Diablo Canyon Independent Safety Committee
July 1, 2017—June 30, 2018

Peter Lam, Chair
Per F. Peterson, Member
Robert J. Budnitz, Member

Approved: October 24, 2018

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This report covers the activities of the Diablo Canyon Independent Safety Committee (DCISC) for the period July 1, 2017 through June 30, 2018. This is the twenty-eighth annual report of the DCISC. The report is presented in two volumes.

**Volume I** includes a report summary and Conclusions and Recommendation ([Executive Summary](#)), a brief introduction and history regarding the DCISC, Committee activities, and documents received by the DCISC during the reporting period ([Section 1.0](#)), DCISC public meetings ([Section 2.0](#)), a review and evaluation of Nuclear Regulatory Commission (NRC) assessments and issues ([Section 3.0](#)), Committee Member and Consultant investigation topical summaries ([Section 4.0](#)), DCPP performance indicators monitored by the DCISC ([Section 5.0](#)), open items being followed by the Committee ([Section 6.0](#)), follow-up of Pacific Gas and Electric (PG&E) actions on previous DCISC recommendations ([Section 7.0](#)), input to the Committee by members of the public ([Section 8.0](#)), and PG&E's response ([Section 9.0](#)) to recommendation in this report. The conclusions and recommendation also appear in **bold face** type throughout the main body of the report with a discussion of the subject involved.

**Volume II** contains a list of documents received by the DCISC, public meeting notices and agendas and minutes, a DCPP operations summary for the reporting period and organization charts ([Exhibit C](#)), full investigation reports by Committee Members and Consultants (Exhibits D1–D9), a record of plant tours by the DCISC ([Exhibit E](#)), the DCISC Open Items List ([Exhibit F](#)), communications and correspondence with members of the public ([Exhibit G](#)), DCISC recommendations and PG&E responses for the previous period ([Exhibit H](#)), the DCISC informational brochure ([Exhibit I](#)), and a glossary of terms ([Exhibit J](#)).

**The DCISC invites questions and comments on this report.**
History and Introduction

The Diablo Canyon Independent Safety Committee (DCISC) was established as part of the June 24, 1988, settlement agreement which arose from the rate proceedings for the Diablo Canyon Nuclear Power Plant (DCPP). The DCISC was formed in late 1989 with the appointments of Committee Members and began formal review activities and meetings on January 1, 1990. The original settlement agreement (D.88-12-083) was terminated by the California Public Utilities Commission (CPUC) in its decision to open the state electricity markets to competition on January 1, 1998; however, under the provisions of the Commission’s Decisions 97-05-088, issued on May 21, 1997, and 04-05-055, issued on May 27, 2004, the DCISC will continue to function and fulfill its responsibilities as established under the terms of the 1988 settlement agreement.

The original settlement agreement provided for a three-member Independent Safety Committee for the purpose of “reviewing and assessing the safety of operations of DCPP”. The members serve three-year staggered terms and remain on the DCISC until a new appointment or their reappointment is made. To fill an expired term or a vacancy, the CPUC issues a public notice soliciting applications from interested persons or nominations by others of prospective candidates. Under the revised process in accordance with the restated charter, candidates are selected by the CPUC from the applications plus the incumbent, if willing to serve.

The candidates must be “persons with knowledge, background and experience in the field of nuclear power facilities and nuclear safety issues.” From the list of candidates, the new or returning member is appointed by the Governor of California, the Attorney General of California or the Chairperson of the California Energy Commission (CEC), whichever made the original appointment.

On May 27, 2004, the CPUC issued Decision 04-05-055. In its decision, the CPUC changed the nomination procedures by eliminating from the process the participation of PG&E and the Dean of Engineering at the University of California at Berkeley; modified the requirements for membership on the DCISC to add “knowledge and background in nuclear safety issues” to the “experience in the field of nuclear power facilities” and modified the DCISC’s mandate to require it to undertake public outreach in the community. The Decision concluded the DCISC
should retain the discretion to determine how best to accomplish its mandate and that the DCISC shall otherwise continue to exist and to operate and continued funding through cost-of-service rates. To implement this directive the DCISC has continued to expand its public outreach as described in Section 8.0 Public Input and Outreach and continues to consider additional outreach activities.

On January 25, 2007, the CPUC issued Decision 07-01-028. The CPUC had previously adopted new practices and expectations for the DCISC without concurrently restating the Committee’s charter to reflect the changes. In its decision, the CPUC granted the DCISC application for authority to restate its charter including the incorporation into the Restated Charter of several terms, conditions, changes and clarifications necessitated by, and previously authorized by, the CPUC which govern the composition, responsibilities and operations of the Committee. In its decision, the CPUC found the Restated Charter to be in the public’s interest as it reflects the latest authority and obligations of the DCISC. The Committee’s application was unopposed. On June 21, 2016, PG&E announced a Joint Proposal with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Works Local 1245, Coalition of California Utility Employees, and the Alliance for Nuclear Responsibility to retire DCPP at the expiration of the current operating licenses. On August 11, 2016, PG&E filed an Application with the California Public Utilities Commission (CPUC) for approval of the retirement of DCPP, implementation of the Joint Proposal, and for recovery of associated costs through proposed ratemaking.

Under the Joint Proposal, PG&E will continue to operate DCPP at current levels through the current license periods. If the Application is approved by the CPUC, in 2024 PG&E would retire Unit-1, and in 2025 would retire Unit-2. To replace DCPP power, the Joint Proposal provides specific greenhouse gas (GHG)-free procurement requirements beginning in 2018 and continuing through 2031. The Committee will follow developments and activities at DCPP to assure continued nuclear safety during the remaining years of operation, if the joint proposal is adopted.

The Committee Members during this period were as follows:

On October 10, 2007, Robert J. Budnitz, Ph.D. was appointed by California Attorney General Edmund G. Brown Jr. to a term on the Committee expiring June 30, 2010. On April 15, 2010, Attorney General Brown announced the reappointment of Dr. Budnitz to a second three-year term on the Committee commencing July 1, 2010 through June 30, 2013. On June 27, 2013, the CPUC ratified its President’s selection of Dr. Budnitz as one of two candidates for appointment by Attorney General Kamala Harris to serve a three-year term on the DCISC for the period July 1, 2013 to June 30, 2016. During that period, Dr. Budnitz continued to serve as a member of the Committee pending his reappointment or replacement. On July 7, 2016, Attorney General Harris announced the reappointment of Dr. Budnitz to serve a three-year term on the
Committee commencing July 1, 2016 through June 30, 2019. Dr. Budnitz served as the DCISC Vice-Chair for this report period, July 1, 2017 through June 30, 2018.

On June 3, 2009, Peter Lam, Ph.D., was appointed by Chair Karen Douglas, J.D., of the California Energy Commission (CEC) to a three-year term on the Committee commencing July 1, 2009 through June 30, 2012. On July 12, 2012, CEC Chair Robert B. Weisenmiller, Ph.D., announced his reappointment of Dr. Lam to a second three-year term on the Committee commencing July 1, 2012 through June 30, 2015. Dr. Lam was reappointed by Dr. Weisenmiller to third three-year term on the Committee commencing July 1, 2015 and ending on June 30, 2018, and subsequently on June 6, 2018, Dr. Weisenmiller announced Dr. Lam’s appointment to a fourth three-year term on the Committee beginning on July 1, 2018 and ending on June 30, 2021. Dr. Lam served as DCISC Chair during this report period, July 1, 2017 through June 30, 2018.


Overview of Activities during the Current Period

The DCISC held three public meetings in the vicinity of the Diablo Canyon Power Plant and one public meeting at Berkeley, CA on the following dates:

- October 18–19, 2017, Avila Beach, CA—Public Meeting
- February 7–8, 2018, Avila Beach, CA—Public Meeting and Public Plant Tour
- May 22, 2018, Berkeley, CA—Public Meeting
- June 27–28, 2018, Avila Beach, CA—Public Meeting and Public Plant Tour

The Committee regularly performs the following activities:

- Three two-day public meetings each year in the vicinity of the plant
- Three tours of the Diablo Canyon Nuclear Power Plant each year with members of the public held in conjunction with the three public meetings
- Numerous fact-finding visits by individual Committee Members and Consultants to assess issues, review plant programs and activities, and
Interview PG&E personnel

- Reviews of technical documents received from PG&E, the Nuclear Regulatory Commission, various state and local agencies, and other interested parties. The DCISC requests, and PG&E routinely provides copies of essentially all relevant documents generated by PG&E, the NRC, and other parties.

- Visits by the DCISC Members and legal counsel to offices of the CPUC and appointing officials (the Governor of California, California Attorney General and California Energy Commission) to update them on DCISC activities

- Use of regular part-time technical consultants to assist the DCISC to perform assessments and reviews

- Use of legal counsel to advise the Committee on its activities

- Use of expert consultants, as needed

**Technical Consultants & Legal Counsel**

The Restated Charter provides the Committee may contract for services including the services of consultants and experts to assist the Committee in its safety review. The DCISC Members are assisted in their important work by technical consultants and legal counsel. For this report period those persons were:

Technical Consultant: Mr. R. Ferman Wardell, a Registered Professional Engineer, holds both Bachelor and Master of Science degrees in Nuclear Engineering from North Carolina State University. He is a 50-year veteran of the nuclear power industry, having been directly involved in design, quality assurance, operation and nuclear safety oversight activities for Duke Energy Corporation’s seven nuclear units. He was formerly Executive Assistant to the Chairman and CEO at Duke Energy. Mr. Wardell has been a Consultant to the DCISC since 1992.

Technical Consultant: Mr. Richard D. McWhorter, Jr., holds a Bachelor of Science in Mechanical Engineering from the United States Naval Academy. He is a 30-year veteran of the nuclear power industry. He served for ten years as a division officer and department head in the Navy’s nuclear submarine program in which he was responsible for the operation of his submarine’s nuclear power plant. Mr. McWhorter then served the U. S. Nuclear Regulatory Commission for ten years first as an Operator Licensing Examiner and then as Senior Resident Inspector at North Anna Power Station. He then was employed for two years as a Systems Engineering Manager for Dominion Virginia Power at North Anna Power Station. For ten years, Mr. McWhorter was employed at Old Dominion Electric Cooperative where he served as Vice President of Operations and Asset Management. Mr. McWhorter has been a Consultant to the DCISC since 2016.

Legal Counsel: Robert R. Wellington, Esq. has been Legal Counsel for the DCISC since its organization in 1989. He is a graduate of Stanford University and the University of California (Hastings) Law School. For over 20 years his practice has...
been limited to representing several cities, regional wastewater and solid waste districts and other public agencies, including the DCISC. He advises the DCISC with regard to its legal and administrative matters.

Assistant Legal Counsel Robert Rathie, Esq. has been associated with the Committee through his work with the Wellington Law Offices since 1993. He obtained a bachelor’s degree in Social Science and History from Chico State University in 1972 and served for 15 years in the U.S. Merchant Marine as chief purser on board passenger and freight vessels in foreign trade. He received his Juris Doctor degree from Monterey College of Law in 1993. He is a member of the State Bar of California and the Monterey County Bar Association. He assists Mr. Wellington in advising the DCISC with regard to its legal and administrative matters.

The DCISC issues a report for each reporting year, which runs from July 1 to June 30. The report is approved by the Committee Members at the fall public meeting following the end of the reporting period. The first six-month interim report and subsequent twenty-six annual reports covered the periods January 1, 1990 – June 30, 2017.

This twenty-eighth annual report covers the period July 1, 2017—June 30, 2018.

The technical items covered during its public meetings were selected by the DCISC based on the DCISC’s own priorities concerning which technical issues are important to cover. PG&E then responds by providing presentations and experts to participate in the public meetings as requested. The following significant items were reviewed:

- Performance During the 20th Refueling Outage
- DCPP Joint Proposal
- DCPP Decommissioning Plan
- Spent Fuel Storage Technical Issues
- Status of NRC Performance Indicators
- Overview of Regulations and PG&E Programs for the Classification of Structures, Systems and Components
- Status of Completing the Transition to NFPA-805
- Results of 2017 Operating Plan and Key Elements of the 2018 Operating Plan
- Handling & Disposal of Damaged Spent Fuel
- Overview of FLEX Training
- Summary of NRC Evaluation of DCPP Tsunami
- Capital Project Planning
DCPP Employee Retention Plan

- NRC Matters

- Seismic Probabilistic Risk Assessment Project and Tsunami Hazard Analysis Results • Committee Discussion of Post-Shutdown Role Matrix and Ad Hoc Decommissioning Consultant

Individual Committee Members and consultants reviewed many other items in nine fact-finding visits, inspections and tours at DCPP. The DCISC keeps track of past, current and future items for review in its Open Items List (Section 6.0 and Volume II, Exhibit F).

A DCISC Member visited officials from the California Energy Commission to provide updates on DCISC activities, to discuss agency concerns and comments, and to provide copies of the Committee’s Annual Report.

Public input and questions were received at the public meetings, and by telephone, letter, and e-mail. Members of the public spoke at each of the four DCISC public meetings held during this reporting period. The DCISC has responded to all of their questions and requests during this period.

**Overall Conclusion**

The DCISC concludes that PG&E operated DCPP safely during the period July 1, 2017—June 30, 2018.

**Specific Conclusions**

Based on its activities, the DCISC has the following specific conclusions from the major review topics examined during the current reporting period (references to sections of this report are shown in parentheses). Conclusions are based on, but may vary from, information contained in Committee Fact-finding Reports in Exhibit D in Volume 2 of this report.

1. The DCISC received regular reports on the Nuclear Regulatory Commission (NRC) Performance Indicators, DCPP License Event Reports (LERs) sent to NRC, and NRC Inspection Reports and Enforcement Actions (violations) at each of its Public Meetings as well as copies of these documents throughout the reporting period. The DCISC investigated selected reports at its fact-finding meetings. The number of LERs has decreased significantly and was one during this period. This is the same as the previous period.

The Committee notes that, although the NRC concluded that DCPP operated acceptably, it identified 10 Non-cited Violations of “very low safety significance.” This appears to be an improvement from most previous periods.
The DCISC will continue to review DCPP’s NRC regulatory performance during the next reporting period, paying particular attention to the number and significance of DCPP violations and LERs. (3.6)

2. A Chemistry technician correctly followed proper Chemistry, Radiation Protection and Human Performance practices in obtaining the pressurized sample. The plant and Chemistry Laboratories appeared orderly and clean. DCPP appears to be appropriately planning for operator staffing, taking into account potential early and normal retirements, resignations, and the possible effects on staffing of the Joint Proposal, which requires plant shutdown in 2025. Plans to observe an Auxiliary Feed Water valve surveillance test were cancelled due to a delay in Maintenance valve preparation. The system components and plant itself appeared to be in good condition. External organizations noted areas for improvement in the Operations Department, and DCPP has moved to implement appropriate corrective actions and include those actions in the Department Excellence Plan. DCPP had not been requested by the California Independent System Operator to implement any procedures for load following. An observation of an operator on data recording rounds in an Emergency Diesel Generator room was positive in that the operator stressed personnel safety as well as good human performance practices. The DCPP Reactivity Management Program was satisfactorily designed and implemented with tight controls and Green (good) performance measures. (4.1.3)

3. DCPP Maintenance performance is generally satisfactory with initiatives for improvement in selected areas, such as Foreign Material Exclusion and the work order process. Maintenance is beginning to use electronic work orders to streamline the work order process and reduce paper. On-line maintenance is performed effectively with emphasis on managing risk caused by taking equipment out of service while operating. (4.2.3)

4. The DCPP Engineering Program appeared to be functioning satisfactorily with improvements being targeted in its Excellence Plan. (4.3.3)

5. Although the DCISC did not review human performance, per se, during this reporting period, it has found DCPP human performance satisfactory in the previous period and did not observe any indicators during this period to indicate otherwise. (4.4.3)

6. DCPP’s nuclear safety culture appears strong according to its Nuclear Safety Dashboard and from early results of its latest Nuclear Safety Culture Survey. (4.5.3)

7. DCPP’s Performance Improvement Department, along with its
Performance Improvement Coordinators appeared to be an effective asset for plant problem solving and continuous improvement. The Fact-finding Team’s observation of one Corrective Action Review Board meeting was hindered by the fact that a quorum was not present for the meeting. A Corrective Action Program Notification was submitted for the lack of a quorum, and those present at the meeting made a productive use of the time. A second Corrective Action Review Board meeting was performed efficiently and effectively. It was evident that members were prepared, facilitated open and effective discussion, and made clear decisions and action assignments. The DCPP Performance Improvement Department effectively reviews information from the Corrective Action Program to identify adverse trends and initiate appropriate corrective actions. DCPP plans for augmented leadership engagement in Performance Improvement processes appeared appropriate. DCPP routinely collects data from plant equipment, and such data can be manually collected and analyzed on an as needed basis. Possible future uses of advanced or automated equipment data monitoring systems are being reviewed, but no plans currently exist for the installation of such systems. (4.6.3)

8. Although the DCISC did not review DCPP Emergency Preparedness in the current reporting period (2017–2018), it has concluded in previous reporting periods that the program was satisfactory. (4.7.3)

9. Probabilistic Risk Assessment is an effective tool in understanding and improving nuclear reactor safety. PG&E has established an effective PRA Program staffed by experienced personnel and utilizes PRA to the full extent in analyzing and operating DCPP safely. (4.8.3)

10. The 2017 Institute of Nuclear Power Operations (INPO) evaluation of DCPP resulted in a positive assessment along with several Areas for Improvement. DCPP has made plans to address each Area for Improvement. (4.9.3)

11. The DCPP Radiological Environmental Monitoring Program appeared satisfactory in monitoring and measuring radioactivity in the environment surrounding DCPP. There were no abnormal levels of radioactivity detected. DCPP identified the cause of increased radiation levels in Unit 1 containment and initiated appropriate corrective actions. (4.10.3)

12. The DCPP Quality Verification Audit Program appeared to be effectively designed and implemented. DCPP’s Software Quality Assurance Program appeared to be comprehensive and designed to assure computer software that could affect the safety of plant operations was developed, maintained, operated, and changed in an appropriately controlled fashion. DCPP Quality Verification’s assessment of Refueling Outage 2R20 was thorough and
comprehensive. \( (4.11.3) \)

13. DCPP nuclear fuel has performed well for many years with no leaks or failures. DCPP’s programs for assuring nuclear fuel integrity appear effective. \( (4.12.3) \)

14. During the current period, the DCISC did not review any equipment reliability-related topics, per se, at Fact-finding Meetings, although it did monitor equipment reliability via such measures as forced outage rate, maintenance department performance, etc. The DCISC plans to review equipment reliability during the next reporting period. \( (4.13.3) \)

15. The DCPP Time in the Field/Engagement and Coaching Program, a prescriptive observation program, appeared satisfactory for providing management expectations on human performance and worker safety practices to workers as well as collecting worker input. The DCPP Employee Concerns Program appeared appropriate for receiving and investigating employee concerns in a confidential manner. During 2017, as in past years, there were no significant employee concerns regarding nuclear safety. DCPP successfully accomplished most of the objectives contained in its 2017 Operating Plan. The 2018 Operating Plan contained appropriate focus areas with initiatives and key metrics. \( (4.14.3) \)

16. DCPP has dealt effectively with most equipment and system problems and is focused on improving system health. DCPP’s Plant Health Committee has been improved to focus more on system/component health and meets more frequently, and overall system health has improved. \( (4.15.3) \)

17. The DCPP Steam Generators (SGs) have been performing as expected since their replacement in 2008 and 2009. The most important SG parameter, tube integrity, has been shown to meet all criteria as a result of visual inspection and Eddy Current testing. \( (4.16.3) \)

18. DCPP Performance in Refueling Outages 1R20 and 2R20 was excellent as it met or exceeded most goals. DCPP Quality Verification issued a Finding on the Seismic Induced System Interaction Program and a recommendation for improvement in this area was implemented via procedure revisions. DCISC tours of 2R20 work areas found that the areas appeared to be well maintained and activities were proceeding in an organized manner. \( (4.17.3) \)

19. DCPP has completed implementation of its Cybersecurity Program to meet all current NRC requirements. The program appears to be well designed and implemented, and the program is transitioning to become a permanent, ongoing station program. The DCISC should continue to review the Cybersecurity Program every two to three years. \( (4.18.3) \)
20. DCPP continues to manage its spent fuel satisfactorily in both the Spent Fuel Pool (SFP) and the Independent Spent Fuel Storage Installation (ISFSI). As part of its decommissioning activities, DCPP is investigating accelerated movement of spent fuel from the SFP to the ISFSI. DCPP is continuing to participate in industry initiatives to address the issue of possible corrosion of Multi-Purpose Canisters (MPCs) stored at the Independent Spent Fuel Storage Installation (ISFSI). As a part of ISFSI relicensing, DCPP will need to develop an aging management plan to include MPC inspections. The Cask Transfer Facility located at the ISFSI provides options for more detailed inspections or repairs to an MPC should such be necessary in the future after the SFPs are no longer available. (4.19.3)

21. The Nuclear Regulatory Commission in its December 17, 2017 final “Staff Assessment (SA) of the FHRR (Flood Hazard Reevaluation Report) concluded that DCPP’s analyses “...are an appropriate representation of the reevaluated tsunami hazard at the Diablo Canyon site.” This concludes NRC’s review of the DCPP flood hazard. (4.20.3)

22. DCPP is making good progress in repairing and/or replacing its impaired fire doors. At one point, DCPP reported that it had reduced to zero the number of impaired fire doors and the number of roving fire watches used for compensatory actions for impaired fire doors. DCPP has satisfactorily completed its implementation of NFPA-805. (4.21.3)

23. DCPP FLEX training, training materials, and instruction for Licensed Operators were satisfactory. (4.22.3)

24. DCPP has successfully implemented its FLEX program of portable equipment and quick-connect connections to mitigate Fukushima-like events, which result in loss of AC power and cooling water. The plant is using FLEX in one application during refueling outages to reduce plant safety risk and is considering other similar applications. The DCISC will review new applications for FLEX equipment when they are identified. FLEX training appeared satisfactory. (4.23.3)

25. DCPP’s plan for decommissioning continues to be developed. Current activities include establishing the DCPP Decommissioning Engagement Panel, preparing a detailed cost estimate, and obtaining the necessary funds for decommissioning to a green field site. DCPP appears to be appropriately managing Employee Retention Programs, taking into account the requirements of the Joint Proposal as modified by the CPUC. The review process and selection of capital projects to be cancelled with regard to the Joint Proposal 2025 plant shutdown were comprehensive and appeared to be satisfactory in maintaining plant safety and reliability. (4.24.3)
Concerns:

Concerns are items, which, while not necessarily warranting recommendations, need enhanced continuing Committee review and scrutiny, or attention by PG&E. Concerns are monitored more actively and frequently by the Committee than other items. DCISC’s concern follows:

- PG&E entered into an agreement, the Joint Proposal, to close DCPP at the end of its original operating license (2024 for Unit 1 and 2025 for Unit 2). As a result, the DCISC has specific interest/concerns in two areas and will follow them closely:
  
  a. Retention of qualified, experienced personnel necessary to operate DCPP at an appropriate level of safety
  
  b. Adequate spending on programs and equipment to preserve an appropriate level of nuclear safety

Recommendations:

None
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3.4 Annual Radiological Environmental Monitoring Report
3.5 Control Room Ventilation System
3.6 Direct Current (DC) Power System
3.7 Plant Health Committee
3.8 Management Observation Program
3.9 Nuclear Fuel Performance
3.10 Independent Spent Fuel Storage Installation
3.11 DCPP Safety Culture
3.12 Use of FLEX Equipment to Reduce Plant Risk
3.13 Cyber Security

4.0 Conclusions
5.0 Recommendations
6.0 References

D.2 Report on Fact Finding Meeting at DCPP on August 9–10, 2017

1.0 Summary
2.0 Introduction
3.0 Discussion

3.1 Meet with Senior NRC Resident Inspector
3.2 Containment In-Service Inspection
3.3 Radioactive Waste Processing Systems
3.4 DCISC Member Meet with DCPP Officer
3.5 Steam Generator Health
3.6 Equipment Qualification Process
3.7 Engineering Excellence Plan
3.8 Observe Chemistry Sampling Process
3.9 Operator Staffing Adequacy
3.10 Independent Spent Fuel Storage Installation (ISFSI) Loading Campai

4.0 Conclusions
5.0 Recommendations
6.0 References

D.3 Report on Fact Finding Meeting at DCPP on September 6–7, 2017

1.0 Summary
2.0 Introduction
3.0 Discussion

3.1 Plant Health Committee
3.2 Non-seismic Probabilistic Risk Assessment Programs
3.3 National Fire Protection Association (NFPA) 805 Program
3.4 Maintenance Department Performance
3.5 Foreign Material Exclusion Program
3.6 Institute for Nuclear Power Operations Evaluation Preparations
3.7 Local Intense Precipitation Analysis
3.8 Tsunami Hazard Analysis
3.9 Meet with NRC Senior Resident Inspector
3.10 Seismic Probabilistic Risk Assessment Program
3.11 Auxiliary Saltwater System Health
3.12 DCISC Member Meet with DCPP Officer

4.0 Conclusions
5.0 Recommendations
6.0 References

D.4 Report on Fact-finding Meeting at DCPP on October 30–31, 2017

1.0 Summary
2.0 Introduction
3.0 Discussion

3.1 State of the Plant Update
3.2 Performance During the 20th Refueling Outage
3.3 Update on the Joint Proposal
3.4 Update on the Decommissioning Plan
3.5 Update on Spent Fuel Storage Technical Issues
3.6 Update on the Status of NRC Performance Indicators
3.7 Overview of Regulations and PG&E Programs for the Classification of Structures, Systems and Component
3.8 Status of Completing the Transition to NFPA-805

4.0 Conclusions
5.0 Recommendations
6.0 References
D.5 **Report on Fact Finding Meeting at DCPP on November 14–15, 2017**

1.0 Summary

2.0 Introduction

3.0 Discussion

3.1 Observe Auxiliary Feedwater Pump Control Valve Periodic Test
3.2 Observe FLEX Training for Licensed Operators
3.3 Meeting with Three Performance Improvement Coordinators
3.4 Results of August 2017 INPO (Institute of Nuclear Power Operations) Evaluation
3.5 Meeting with NRC Senior Resident Inspector
3.6 Plant Protection System Review with System Engineer
3.7 Meeting with DCPP Station Director
3.8 Fire Doors Status
3.9 NRC 95001 Inspection of Residual Heat Removal System Valve Operator White Finding
3.10 NRC 2017 Inspection Report for 2010 Event

4.0 Conclusions

5.0 Recommendations

6.0 References

D.6 **Report on Fact Finding Meeting at DCPP on December 13–14, 2017**

1.0 Summary

2.0 Introduction

3.0 Discussion

3.1 Spent Fuel Inspections
3.2 Meet with NRC Senior Resident Inspector
3.3 Unit 1 Increased Radiation Levels
3.4 Emergency Diesel Generator System Health
3.5 Observe Corrective Action Review Board Meeting
3.6 Operations Department Performance
3.7 230kV/500kV Switchyards and Offsite Power Lines Health
3.8 Use of Portable Electronic Devices in the Power Block
3.9 Electronic Work Management System
3.10 Management of Data in the Performance Improvement Program
3.11 DCISC Member Meet with DCPP Officer

4.0 Conclusions

5.0 Recommendations
6.0 References

D.7 **Report on Fact Finding Meeting at DCPP on January 17–18, 2018**

1.0 Summary

2.0 Introduction

3.0 Discussion

   3.1 Meet with NRC Senior Resident Inspector
   3.2 Fire Protection Program and System Health
   3.3 Independent Spent Fuel Storage Installation (ISFSI) Operations
   3.4 Auxiliary Building Ventilation System Health
   3.5 Centrifugal Charging Pump System Health
   3.6 DCISC Member Discussion with DCPP Senior Director of Nuclear Services
   3.7 Reactor Vessel Material Surveillance Program
   3.8 Operability Determination Program
   3.9 Status of the Joint Proposal
   3.10 Employee Concerns Program

4.0 Conclusions

5.0 Recommendations

6.0 References

D.8 **Report on Fact Finding Meeting at DCPP on March 7–8, 2018**

1.0 Summary

2.0 Introduction

3.0 Discussion

   3.1 Meet with NRC Senior Resident Inspector
   3.2 Software Quality Assurance Programs
   3.3 Non-Containment Outage Work Tour
   3.4 Nitrogen Leak in Containment Event
   3.5 2018 Operating Plan
   3.6 Containment Outage Work Tour
   3.7 Decommissioning Planning
   3.8 Employee Retention Programs
   3.9 Meet with DCPP Officer
   3.10 Human Performance Data Inclusion into Probabilistic Risk Assessments

4.0 Conclusions

5.0 Recommendations
D.9 **Report on Fact Finding Meeting at DCPP on April 17–18, 2018**

1.0 Summary
2.0 Introduction
3.0 Discussion
   3.1 4kV System Review and Walkdown with System Engineer
   3.2 Refueling Outage 2R20 Results
   3.3 Leadership Engagement in the Performance Improvement Processes
   3.4 On-line Maintenance
   3.5 Reactivity Management
   3.6 Boric Acid Corrosion Control
   3.7 Meeting with NRC Senior Resident Inspector
   3.8 Meeting with Jan Nimick, Senior Director Nuclear Services
   3.9 Control Room Ventilation System 10 Quality Verification Assessment of Refueling Outage 2R20 Activities
4.0 Conclusions
5.0 Recommendations
6.0 References

D.10 **Report on Fact Finding Meeting at DCPP on May 2–3, 2018**

1.0 Summary
2.0 Introduction
3.0 Discussion
   3.1 Meet with NRC Resident Inspector
   3.2 Workplace Seismic Safety
   3.3 Equipment Data Collection, Trending and Retention
   3.4 System Engineering Programs
   3.5 Observe Corrective Action Review Board Meeting
   3.6 Commercial Grade Dedication Program
   3.7 Cybersecurity Program
   3.8 Spent Fuel Pool Systems
   3.9 Meet with DCPP Director
   3.10 Large Transformers
4.0 Conclusions
5.0 Recommendations
6.0 References
E. Record of DCISC Tours of DCPP
F. DCISC Open Items List
G. DCISC Public Contacts
   G.1 DCISC Telephone/Correspondence Log
   G.2 Documents Received by the DCISC [252 page PDF]
   G.3 Comments Received at Public Meetings
H. Past DCISC Recommendations and PG&E Responses
I. DCISC Informational Brochure
J. Glossary of Terms
Dear Dr. Lam:


We are pleased that the DCISC has once again concluded that PG&E operated Diablo Canyon Power Plant (DCPP) safely and has no recommendation during this report period.

As you are aware, operating the plant conservatively to protect public health and safety is our highest priority, and we will continue to ensure that we fulfill this commitment.
We welcome the DCISC independent review and oversight, which contributes to the continued safe operation of DCPP.

Sincerely,

James M. Welsch
Vice President, Nuclear Generation and Chief Nuclear Officer

cc/enc:

   Dr. Robert J. Budnitz
   Dr. Per F. Peterson
   Richard McWhorter
   Robert W. Rathie
   Ferman Wardell
   Robert R. Wellington
   Cary D. Harbor
For more information about DCISC contact:

Diablo Canyon Independent Safety Committee
Office of the Legal Counsel
857 Cass Street, Suite D
Monterey, California 93940

Telephone:

In California call 800-439-4688
Outside of California call 831-647-1044

Send E-mail to: dcsafety@dcisc.org
1.0 Introduction, DCISC 28th Annual Report–July 1, 2017 thru June 30, 2018

1.1 Formation of the Independent Safety Committee
1.2 Appointment of Committee Members
1.3 DCISC Public Meetings and Plant Tours
1.4 Committee Member Site Inspection Tours and Fact-finding meetings
1.5 Visits by DCISC Members to California State Agencies
1.6 CPUC Decision to Retire Diablo Canyon Power Plant (DCPP) at Expiration of Current Operating Licenses
1.7 Documents Provided to the DCISC
1.8 Documentation of DCISC Activities
During its July 1, 2017—June 30, 2018 reporting period, the Diablo Canyon Independent Safety Committee (DCISC) held three two-day Public Meetings in the vicinity of the plant, one one-day public meeting in Berkeley CA, and two public tours of Diablo Canyon Power Plant (DCPP) as part of its public outreach program.

2.1 Public Meetings

During this reporting period the Diablo Canyon Independent Safety Committee (DCISC) heard presentations from PG&E on DCPP activities and from Committee Members and Consultants on Committee activities and provided the opportunity for public input at the following DCISC public meetings:

- **October 18–19, 2017, Avila Beach, CA Public Meeting**
- **February 7–8, 2018, Avila Beach, CA Public Meeting and Public Plant Tour**
- **May 22, 2018, Berkeley, CA Public Meeting**
- **June 27–28, 2018, Avila Beach, CA Public Meeting and Public Plant Tour**

Minutes of the meetings are located in this report as described below. Copies of the Committee’s Annual Reports are located in the Library Reference Department at the California Polytechnic State University at San Luis Obispo, California. Each meeting is streamed live on the internet on www.slospan.org and shown at various later times on one of the local public access television channels.

2.1.1 October 18–19, 2017 Public Meetings

A Notice of Meeting (see Volume II, Exhibit B.1) was published in the local newspaper and was mailed to the media and those persons on the Committee’s service list (see Volume II, Exhibit B.13). The meeting agenda is shown in Volume II, Exhibit B.2 and minutes of the meeting are included in Volume II, Exhibit B.3.

A public tour of DCPP was not conducted during the October 2017 Public Meeting.

2.1.2 February 7–8, 2018 Public Meetings

A Notice of Meeting (see Volume II, Exhibit B.4) was published in the local newspapers, along with several display advertisements, and was mailed to the media and those persons on the Committee's service list (see Volume II, Exhibit
The meeting agenda is shown in Volume II, Exhibit B.5, and minutes of the meeting are included in Volume II, Exhibit B.6. A public tour of DCPP was conducted during the February 7, 2018 Public Meeting. Members of the public were given the opportunity to see much of the plant and hold discussions with DCISC Members and Consultants as well as with PG&E personnel. The public tour is described in Volume I, Section 8.

2.1.3 May 22, 2018 Public Meeting

A Notice of Meeting (see Volume II, Exhibit B.7) was published in the local newspapers, along with several display advertisements, and was mailed to the media and those persons on the Committee’s service list (see Volume II, Exhibit B.13). The meeting agenda is shown in Volume II, Exhibit B.8, and minutes of the meeting are included in Volume II, Exhibit B.9.

2.1.4 June 27–28, 2018 Public Meetings

A Notice of Meeting (see Volume II, Exhibit B.10) was published in the local newspapers, along with several display advertisements, and was mailed to the media and those persons on the Committee’s service list (see Volume II, Exhibit B.13). The meeting agenda is shown in Volume II, Exhibit B.11, and minutes of the meeting are included in Volume II, Exhibit B.12.

A public tour of DCPP was conducted during the June 27, 2018 Public Meeting. Members of the public were given the opportunity to see much of the plant and hold discussions with DCISC Members and Consultants as well as with PG&E personnel. The public tour is described in Volume I, Section 8.
This section of the DCISC Annual Report describes the DCISC review of PG&E’s interface with the US Nuclear Regulatory Commission (NRC). The NRC is the Federal regulatory entity charged with assuring the safety and security of domestic nuclear power plants; by agreement with the State, NRC also performs these functions for the State of California. As regulator, the NRC employs two full-time Resident Inspectors at the plant (and other specialist inspectors at its US headquarters and regional locations), performs and reports on its inspections at DCPP on matters of nuclear safety and security, investigates significant plant events, maintains a set of plant performance indicators, and performs an annual assessment of DCPP regulatory performance which it reports at a public meeting in the plant vicinity. The NRC also must approve significant changes, additions and deletions to plant designs, procedures and Technical Specifications.

PG&E is required to submit routine, periodic reports to the NRC on selected activities and submit special reports when triggered by off-normal plant incidents, events or occurrences.

The DCISC monitors the aforementioned activities and resulting documents in the following ways: (1) receipt and review of correspondence and reports between PG&E and the NRC, (2) on-site review (at fact-finding meetings at the plant) of selected NRC inspections, investigations and reports, (3) meetings with the NRC Resident Inspectors, and (4) presentations by PG&E at DCISC public meetings on NRC matters.

### 3.1 Summary of License Event Reports

#### 3.1.1 Discussion and Required LERs

License Event Reports (LERs) are reports required of the nuclear power plant licensee by Nuclear Regulatory Commission (NRC) regulations when an off-normal event occurs. These events include operations or conditions outside of or in violation of station Technical Specifications (TS), procedures or NRC regulations. Events are to be promptly reported by telephone and by written report within 60 days of the event or initial knowledge of the event. Voluntary LERs are submitted for events, which NRC should know about, or are significant but are not specifically required by NRC. Each of these reports is reviewed in DCISC public meetings and
is mailed to each DCISC Member and Consultant.

The LER is the responsibility of the Licensee, in this case PG&E. Therefore, it is the Licensee who makes the determination of the level of risk or significance to safety of the event. The NRC has a Significance Determination Process, which sets forth its rules for making these determinations; however, events may be complex or may not easily fit the rules. The NRC may concur or it can question or challenge the Licensee’s determination. Discussions or meetings may be required to reach understandings between the parties.

There was one LER reported during this reporting period. This is good performance. The event reported in the LER was a Unit 2 relief valve with leakage resulting in an inoperable Pressurizer Power-Operated Relief Valve.

DCPP reported on this LER at a DCISC public meeting, and the DCISC received the LER in its monthly document package for review. DCPP corrected the problem/event before it submitted the LER.

### 3.1.2 Special Report LERs

There were no special LERs submitted by DCPP during the reporting period.

### 3.1.3 Voluntary LERs

There were no voluntary LERs during this period.

### 3.1.4 Reactor Trips Reported in LERs

During the reporting period, there were no manual or automatic reactor trips reported.

In the past five DCISC reporting periods the following numbers of trips have occurred:

<table>
<thead>
<tr>
<th>Reporting Period</th>
<th>Automatic</th>
<th>Manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013/2014</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2014/2015</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2015/2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2016/2017</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2017/2018</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The number of reactor trips continues to be commendably low.

### 3.1.5 Other Reports to NRC
There were no other significant reports made to NRC.

### 3.1.6 LER Trends

The following table depicts the LER history for DCPP for the last five DCISC reporting periods:

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Number of LERs Submitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/1/13–6/30/14</td>
<td>11</td>
</tr>
<tr>
<td>7/1/14–6/30/15</td>
<td>3</td>
</tr>
<tr>
<td>7/1/15–6/30/16</td>
<td>1</td>
</tr>
<tr>
<td>7/1/16–6/30/17</td>
<td>1</td>
</tr>
<tr>
<td>7/1/17–6/30/18</td>
<td>1</td>
</tr>
</tbody>
</table>

### 3.1.7 DCISC Evaluation and Conclusions

The DCISC recognizes that off-normal events will occur in any large complex system. The goal is to identify them and understand them and take action to minimize the consequences and likelihood of any significant increase in risk. The design basis for nuclear power plants involves defense-in-depth. This recognizes that in real systems, unanticipated events will occur, so protective systems are designed to provide protection even if systems do not always perform as anticipated. For this reason, it is important to investigate events and to share information about them with other plants. DCPP’s performance in regard to LERs was good – one LER.

The DCISC is pleased that DCPP’s operations resulted in only one LER reported during the current (July 1, 2017—June 30, 2018) reporting period. This is good performance.

### 3.2 NRC Inspection Reports and Enforcement Actions

#### 3.2.1 Discussion

The NRC performs inspections at each nuclear power plant. The purpose is to determine how well the plant personnel are implementing and following NRC regulations, plant Technical Specifications, and other requirements, procedures, or commitments. Generally, better regulatory performance results in fewer inspections. NRC meets with the nuclear plant operator twice per year to review plant safety performance under the NRC Reactor Oversight Process (see Section 3.4 below). These meetings are usually public.

Inspections are performed by the plant Resident NRC Inspectors, inspectors from the NRC Region Office, experts from other NRC organizations, and NRC
consultants. The bulk of inspections are routine, announced visits focusing on one or more specific areas of operation such as As Low As Reasonably Achievable (ALARA) radiation dose minimization program, maintenance, chemistry, security, operator examinations, or corrective actions. Special inspections are often made for investigation into previous events affecting plant safety and into special programs, such as NRC Generic Letter 89-10, Testing of Motor-Operated Valves.

Each inspection usually concludes with an exit meeting with licensee personnel, followed by a written inspection report. Inspections can result in the following categories of findings:

- **Unresolved Items** are items for which information is not yet available or awaiting licensee response or action.
- **Deviations** are variances from NRC regulations and/or licensee procedures or other requirements or commitments, which are not as severe as outright violations.
- **Findings** are NRC-identified or self-revealing issues of concern associated with a performance deficiency by the licensee.
- **Concerns**, typically including more than one individual weakness in a single area, are to alert the licensee to situations which could become violations if not corrected.
- **Non-cited Violations** are violations for which NRC credits the licensee for identifying the violation and/or for prompt, effective corrective action completed before or taken during the inspection. These are usually non-recurring, non-safety-significant items.
- **Violations** of NRC regulations, plant Technical Specifications, and other commitments, procedures, etc. require a formal response and corrective action. Violations carry four severity levels as described in Section 3.3, NRC Enforcement Actions and below.

Fewer violations generally mean better performance. Some in the industry believe having a significant number of non-cited violations indicates an effective, aggressive regulatory program, meaning the licensee quickly finds and corrects its own problems/violations rather than the NRC identifying them.

NRC considers items not in compliance with its regulations or with the licensee’s commitments or procedures to be violations. Corrective action is required for all violations. NRC identifies four severity levels for violations.

Level I is the most severe, representing the most significant regulatory concern which usually involves actual or high potential impact on the safety of the public. Level IV violations are more than minor concern and should be corrected so as to prevent a more serious concern. Civil penalties (monetary fines) are usually imposed for Level I and II violations, are considered for Level III, and usually not
imposed for Level IV violations. Most low-level violations are reported as Non-cited Violations provided the licensee places the violation into its corrective action program and provided the violation is not willful or repetitive. NRC has increased its scrutiny of corrective action programs. The categorization of violations in this report follows NRC’s actual classification in each notice of a violation.

NRC issued the following inspection reports during this reporting period:

3. IR 2017-406 August 21, 2017: NRC Material Control and Accounting Program Inspection
5. IR 2017-008 September 27, 2017: NRC Supplemental Inspection Report and Assessment Follow-Up Letter
6. IR 2017-003 October 26, 2017: Third Quarter Integrated Inspection Report
8. IR 2017-007 January 24, 2018: NRC Inspection of Implementing Strategies and Emergency Preparedness Plans to Address Fukushima Event
11. IR 2018-001 April 24, 2018: First Quarter 2018 Integrated Inspection Report
12. IR 2018-008 June 8, 2018: NRC Biennial Problem Identification and Resolution Inspection Report

These inspection reports (plus assessment letter) are typical of recent previous periods for DCPP. Cross-cutting performance appears good with no cross-cutting themes identified by NRC.

3.2.2 DCISC Review of Trends of Violations and NRC-Identified Issues

Non-Cited Violations (NCVs) are usually items of very low safety significance (called “Green”). All NCVs are entered into the DCPP Correction Action Program (CAP), and a Notification is issued. Notifications are reports used to identify and document plant problems in the CAP. The NCVs are reviewed for their safety significance, and cross-cutting issues. DCPP will perform an Apparent Cause Evaluation (ACE) for the NCVs as determined by plant director-level management.

**NRC Non-Cited Violations (NCVs)**

NCVs are violations of NRC regulations, which have very low safety significance,
and, as such, are not “cited” as violations by NRC.

NRC violations are included in the DCPP CAP Trending Program and are not trended separately. An Event Trend Record (ETR) is issued for each NCV associated with an AT-NCV AR (A-type Non-Cited Violation Action Request). Periodic evaluation of the ETRs is undertaken to identify adverse trends.

NRC issued the following nine Non-Cited Violations and one Finding during the reporting period:

(Note: the following terms are used:

- **NCV = NRC Non-Cited Violation**
- **SLIV = NRC Safety Level IV Violation**
- **FIN = NRC Finding**
- **Green = NRC considers very low safety significance**
- **PG&E-Identified = violation was first found by PG&E and reported to NRC**
- **C-C Aspect = NRC cross-cutting category for the violation**)

1. NCV (Green) – NRC-identified failure to properly expand weld inspection scope (Cross-cutting Aspect H.3, Change Management)
2. NCV (Green) – Self-revealing failure to follow equipment clearance procedures resulting in momentary loss of component cooling water to one of the two in-service heat exchangers. (Cross-cutting Aspect H.14, Conservative Bias)
3. NCV (Severity Level IV) – Failure to Conduct Requires Biennial Medical Examination within two years. (No Cross-cutting Aspect)
4. NCV (Severity Level IV) – Failure to Notify the NRC of a Permanent Medical Condition within 30 Days. (No Cross-cutting Aspect)
5. NCV (Green) – NRC-identified failure to properly identify and correct relief valve leakage in a timely manner. (Cross-cutting Aspect H.13, Consistent Process).
6. NCV (Green) – Failure to provide adequate procedural guidance for operating the Nitrogen Supply System. (No Cross-cutting Aspect).
7. NCV (Green) – Failure to follow maintenance procedure resulting in temporary loss of source range nuclear instrumentation. (Cross-cutting Aspect H.5, Work Management)
8. Finding (Green) – Failure to follow procedural requirements regarding Operating Experience review, which may have prevented a similar event occurring at DCPP. (No Cross-cutting Aspect)
9. NCV (Green) – Failure to ensure materials intended for installation in Diesel
Generator air inlet boot seal conformed to procurement requirements or, if they did not, were adequately controlled and evaluated. (No Cross-cutting Aspect)

10. NCV (Green) – failed to identify a trouble light lit on the Emergency Diesel Generator 1-1 Cardox fire protection system panel. The light, which had been lit for 2 weeks before being identified by the NRC, indicated a condition that would have prevented the automatic fire suppression system from effectively suppressing a fire in the DG 1-1 room. (Cross-cutting Aspect H.14, Problem Identification and Resolution)

<table>
<thead>
<tr>
<th>DCISC Reporting Period</th>
<th>Number of Inspections</th>
<th>Violation Severity Level</th>
<th>Violations Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/1/13–6/30/14</td>
<td>5</td>
<td>–</td>
<td>11</td>
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<tr>
<td>7/1/14–6/30/15</td>
<td>10</td>
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<tr>
<td>7/1/15–6/30/16</td>
<td>7</td>
<td>–</td>
<td>19</td>
</tr>
<tr>
<td>7/1/16–6/30/17</td>
<td>10</td>
<td>1*</td>
<td>8</td>
</tr>
<tr>
<td>7/1/17–6/30/18</td>
<td>10</td>
<td>–</td>
<td>9</td>
</tr>
</tbody>
</table>

* Classified as “White” by NRC

There were no NCVs in the last four quarters that had four or more common Cross-cutting Aspects. This means that the NRC does not need to closely monitor any particular Cross-cutting aspects, and that DCPP is not close to receiving an NRC Substantive Cross-cutting Issue.

3.2.3 DCISC Evaluation and Conclusions

The numbers of NRC inspections in prior periods had been fairly consistent at about ten, which is the same for this period. This relatively low number is a direct result of good regulatory performance as measured primarily by NRC Performance Indicators (see Section 3.5 below). The number of non-cited violations has held steady at seven in this and the previous period, which is a positive step, although not a trend. The DCISC will continue to follow NRC violations and trends.

The one “White” violation in the previous report period was more serious than the other “Non-cited” violations and considered by NRC to be of low-to-moderate risk.

The DCISC received reports and heard presentations by DCPP on each non-cited violation and finding at its public meetings and has reviewed each cited violation and DCPP’s corrective actions, where applicable. DCPP corrective actions appeared adequate. There were no individual items of significance to warrant DCISC recommendations or actions.
All of DCPP’s nine NCVs and one Finding were classified by the NRC as having “very low safety significance (Green).” The one prior period Level III White violation, classified by the NRC as of “low-to-moderate risk significant,” was addressed by DCPP and has been resolved through a re-inspection by the NRC. The DCISC reviewed the corrective actions and concluded they were satisfactory.

3.3 NRC Performance Evaluations

The Nuclear Regulatory Commission (NRC) inspection, assessment, and enforcement programs for commercial nuclear power plants takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC-licensed plants.

The NRC Revised Reactor Oversight Process (RROP) monitors licensee performance in three broad areas (called strategic performance areas):

1. Reactor Safety (avoiding accidents and reducing the consequences of accidents if they occur)
2. Radiation Safety (protecting plant employees and the public during routine operations)
3. Safeguards (protecting the plant against sabotage or other security threats).

The process focuses on licensee performance within each of “Seven Cornerstones” of safety in the three areas:

<table>
<thead>
<tr>
<th>Reactor Safety</th>
<th>Radiation Safety</th>
<th>Safeguards</th>
</tr>
</thead>
<tbody>
<tr>
<td>•Initiating Events</td>
<td>•Occupational</td>
<td>•Physical Protection</td>
</tr>
<tr>
<td>•Mitigating Systems</td>
<td>•Public</td>
<td></td>
</tr>
<tr>
<td>•Barrier Integrity</td>
<td></td>
<td></td>
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<tr>
<td>•Emergency Preparedness</td>
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</tr>
</tbody>
</table>

To monitor these Seven Cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations:

1. Inspections
2. Performance Indicators

Inspection findings are evaluated according to their potential significance for safety, using the significance determination process, and assigned colors of GREEN, WHITE, YELLOW, or RED.

- GREEN findings are indicative of issues that, while they may not be desirable,
represent very low safety significance.

- WHITE findings indicate issues that are of low to moderate safety significance.
- YELLOW findings are issues that are of substantial safety significance.
- RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance Indicator data are compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, or RED.

- GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections.
- WHITE corresponds to performance that may result in increased NRC oversight at the Resident Inspector or Regional level.
- YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight at the NRC Region level.
- RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety. NRC response at the Agency level could include Public Meeting, utility-developed performance improvement plan, and/or special inspection team.

The assessment process integrates performance indicators and inspections so the agency can reach objective conclusions regarding overall plant performance. The NRC uses an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee’s performance. The NRC’s actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee’s safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

The NRC Performance Indicators (PIs) for DCPP through the second quarter are depicted in Table 3.1 at the back of Section 3.0.

The NRC inspection program uses a risk-informed approach to select areas of the plant to inspect within each cornerstone. The selection is based on potential risk, past operational experience, and regulatory requirements.

Each calendar quarter, NRC inspectors and the regional office review plant performance indicators and inspection findings. Each year, NRC regional and headquarters offices make a final review, to include a more detailed assessment of plant performance over the 12-month period, preparation of a performance report, and preparation of a six-month inspection plan. The report is sent to each plant and discussed in a public meeting.
NRC Annual Assessment Letter March 1, 2018

The NRC determined the performance at Diablo Canyon Power Plant, Unit 1, during the most recent quarter was within the Licensee Response Column, the highest performance category of the NRC’s Reactor Oversight Process (ROP) Action Matrix, because all inspection findings had very low safety significance (i.e., Green), and all PIs were within the expected range (i.e., Green). Therefore, the NRC plans to conduct ROP baseline inspections for Unit 1 at your facility in 2018.

The NRC determined the performance at Diablo Canyon Power Plant, Unit 2, during the most recent quarter was within the Regulatory Response Column, the second highest performance column of the NRC’s ROP Action Matrix. This conclusion was based on a single, Unit 2-related inspection finding having low-to-moderate safety significance (i.e., White) in the Mitigating Systems Cornerstone originating in the third quarter of 2016, and all PIs being within the expected range (i.e., Green). The NRC previously communicated the final significance determination associated with this finding, and the transition of Diablo Canyon Power Plant, Unit 2, to the Regulatory Response Column, in a letter to Pacific Gas and Electric Company (PG&E) dated December 28, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16363A429).

Subsequently, in letters to PG&E dated September 27, 2017, and January 23, 2018 (ADAMS Accession Nos. ML17271A431 and ML18023A118, respectively), the NRC transmitted the results of the initial and follow-up supplemental inspections conducted in accordance with Inspection Procedure 95001, “Supplemental Inspection Response to Action Matrix Column 2 Inputs,” in which the NRC reviewed the cause evaluations and corrective actions PG&E undertook to address the performance deficiencies associated with the aforementioned White finding. As the NRC described in our January 23, 2018, letter, the NRC concluded the station’s actions met the objectives of Inspection Procedure 95001. As such, in accordance with the guidance in Inspection Manual Chapter 0305, “Operating Reactor Assessment Program,” the White finding was closed, effective December 31, 2017. As a result, the NRC determined the performance at Diablo Canyon Power Plant, Unit 2, to be in the Licensee Response Column of the ROP Action Matrix as of January 1, 2018. Therefore, the NRC plans to also conduct ROP baseline inspections for your Unit 2 facility in 2018.

The DCISC understands this to mean acceptable regulatory performance and no increased inspections above baseline, except for the White violation (see Section 4.7.2). The DCISC will continue to follow this area closely.

The DCISC concurs with the NRC assessment of DCPP’s having acceptable regulatory performance and will continue monitoring DCPP regulatory performance.
3.4 DCISC Meetings with NRC Resident Inspector

The DCISC held 10 meetings with the NRC Resident Inspectors (NRC RIs) as follows:

July 25–26, 2017 Fact-finding Meeting (Volume II, Exhibit D.1, Section 3.1)

1. Seismic workplace safety, including successfully testing several bookcases in the NRC office area
2. NRC’s DCPP FLEX inspection will begin November 14, 2017
3. NRC is aware of DCPP’s plans to use FLEX equipment to reduce day-to-day risk in the refueling outage 1R20 and future outages (see Item 3.12 below)
4. NRC’s tsunami evaluation should be released by 2017 year end
5. NRC has approved DCPP’s use of the Alternate Source Term for its Control Room Ventilation System analyses (see Item 3.5 below)
6. NRC has completed its 95001 inspection of the Residual Heat Removal valve white finding, but the report has not yet been approved by NRC Region 4
7. DCPP is implementing its modifications for the Open Phase Power issue
8. DCPP post-accident field monitoring teams (the DCISC plans to include this in a future fact-finding meeting). Both DCISC and NRC did not believe they knew enough about the field monitoring teams.

August 9–10, 2017 Fact-finding Meeting (Volume II, Exhibit D.2, Section 3.1)

1. Emergency evacuation process and routes
2. Decommissioning – following final reactor defueling, the operating NRC Residents’ Office will terminate, and responsibility will be transferred to the off-site NRC Decommissioning Office.
3. NRC Public Information Meeting on Decommissioning will be held on August 29, 2017 in San Luis Obispo
4. Spent fuel transportation
5. DCPP’s maintaining plant safety following the four-year incentive period and after a three-year incentive plan, if any
6. NRC 95001 Inspection of the Residual Heat Removal Valve White Finding corrective actions – the inspection has been completed, awaiting final results from NRC Headquarters.
7. Mr. Newport meets with Jim Welsch, DCPP Site VP, every two weeks

September 6–7, 2017 Fact-finding Meeting (Volume II, Exhibit D.3, Section 3.9)
1. Status of NRC reviews of DCPP’s Seismic PRA and External Flooding analyses
2. Upcoming NRC inspection of FLEX systems and procedures.
3. The recent “Alert” emergency declared in response to a reduction in containment atmosphere oxygen levels
4. NRC 95001 Inspection of the Residual Heat Removal Valve White Finding corrective actions – the inspection has been completed, awaiting final results from NRC Headquarters.
5. Recent activities with regards to the Joint Proposal for DCPP to cease operations in 2025
6. DCPP’s completion of implementation of the NFPA-805 Fire Protection Program

October 30–31, 2017 Fact-finding Meeting (Volume II, Exhibit D.4, Section 3.1)

1. NRC 95001 Inspection of the Residual Heat Removal Valve White Finding corrective actions – the inspection has been completed, and NRC closed some of the items and left several open, pending re-inspection, which is expected to occur within a few weeks.
2. The NRC independent evaluation of DCPP’s tsunami and local intense precipitation submittal is expected by the end of 2017.
3. NRC’s DCPP FLEX inspection will occur in November and will take about one week. Mr. Newport will participate in this inspection.

November 14–15, 2017 Fact-finding Meeting (Volume II, Exhibit D.5, Section 3.5)

1. Decommissioning and DCISC’s role and NRC’s Decommissioning Office
2. Spent fuel storage and transportation
3. NRC independent evaluation of DCPP tsunami
4. Probabilistic Risk Assessment use of FLEX
5. NRC FLEX inspection currently in process
6. White Finding re-inspection following Thanksgiving
7. Joint Proposal update – less money for employee retention

December 13–14, 2017 Fact-finding Meeting (Volume II, Exhibit D.6, Section 3.2)

1. Recent Public Utilities Commission activities with regards to the Joint Proposal for DCPP to cease operations in 2025.
2. DCPP’s process for reviewing future plant investments in light of the Joint Proposal.
3. Status of NRC reviews of DCPP’s External Flooding analyses – report to be
4. Results of the NRC 95001 Inspection of the Residual Heat Removal Valve White Finding corrective actions – report to be issued soon, and white finding to be closed.

5. Results of the NRC inspection of FLEX systems and procedures – report to be issued soon with no issues.

6. The recent identification of a failed bearing on the 2-1 Centrifugal Charging Pump.

January 17–18, 2018 Fact-finding Meeting (Volume II, Exhibit D.7, Section 3.2)

1. Small leak in DCPP Main Feedwater Pump 2-2 suction (see below)

2. NRC flooding hazard reevaluation released in late December 2017 affirming the DCPP design basis

3. GSI-191, Containment Debris Issue, is still open but is close to being closed

4. DCPP has eliminated all roving fire watches for impaired fire doors. There are five impaired doors none of which required fire watch compensatory measures.

5. DCPP’s License Event Report (LER) regarding Pressurizer Relief Valve (NRC Green Non-cited violation)

6. DCPP White Finding re-inspection by NRC clears the issue and returns DCPP to Column 1 (normal) for inspections

7. NRC FLEX inspection contained no findings or concerns

8. Main Feedwater Pump (MFW) 2-2 Suction Piping Leak - At 0857 hours on January 16, 2018 DCPP personnel discovered “lightly wisping” steam coming from insulation on MFW Pump 2-2 suction piping, which is non-nuclear-safety-related but essential for power operation. A Corrective Action Program Notification was initiated. Engineering verified the structural adequacy of the pump pressure boundary, and the plant continued to operate safely while corrective action was being determined. The plant brought in a leak repair contractor who repaired the hole for continued operation until the Unit 2 refueling outage 2R20, which is to begin in three weeks, when the final repair will be performed.

March 7–8, 2018 Fact-finding Meeting (Volume II, Exhibit D.8, Section 3.2)

1. Refueling Outage 2R20 Activities

2. Possible Effects of the Joint Proposal on DCPP Performance

3. Generic Safety Issue 191 (Containment Sump Strainer Performance) Status
4. Decommissioning Planning

April 17–18, 2018 Fact-finding Meeting (Volume II, Exhibit D.9, Section 3.7)

1. Refueling Outage 2R20 – there were no issues identified
2. Boric Acid Corrosion Control Program – NRC’s inspection identified no issues
3. Residual Heat Removal weld overlay went well
4. Containment Integrated Leak Rate Test went well
5. Open Phase Power modifications have been installed but not connected until operational experience shows the modification is stable and reliable
6. National Fire Protection Association-805 modifications have been installed, and the NRC will perform their inspection.
7. DCPP has lost some licensed operators and has created some new classes to fill any gaps

May 2–3, 2018 Fact-finding Meeting (Volume II, Exhibit D.10, Section 3.1)

1. Results of the Recent NRC Problem Identification and Resolution Inspection
2. Geomagnetic Disturbances
3. Resident Inspector Objectivity Visits and Rotation Policies

Conclusions:
The DCISC meetings with the NRC Resident Inspectors are a useful opportunity to review the status of NRC’s current issues with the plant and compare them with DCISC items of interest. DCISC meets regularly with the Senior and Resident Inspectors during fact-finding visits and will continue to do so.

3.5 Status of DCPP NRC Regulatory Issues

The DCISC tracks major DCPP NRC regulatory issues at its fact-finding meetings at DCPP. Below in italics are the regulatory items from the March 2017 Fact-finding Meeting with January 2018 updates (Volume II, Exhibit D.7, Section 3.7) shown entirely in bold.

1. **Containment Debris:** The issue of potential debris blockage of a containment sump during a potential loss of coolant accident (LOCA) has been the subject of detailed and lengthy research by the industry and the NRC (Generic Safety Issue 191). Extensive enlargements and modifications have been made to DCPP’s containment sump screens in order to substantially reduce the risk of interrupting recirculation to the Reactor Vessel during a Loss of Coolant Accident. PG&E’s decision to
pursue resolution of this long-standing industry issue through a risk informed process appears to be a reasonable and achievable approach, recognizing that the deterministic approach is well established practice. [January 15-15, 2014 Fact-finding Meeting]

**March 2017 Update:** DCPP has removed/replaced substantial amounts of containment insulation and other materials which could have blocked/clogged sump screens and pumps. It is waiting for the completion and approval of a Westinghouse topical report documenting the final testing performed on the ability of containment sump screens and Residual Heat Removal pumps to handle expected containment sump mixtures. The topical uses a risk-informed approach to the debris problem. The final resolution will require Technical Specification changes.

**January 2018 Update:** No changes. Pending final generic resolution for Technical Specifications.

2. **EDG Health and Performance:** DCPP has resolved most of the significant issues with its Emergency Diesel Generators (EDGs) and reports the health of Unit 1 as Green and Unit 2 as White (and trending towards Green). This is good progress. Additionally, DCPP has implemented an impressive EDG Reliability Improvement Plan, which the DCISC should follow closely. [January 18-19, 2017 Fact-finding meeting.]

**March 2017 Update:** The EDGs exhibit good health resulting from DCPP’s recent and current actions. The DCISC FFR received and reviewed the DCPP EDG Reliability Improvement Plan, dated March 10, 2017. The plan is comprehensive and action-based. The Plan implements more targeted maintenance at appropriate intervals, completion of overdue design changes for known deficiencies, increasing critical spare parts stocking levels, and enhancing operating and maintenance procedures.

**January 2018 Update:** No changes. EDG performance indicators for Units 1 and 2 are both NRC Green and meeting plant goals (MSPI > 3.0x10⁻⁷, NRC Green > 1.0x10⁻⁶).

3. **230kV Emergency Power:** The DCPP 230kV System health has improved, and several corrective actions made to date to address system problems have been successfully completed. [December 7-8, 2016 Fact-finding Meeting]

**March 2017 Update:** All 230kV disconnect switches have been replaced. Static VAR compensators at the Mesa Substation feeding DCPP have been added. Unit 1 circuit switches are being replaced in Outage 1R20, and Unit 2 switches are being replaced in Outage 2R20. This
concludes the design and component upgrades for the 230kV System.

**January 2018 Update:** All actions have been completed. This item was closed.

4. **Open Phase Power:** DCPP has satisfactorily committed to and added temporary compensatory actions to deal with the Open Phase Electric Power Issue. It has also committed to and has plans and funds to add a permanent solution to be completed in the R21 refueling outages in 2018. [May 17-18, 2016 Fact-finding Meeting].

**March 2017 Update:** These design modifications will be installed in Outages 1R20 and 2R20. Unit 1 trip functions will be enabled by June 30, 2018. Unit 2 trip functions will be enabled by December 31, 2018.

**January 2018 Update:** The design modification has been installed for Unit 1 and will be installed for Unit 2 in upcoming Refueling Outage 2R20 beginning in February 2018. DCPP is considering replacing the power supplies for improved reliability. This may affect the date for full implementation.

5. **Control Room Habitability:** DCPP is making good progress in resolving issues with its Control Room Ventilation System (CRVS). The two remaining issues, upgrading the CRVS air conditioning system and NRC approval of Control Room Envelope accident radiation dose calculations using the Alternate Source Term, are on-track for completion in 2018 and 2017, respectively. [May 17-18, 2016 Fact-finding Meeting.]

**March 2017 Update:** DCPP expects NRC approval of its submittal in April 2017. [Note: the NRC approved this submittal on April 27, 2017 for use of the Alternate Source Term.] The Control Room Briefing Room shielding is currently being installed. The new Control Room air conditioning compressors have been funded and are scheduled for installation in 2018.

**January 2018 Update:** AST is on track to be implemented by the required date of 4/27/18. Procedure changes are in progress and final modifications are being performed in Outage 2R20.

6. **NRC White Finding for Inoperability of Valve SI-1-8982B Interlock:**

**March 2017 Update:** DCPP is preparing for the NRC 95-001 inspection in late May or early June 2017. If satisfactory, NRC will move DCPP inspection frequencies back to Column 1 (normal).

**January 2018 Update:** The NRC 95-001 inspection in June 2017
identified several open items; however, re-inspection in December 2017 resolved these open items, and NRC returned DCPP inspection frequencies to Column 1 (normal).

7. **NRC Assessment of the DCPP March 2015 Local Intense Precipitation and Tsunami Analysis**: DCPP’s Local Intense Precipitation analyses appear satisfactory to assure protection for safety-related equipment in the Auxiliary Building either analytically or by pre-planned mitigation using sand bags. DCPP’s tsunami analyses were completed and submitted to NRC in March 2015, and they are awaiting NRC’s Final Safety Evaluation. Meanwhile, DCISC has requested a separate analysis for which DCPP is seeking funding. [January 18-19, 2017 Fact-finding Meeting.]

**March 2017 Update**: The NRC Final Safety Evaluation is expected by the end of May 2017. The DCISC-requested tsunami analysis should begin in August if funding is approved.

**January 2018 Update**: As reported in Item 3.6 above, the NRC found the DCPP flood and tsunami analyses acceptable and closed the items.


**Conclusions:**

DCPP has satisfactory plans and actions for 2018 which should resolve its major regulatory issues.

3.6 DCISC Conclusions and Recommendations

**Conclusions:**
The DCISC received regular reports on the Nuclear Regulatory Commission (NRC) Performance Indicators, DCPP License Event Reports (LERs) sent to NRC, and NRC Inspection Reports and Enforcement Actions (violations) at each of its Public Meetings as well as copies of these documents throughout the reporting period. The DCISC investigated selected reports at its fact-finding meetings. The number of LERs has decreased significantly and was one during this period. This is the same as the previous period.
The Committee notes that, although the NRC concluded that DCPP
operated acceptably, it identified Nine Non-cited Violations of “very low safety significance.” This appears to be an improvement from most previous periods.

The DCISC will continue to review DCPP’s NRC regulatory performance during the next reporting period, paying particular attention to the number and significance of DCPP violations and LERs.

Recommendations:

None
### Diablo Canyon 1 2Q/2018 NRC Most Significant Inspection Findings

<table>
<thead>
<tr>
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<th>Reactor Safety</th>
<th>Radiation Safety</th>
<th>Safeguards</th>
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</thead>
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<td>G</td>
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<tr>
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<td>No findings this quarter</td>
<td>No findings this quarter</td>
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<td>Q3/2017</td>
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<td>G</td>
<td>No findings this quarter</td>
</tr>
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</table>

### Diablo Canyon 2 2Q/2017 Performance Summary

#### Performance Indicators

Diablo Canyon 2 – Quarterly Performance Summary

<table>
<thead>
<tr>
<th>Inspection Findings</th>
<th>Action Matrix Columns: Licensee Response</th>
<th>Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment Reports</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Key Topics

- QOP Update Schedule

#### Related Information

- Action Matrix
- Inspection Findings
- Performance Indicators

#### Reactor Safety | Radiation Safety | Safeguards

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness
- Occupational Radiation Safety
- Public Radiation Safety
- Security
Diablo Canyon 2 2Q/2016 NRC Most Significant Inspection Findings
28th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2017—June 30, 2018
Preface | Executive Summary
Volume I TOC | Volume II TOC | PG& Response | Contact the DCISC

28th Annual Report, Volume I, Section 4.0, Summary of Major DCISC Review Topics

The DCISC reviews a broad spectrum of topics and issues at DCPP. Detailed reports of these topics are contained in Volume II, Exhibit B–DCISC Public Meeting Notices, Agendas and Reports and Volume II, Exhibit D–DCISC reports on Fact-finding meetings. This section contains summaries of these reports along with conclusions and any recommendations.
28th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2017—June 30, 2018

Preface | Executive Summary

Volume I TOC | Volume II TOC | PG& Response | Contact the DCISC

28th Annual Report, Volume I, Exhibit 5.0, Performance Indicators

DCPP operational performance is reported in Volume II, Exhibit C, “Diablo Canyon Power Plant (DCPP) Operations.”
The DCISC Open Items List is a database used to track items for follow-up and monitoring. The List is updated and reviewed at each public meeting. The Open Items List included in Exhibit F in Volume II was used at the DCISC June 13–14, 2018 Public Meetings.
The DCISC has made 222 recommendations in its previous 27 Annual Reports. The recommendations, PG&E responses and DCISC dispositions from the previous DCISC reporting period are included in Exhibit H, Volume II, along with references to the location for the basis for each recommendation.

The DCISC had no recommendations in its 2015–2016 report.

The DCISC had one recommendation in this 2016–2017 report – see Section 4.20.3.

The DCISC has no recommendations in this (2017–2018) report.

The DCISC concludes that the actions taken by PG&E relative to past DCISC recommendations have been satisfactory and have helped to maintain or improve safety and reliability.
The DCISC has welcomed and encouraged input from the public since its inception in 1990. As part of its Public Outreach Program, the Committee has established a number of channels of communication opportunities in an effort to foster public outreach. These are mainly in the form of three public meetings each year in the local community, along with plant tours that are open to the public. Notice of these public meetings is published in local newspapers and on the DCISC website and is sent to persons on the DCISC’s Service Mailing List (see Volume II, Exhibit B-13), maintained in accordance with California Government Code §14911, and a notice was sent to all such persons and entities during this Annual Report period of the opportunity to received notice of DCISC public meetings by email. The Committee’s public meetings are webcast in real time, available for subsequent viewing on the web through archived, streaming video, linked to each meeting agenda, and cablecast for subsequent broadcasts on the local government access channel, Channel 21. The Committee maintains a toll-free telephone line. The DCISC also issues public notices, press releases and advertisements. Input from the public has been received from many of these channels as described in this section of the report.

8.0 Public Input and Outreach

The DCISC has welcomed and encouraged input from the public since its inception in 1990. As part of its Public Outreach Program, the Committee has established a number of channels of communication opportunities in an effort to foster public outreach. These are mainly in the form of three public meetings each year in the local community, along with plant tours that are open to the public. Notice of these public meetings is published in local newspapers and on the DCISC website and is sent to persons on the DCISC’s Service Mailing List (see Volume II, Exhibit B-13), maintained in accordance with California Government Code §14911, and a notice was sent to all such persons and entities during this Annual Report period of the opportunity to received notice of DCISC public meetings by email. The Committee's public meetings are webcast in real time, available for subsequent
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### 8.1 Telephone Calls and E-mails Received by the DCISC

Telephone calls, e-mails and other correspondence have been received by the DCISC Legal Counsel's office with questions, concerns, information and requests for information. During this reporting period, 45 calls and 38 e-mails were received from individuals. The breakdown of these calls and e-mails is as follows:

<table>
<thead>
<tr>
<th>Number of Calls</th>
<th>Number of E-mails</th>
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<td>1</td>
<td>23</td>
<td>DCPP issues or nuclear information requests</td>
</tr>
<tr>
<td>44</td>
<td>15</td>
<td>Other (administrative, document requests, tour requests and miscellaneous)</td>
</tr>
</tbody>
</table>

When requested, answers, responses or documents were provided either during the exchange, a return call, or by email or documents from the Committee records. The DCISC Telephone/Correspondence Log which provides a memorandum of contacts initiated by members of the public, citizen or public interest groups, the media or similar organizations is included as Exhibit G.1 and correspondence with the public is included with Exhibit G.2.

The Committee maintains a California toll-free telephone number (800-439-4688), an E-mail address (dcsafety@dcisc.org) and a site on the worldwide web at www.dcisc.org for receiving questions, concerns or information to and from the public. The DCISC has developed an information pamphlet and an informational video describing the Committee and its function (see Volume II, Exhibit I). The pamphlet is provided to attendees at DCISC public meetings and plant tours and the informational video is used in connection with the public tours and on the Committee’s website.

### 8.2 DCISC Internet - Worldwide Web Page Activity

The DCISC maintains a frequently updated web page on the worldwide web. Since the DCISC established its web page and presence on the internet in 1999 the Committee’s goal has been to provide a convenient and accessible forum for interested members of the public to learn about the Committee, its history, background and role in safety oversight at DCPP; its current members and consultants; Volumes I and II of the Committee’s latest Annual Report; previous
annual reports; the current schedule of future DCISC public meetings and public
tours, along with an interactive map to the PG&E Energy Education Center; and
the legal notice and agenda packet for the Committee’s next public meeting, which
is posted on the website prior to the meeting. Changing the file names from “html”
to “php” has made it possible to quickly make changes to both the site navigation
and standard features such as the wording for the public tours and the interactive
maps.

The web page also provides visitors with an opportunity to download or print
pages from the DCISC web site and offers a convenient email link to permit
interested persons to communicate directly with the Committee and to receive an
expedited response to questions and concerns. When the Annual Report is
finalized, the entire report is published on the website and is also published and
distributed to local public libraries and interested persons on compact disk. The
website also includes a link to the Committee’s Recommendations made in its
Annual Reports to PG&E from the 2000/2001 to the 2015/2016 annual report
periods.

The links on the DCISC's site on the worldwide web have been further developed
with information on CPUC Decision to retire DCPP at the end of its current
operating licenses from the NRC; the Committee’s letter in support of California
Senate Bill 1090; the NRC staff assessment of DCISC’s Post Fukushima Seismic
Hazard Reevaluation and the April 21, 2017 Decision of the NRC’s Director of
Nuclear Reactor Regulation on DCPP operational safety and safe shut down due to
earthquake; the DCISC's review of the tsunami hazard and risk at DCPP and its
environs and Dr. Sewell’s response of April 4, 2017 to questions on the tsunami
risk; and the DCISC’s September 5, 2013 and October 17, 2014 evaluations of the
Bechtel Final Assessment and Bechtel Addendum of Alternative Cooling
Technologies or Modifications to the Existing Once-Through Cooling System for the
Diablo Canyon Power Plant prepared for the State Water Resources Control Board.
The website continues to provide access to videos concerning the replacement of
Diablo Canyon’s steam generators and spent fuel storage project in a convenient
and accessible forum for interested members of the public.

The Committee continues to post the agendas and now the agenda packet for all
its public meetings on the website, as well as general information about the
Committee, its members and consultants. A list of useful links is included to topics
of interest to the general public, to PG&E's website for information concerning
Diablo Canyon Power Plant, to the NRC and to the International Atomic Energy
Agency for agency and industry-related information and to an indexed webcast of
streaming video of its past public meetings through electronic archives and to the
public meetings in real time when they are in session.

The website also provides access to a convenient glossary of nuclear power terms
and a list of acronyms in common use in the industry. Both Volumes of this Annual
Report are available on the website in fully-linked php-text format, as is an
animated depiction of the operation of a pressurized water nuclear reactor such as those in operation at Diablo Canyon.

During the DCISC’s October 18–19, 2017 public meeting, the live-streaming video of the meetings was accessed by visitors 29 times. The live streaming video feed of the DCISC’s February 7–8, 2018 public meeting was similarly accessed 10 times. During the DCISC’s public meeting on June 13–14, 2018, visitors accessed the live stream video 40 times. These data represent the total number of times “live visitors” entered the site including those visitors who may have come and gone from the site more than once (i.e. “total page views”).

The most meaningful statistics provided for July 1, 2017 through June 30, 2018 were the actual visits, that is, the “unique visitor” numbers, regardless of how many pages that visitor actually viewed on the DCISC’s website during the period of this report included the following:

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Top ten countries from which visitors accessed the site were: United States, the Russian Federation, Poland, Uzbekistan, Japan, Ukraine, India, Canada, Germany and the Philippines.

Among the most common "key phrases" typed into internet search engines, such as LG, MS Internet Explorer, Konqueror, Firefox, Mozilla, and Google Chrome and others were: “content”, “foreign material exclusion procedure”, “California fire prevention institute 24th annual workshop-fire safety exhibit 2014”, “tour report notice”, “diablo canyon vessel internals”, “annual report preface”.

The top ten downloads were:

- /24th pdf.pdf
8.3 Comments Received at DCISC Public Meetings

During this period (July 1, 2017—June 30, 2018), the Diablo Canyon Independent Safety Committee (DCISC) held three public meetings in the vicinity of Diablo Canyon Power Plant (DCPP) and a single meeting in Berkeley, California. The two-day public meetings included numerous informational, programmatic and plant status presentations by PG&E and by Committee Consultants and questions and comments from the public. The Committee always holds an evening session on the first of the two days of a public meeting in the San Luis Obispo area for the convenience of the public. All public meetings are webcast in real time and cablecast afterwards on the local public access television station and by indexed webcast and all meetings are videotaped.

The DCISC encourages members of the public to attend and speak at its public meetings. Times are set aside throughout the meetings for public questions and
comments. During the reporting period July 1, 2017—June 30, 2018 fourteen
different individuals spoke a total of ninety times. Eight individuals appeared and
spoke at the October 18–19, 2017, meeting; nine individuals appeared and spoke
at the February 7–8, 2018, meeting; three individuals spoke at the May 22, 2018
meeting and six individuals appeared and spoke at the June 13–14, 2018 meeting.
Seven persons addressed the Committee during more than one of its public
meetings.

The comments and questions, together with the Committee’s and PG&E’s
responses, are contained in the public meeting minutes included in Volume II,
Exhibits B.3, B.6, B.9 and B.12.

8.4 DCISC Public Tours of DCPP

The DCISC usually holds public tours in conjunction with its three public
meetings each year in the San Luis Obispo local area. As part of the DCISC
outreach program, each tour now provides an opportunity for interested persons to
see the plant as interact with DCISC Members and Consultants. The tours
conducted in February and June 2017 are described below. No tour was conducted
in conjunction with the October 2016 public meeting.

8.4.1 February 7, 2018 Public Tour

On the morning of Wednesday, February 7, 2018, the DCISC Members Drs.
Budnitz and Lam and the Technical Consultants accompanied by 23 members of
the public participated in a tour of Diablo Canyon Power Plant (DCPP or the
“plant”). The members of the public responded to the advertisement concerning
the public tour placed in a local area newspaper and on the DCISC’s website. The
group received security badges at the PG&E Energy Education Center and
assembled in the auditorium for a brief introduction of the DCISC and its Members
and Technical Consultants and a discussion of the operation of the Committee and
to view an informational video on the history, role and responsibility of the
Committee. Afterward DCPP Lead Manager, Government Relations, Ms. Suzanne
Hosn and Communications Representative Mr. John Lindsay gave informational
presentations about the plant and Pacific Gas &Electric Company’s (PG&E’s)
current energy generation portfolio and plans for the future. An opportunity was
provided for questions. The group then boarded a bus for the plant. During the
drive information was presented on the history of the plant and PG&E’s land
stewardship responsibilities. The bus entered the plant site through the Avila Gate
and the group received a briefing from PG&E tour guide Ms. Diana Turk on the
various external features and buildings and was taken on a narrated drive-by of
the Independent Spent Fuel Storage Installation (ISFSI), also known as the dry
cask spent fuel storage facility.

The bus then arrived at the parking area. The members of the public and the
DCISC Members and Technical Consultants viewed the Intake and Outfall Facilities
where the plant pulls in and discharges cooling water from and to the Pacific Ocean and then visited the Mechanical Maintenance Facility.

The group then departed DCPP for return to the Energy Education Center and had the opportunity to discuss the tour with individual DCISC members and consultants.

8.4.3 June 13, 2018 Public Tour

On the morning of Wednesday, June 13, 2018, the Members of the Diablo Canyon Independent Safety Committee (DCISC) together with Committee Technical Consultant Mr. McWhorter, accompanied by 32 members of the public participated in a tour of Diablo Canyon Power Plant (DCPP). The members of the public responded to the advertisement concerning the public tour placed in a local area newspaper and on the DCISC’s website. The group assembled in the PG&E Energy Center auditorium for a brief introduction of the DCISC and its Members and Technical Consultants and a discussion of the appointment of its members and the operations of the Committee and to view an informational video on the history, role and responsibility of the Committee. Afterward DCPP Lead Manager, Government Relations Ms. Suzanne Hosn and Communications Representative Mr. John Lindsay gave informational presentations about the plant and PG&E’s current energy generation portfolio and its plans for the future. An opportunity was provided for questions. The group then boarded a bus for the ride to the plant. During the drive information was presented on the history of the plant. The bus entered the plant site through the Avila Gate and the group received security badges and a briefing from PG&E on the various external features and buildings and was taken on a narrated drive-by of the Independent Spent Fuel Storage Installation (ISFSI), also known as the dry cask spent fuel storage facility.

The bus then arrived at the parking area. The members of the public and the DCISC Members and Technical Consultants visited in turn the DCPP Fire Department and the FLEX Storage Facility and had the opportunity to view the Intake and Outfall Facilities where the plant pulls in and discharges cooling water from and to the Pacific Ocean.

The group then departed DCPP for return to the Energy Education Center and had the opportunity to discuss the plant with individual DCISC members and consultants.

8.5 DCISC Evaluation

The DCISC has been relatively successful to date in implementing its Public Outreach Program as demonstrated by the descriptions above. The public tours of DCPP were moderately subscribed during this report period. However, in the coming year the DCISC understand that PG&E will be curtailing public tours of the power plant in favor of conducting tours of the environs of the site. The DCISC
discussed its outreach programs during this report period and reached a decision to continue its tours of the power plant with members of the public during the next year. The website and e-mail channels of communication are used frequently as indicated above. The public meetings during this period were attended or accessed by teleconference by between three to eight persons who also addressed remarks or questions to the Committee during those meetings. Representatives of Congressman Salud Carbajal’s office, State Senator William Monning’s office, U.S. Senator Diane Feinstein’s office, a Member of the San Luis Obispo County Board of Supervisors and of the California Energy Commission, and several representatives of Californians for Green Nuclear Power, a group promoting the use of nuclear power in California, as well as representatives of the San Luis Obispo Mothers for Peace and the Alliance for Nuclear Responsibility, non-profit organizations concerned with the local and nationwide dangers involving DCPP and with the dangers of nuclear power, weapons and radioactive waste on national and global levels. During this reporting period, many different individuals and groups attended also attended various meetings and sessions of the DCISC public meetings. The Committee has publicly reviewed its effectiveness including the conduct of fact findings and public meetings; the development and utility of the Annual Report; Committee outreach to government agencies and the officials appointing its members; the engagement of consultants for specific projects; the Committee’s continuing interaction with PG&E, and the nature and utility of a role, if any, for the DCISC to review issues related to plant decommissioning once the plant ceases making electricity. The Committee intends to continue this review during the next annual report period.
1.0 PG&E/DCPP Organization

The DCPP organization chart is included as an attachment.

2.0 Summary of Diablo Canyon Operations

2.0.1 Capacity Factor

During the assessment period of July 1, 2017, through June 30, 2018, Diablo Canyon’s Combined “Capacity Factor” averaged 94.3% (Net Maximum Dependable Capacity). Capacity factor is the ratio of actual generation output during an operating period to its potential generation output during that period when operating continuously at Maximum Dependable Capacity.

Unit 1 Operating Event Summary

During the 12-month reporting period ending June 30, 2018, Unit 1’s Capacity Factor was 100.1% (Net Maximum Dependable Capacity). No refueling outage occurred during this period. The table below provides descriptions of operating events that impacted Unit 1 generation.

Unit 1 Power Generation-Impacting Events July 2017—June 2018

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Reduced to Power Level</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/06/17 – 07/09/17</td>
<td>Curtailment</td>
<td>28%</td>
<td>Repair flow control valve FCV-520.</td>
</tr>
<tr>
<td>12/15/17 – 12/15/17</td>
<td>Curtailment</td>
<td>89%</td>
<td>Perform surveillance test procedure STP M-21C Main Turbine Control Valve Test</td>
</tr>
<tr>
<td>04/09/18 – 04/15/18</td>
<td>Curtailment</td>
<td>50%</td>
<td>Ocean cooling water system tunnel cleaning</td>
</tr>
<tr>
<td>05/30/18 – 06/01/18</td>
<td>Curtailment</td>
<td>50%</td>
<td>Repair main feedwater pump 1-2 lube oil level switch</td>
</tr>
</tbody>
</table>
Unit 2 Operating Event Summary

During the 12-month reporting period ending June 30, 2018, Unit 2’s Capacity Factor was 88.4% (Net Maximum Dependable Capacity). This period included a refueling outage. The table below provides descriptions of operating events that impacted Unit 2 generation.

Unit 2 Power Generation-Impacting Events July 2017—June 2018

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Reduced to Power Level</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/25/17 – 08/25/17</td>
<td>Curtailment</td>
<td>96%</td>
<td>Repair local control valve LCV-155 positioner</td>
</tr>
<tr>
<td>09/08/17 – 09/08/17</td>
<td>Curtailment</td>
<td>89%</td>
<td>Perform surveillance test procedure STP M-21C Main Turbine Control Valve Test</td>
</tr>
<tr>
<td>01/22/18 – 02/10/18</td>
<td>Pre-Refueling Reactor Power Coast-down</td>
<td>79%</td>
<td>Pre-2R20 refueling outage reactor power coast-down from 100% to 79% power, then shut-down of Unit 2</td>
</tr>
<tr>
<td>02/11/18 – 03/22/18</td>
<td>Refueling Outage</td>
<td>Off-line</td>
<td>39-day 2R20 refueling outage</td>
</tr>
<tr>
<td>03/22/18 – 03/26/18</td>
<td>Post-Refueling Power Ascension</td>
<td>0% to 100% power</td>
<td>Post-2R20 refueling outage power ascension from off-line to full power</td>
</tr>
</tbody>
</table>

2.0.2 Refueling Outages

The Unit 2 twentieth refueling outage (2R20) included the following work efforts:

- Control rod guide tube swaps
- Incipient fire detection
- Integrated Leak Rate Test (ILRT)
- Reactor Cavity Sump Pump repair
- Reactor Coolant Pump 2-4 rotor and stator
- Residual Heat Removal line weld overlay (WIB-245)
- Thimble tube replacement (13)
- Auxiliary Salt Water Pump 2-1 motor and pump replacement
- FW-2-FCV-441 stem replacement
- HP turbine blade replacement
- Main Feedwater Pump 2-2 turbine inspection
- Main Generator robotic crawl through
- 230 kV circuit switcher 211-2 replacement
- 230 kV insulator washing (cold)
- 500 kV breaker 642 replacement
- 500 kV CCVT replacement
- Open Phase mod (230 kV and 500 kV)
- PF testing of SUT 2-1 and 2-2
- Power Factor (PF) testing of Aux Transformer 2-2
- Regulating transformers TRY 2-5 and 2-7 replacement
- SUT 2-1 Load Tap Changer overhaul
- Vital Bus F breaker replacements

2R20 began February 11, 2018 and completed on March 22, 2018. Outage goals and results were as follows:

<table>
<thead>
<tr>
<th>Performance Category</th>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recordable &amp; Disabling Injuries</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nuclear Safety Events</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Human Performance Event Clock Resets</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Outage Duration (days)</td>
<td>≤40</td>
<td>39</td>
</tr>
<tr>
<td>Does Goal (Rem)</td>
<td>≤35</td>
<td>24</td>
</tr>
<tr>
<td>Significant Foreign Material Events (FME)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### 2.0.3 Collective Radiation Exposures

The bulk of personnel radiation exposure occurs during refueling outages. For this reason, the total annual exposure is largely dependent upon the outage
planning effectiveness, radiation levels, outage duration, number of outages conducted in the year and emergent maintenance activities.

Collective Radiation Exposure (CRE) for Refueling Outage 2R20 was 24.1 person-Rem versus a goal of 35 person-Rem. DCPP attributes this excellent station dose performance to source term reduction, dose ownership, use of technology and improved outage awareness and planning. On-Line exposure typically amounts to about six person-Rem per year. Unit 1 and 2 collective radiation exposure performances are meeting industry goals. Both units are receiving full industry points for CRE.

2.0.4 Unplanned Reactor Trips

PG&E’s goal is to have zero unplanned automatic reactor trips per unit per year while critical. Unnecessary reactor trips not only reduce plant capacity factor, but they also represent unnecessary challenges to safety systems and may indicate substandard operating or maintenance practices. Manual trips are not counted because PG&E believes that this may inhibit operator-initiated trips and actions to protect equipment.

No unplanned automatic reactor trips occurred during the reporting period.

2.0.5 Unplanned Safety System Actuations

This indicator is the sum of the number of unplanned emergency core cooling system (ECCS) actuations (whether the ECCS actuation set point has been reached or from a spurious or inadvertent ECCS signal) and the number of unplanned emergency AC power system actuations that result from the loss of power to a safeguards bus. For Diablo Canyon, ECCS actuations include actuations of the high-pressure injection system, the low-pressure injection system, or the accumulators. Such actuations should be avoided because the plant should be maintained in a safe configuration to preclude actuations, and unnecessary challenges to plant safety systems should be minimized. PG&E’s goal for this indicator continues to be no unplanned safety system actuations at DCPP.

No actuations occurred during the reporting period.

2.0.6 Chemistry Effectiveness Indicator (CEI)

DCPP has adopted the industry Chemistry Effectiveness Indicator (CEI) to measure overall station chemistry effectiveness. The CEI includes metrics for the Primary Chemistry and the Secondary Chemistry and is a measure of chemical and contaminant control practices.

The CEI can range from 0 to 100 with a lower value demonstrating better chemistry control. CEI >5 will impact the station’s Industry Performance Indictor
Index. CEI is an 18-month rolling indicator and is updated monthly.

August 2018 CEI for Unit 1 and Unit 2 was 0.00.

The 18-month composite CEI for Unit 1 and Unit 2 is 0.00.

2.0.7 Fuel Reliability

The purpose of the fuel reliability indicator is to monitor progress in achieving and maintaining high fuel integrity. Failed fuel represents a breach in the initial barrier for preventing offsite release of fission products. Such failure also has a detrimental effect on operations and increases the radiological hazards to plant workers.

Based on measurement of both steady-state reactor coolant activity and transient iodine spiking, PG&E determined that both Units 1 and 2 operated without any failed rods during the 12-month reporting period. Unit 1 has operated without any failed rods since the beginning of Cycle 5. The Unit 2 radiochemistry data indicates that Unit 2 has been operating without fuel defects since starting up Cycle 17 (June 2011).

PG&E continues to follow its fuel reliability programs, including the aggressive preventive maintenance inspection of new and irradiated fuel, continued implementation of procedural guidelines to prevent fuel damage during both power and refueling operations, implementation of chemistry controls, fuel assembly reconstitution for identified rod failures, tracking and disposition of damaged fuel assemblies and strict controls to exclude foreign material from the reactor coolant system.
The DCISC tours the Diablo Canyon Nuclear Power Plant during most fact-finding meetings to observe or inspect items it is reviewing. Also, the DCISC conducts plant tours with members of the public three times per year during its public meetings. For the two years following the terrorist events of September 11, 2001 no public tours were held. The DCISC resumed public tours at its June 2, 2004 public meeting. This exhibit includes a database of the areas of the plant the DCISC and the public have toured.

### Table 1—Ten–Year Record of DCISC Tours of DCPP (Through June 2018)

<table>
<thead>
<tr>
<th>Area No.</th>
<th>Location</th>
<th>System-Area</th>
<th>Tour No(s) (See Table 2) (Bold = Public Tour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB-1</td>
<td>TB—Buttress Area</td>
<td>Condensate Polishing System</td>
<td>*, 09-9, 17-3</td>
</tr>
<tr>
<td>TB-2</td>
<td>TB—El 73 NH-SH (U1&amp;2)</td>
<td>Condensate Pumps</td>
<td>*, 09-8, 17-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Condensate Cooler</td>
<td></td>
</tr>
<tr>
<td>TB-3</td>
<td>TB El 85 NH</td>
<td>Oily Water Separator Room</td>
<td></td>
</tr>
<tr>
<td>TB-4</td>
<td>TB—El 85 NH-SH (U1&amp;2)</td>
<td>Condensate Booster Pumps</td>
<td>17-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Letdown Storage Tanks</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Main Feedwater Pumps</td>
<td>*,07-11, 09-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Condenser Water Box</td>
<td>*, 14-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plant Air Compressors</td>
<td>15-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Service Water</td>
<td>11-1</td>
</tr>
<tr>
<td>TB-5</td>
<td>TB EL 85 (U1&amp;2)</td>
<td>Emergency Diesel Generators</td>
<td>09-5, 09-8, 09-9, 10-2, 10-7, 14-2, 17-4</td>
</tr>
<tr>
<td>TB-6</td>
<td>TB EL 85 (U1&amp;2)</td>
<td>4 kV &amp; 12 kV Non–vital Switchgear</td>
<td>17-4, 18-9</td>
</tr>
<tr>
<td>TB-7</td>
<td>TB Buttress EL 104 (U2)</td>
<td>Technical Support Center</td>
<td>10-3</td>
</tr>
<tr>
<td>TB-8</td>
<td>TB EL 104 (U1&amp;2)</td>
<td>4 kV Vital Cable Spread. Rms.</td>
<td>18-9</td>
</tr>
<tr>
<td>TB-9</td>
<td>TB EL 104 (U1&amp;2)</td>
<td>Main Lube Oil Resvr. -Cooler</td>
<td>11-1, 17-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feedwater Heaters</td>
<td>*</td>
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<tr>
<td></td>
<td></td>
<td>Mid–condenser &amp; Hoods</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Seawater Evaporators</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Steam Jet Air Ejectors</td>
<td>*</td>
</tr>
<tr>
<td>TB-10</td>
<td>TB EL 119 (U1&amp;2)</td>
<td>4 kV Vital Switchgear</td>
<td>14-2, 18-9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switchgear Ventilation Fans</td>
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<tr>
<td>TB-11</td>
<td>TB EL 119 (U1&amp;2)</td>
<td>Isophase Busses</td>
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<tr>
<td></td>
<td></td>
<td>LP Cond. Exhaust Hoods</td>
<td>*</td>
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<td></td>
<td></td>
<td>Moisture Septrs. /Reheaters</td>
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<tr>
<td></td>
<td></td>
<td>Tech. Maintenance Shop</td>
<td></td>
</tr>
<tr>
<td>TB-12</td>
<td>TB EL 140 (Turbine Deck) (U1&amp;2)</td>
<td>Main Turbines, Generators &amp; Steam Leads &amp; Valves</td>
<td>*, 08-7, 10-2, 10-5, 10-7, 14-5, 15-4, 15-8, 16-2, 16-5, 16-8, 17-3,</td>
</tr>
<tr>
<td>Location</td>
<td>Equipment</td>
<td>Description</td>
<td>Notes</td>
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<tr>
<td>----------</td>
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<tr>
<td>TB-13</td>
<td>TB El 140 NH</td>
<td>Outage Coordination Center</td>
<td>17-7, 18-1, 18-3, 18-4, 18-7</td>
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<td>TB-14</td>
<td>U1 TB 140 NH</td>
<td>Operations Support Center</td>
<td>14-7</td>
</tr>
<tr>
<td>AB–1</td>
<td>AB El 55</td>
<td>Pipe Tunnel Area</td>
<td>-</td>
</tr>
<tr>
<td>AB–2</td>
<td>AB El 64 (U1&amp;2)</td>
<td>Boron Injection Tanks</td>
<td>-</td>
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<tr>
<td></td>
<td></td>
<td>Residual Heat Removal Pumps</td>
<td>08-8, 09-8, 17-7, 18-7</td>
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<tr>
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<td>Gas Decay Tanks &amp; Comprsrs.</td>
<td>09-1</td>
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<td>Radwaste Monitor Tanks</td>
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<td>Liquid Radwaste Storage Tanks</td>
<td>09-1</td>
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<tr>
<td>AB–3</td>
<td>AB El 73 (U1&amp;2)</td>
<td>Residual Heat Removal HXs</td>
<td>-</td>
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<td></td>
<td></td>
<td>Compnt. Cool. Water Pumps</td>
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<td></td>
<td></td>
<td>Charging Pumps</td>
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<td>Containment Spray Pumps</td>
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<td>Boron Injection Tanks</td>
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<td>AB–4</td>
<td>AB El 85 (U1&amp;2)</td>
<td>Penetration Area</td>
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<td>Post–LOCA Sampling Station</td>
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<td>Waste Gas Analyzer</td>
<td>09-1</td>
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<td>AB–5</td>
<td>AB EL 85(U1&amp;2)</td>
<td>Safety Injection Pumps</td>
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<td>Boric Acid Evap.</td>
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<td>Aux. Control Board</td>
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<td>Let down &amp; Seal Return HX</td>
<td>-</td>
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<tr>
<td>AB–6</td>
<td>AB EL 85</td>
<td>Chemistry Offices &amp; Labs</td>
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<td>Location</td>
<td>Equipment</td>
<td>Description</td>
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<td>AB El 85</td>
<td>Auxiliary Boiler</td>
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<td>AB-8</td>
<td>AB El 100 (U1&amp;2)</td>
<td>Penetration Area</td>
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<td>AB-9</td>
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<td>Auxiliary Feedwater Pumps</td>
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<td>Boric Acid Transfer Pumps</td>
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<td>AB El 100 (U1&amp;2)</td>
<td>480 V Vital Bus</td>
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<td>QHot Shutdown Panel</td>
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<td>AB-11</td>
<td>AB El 115 (U1&amp;2)</td>
<td>Penetration Area - MS &amp; FDW</td>
<td></td>
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<tr>
<td></td>
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<td>Radwaste Processing Area</td>
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<td>Ion Exchangers</td>
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<tr>
<td>AB-12</td>
<td>AB El 115 (U1&amp;2)</td>
<td>Vital Batteries, Chargers &amp; Inverters</td>
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<tr>
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<td>Rod Control Cabinets</td>
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<tr>
<td>AB-13</td>
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<td>O-1</td>
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<td>O–3</td>
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<td>Storage Tank, Refueling Water Storage Tank, Diesel Fuel Oil Storage Tank (buried)</td>
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<td>O–5</td>
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<td>Fire Protection System 09-6, Fire Protection System</td>
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<td>O–9</td>
<td>500 kV Switch yard</td>
<td>500 kV Switchyard &amp; Control Building 06-3, 06-8, 13-2, 13-6, 13-8, 14-3, 14-6, 14-8, 16-8, 17-5, 17-8</td>
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<td>230 kV Switchyard &amp; Control Building *,13-2, 13-6, 13-8, 14-3, 16-8, 17-5, 17-8</td>
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<td>Emergency Operations Facility</td>
<td>08-9, 09-4, 09-7, 09-10, 12-3, 12-5, 12-8, , 13-2, 13-6, 13-8, 14-3, 14-6, 14-8, 15-1, 16-2, 16-8, 17-5, 17-8, 18-6, 18-11</td>
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<td>Joint Information Center</td>
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<td>Other</td>
<td>Other Specific Areas:</td>
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<td></td>
<td>AB Asset Team Work Area</td>
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<td>AB Elect. Asset Team Work Area</td>
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<td>AB Fire Pumps, Piping &amp; Equipment</td>
<td>09-6</td>
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<td></td>
<td>AB Security System Components &amp; SAS</td>
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<td>Seismic Gap Modifications</td>
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<td>Expansion Joint Failures</td>
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<td>Temporary Jumpers</td>
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<td>Human Performance Lab</td>
<td>08-4, 09-5</td>
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<td>Simulation Lab</td>
<td>09-1</td>
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<td></td>
<td>Radiation Monitoring System</td>
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<td>Outside Control Area, Firing Range, Protected Control Area (including</td>
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<tr>
<td>ISFSI Site</td>
<td>08-2, 08-6, 08-9, 10-4, 10-6, 10-9, 12-3, 12-5, 12-8, 13-2, 13-6, 13-8, 14-3, 14-6, 14-8, 15-1, 15-3, 15-4, 15-8, 16-2, 16-5, 16-8, 17-5, 17-8, 18-6, 18-11</td>
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<tr>
<td>Admin Bldg Tall Bookcase</td>
<td>12-7, 15-3, 15-7</td>
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<tr>
<td>Seismic Bracing</td>
<td>10-8, 12-7</td>
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<tr>
<td>Control Room Ready Room</td>
<td>12-7</td>
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<td>Tall Bookcase Seismic Bracing</td>
<td>10-8, 12-7, 17-1, 17-7, 18-10</td>
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</tbody>
</table>

* Systems/areas marked with “∗” have also been visited on many tours due to their location along routes frequently traveled.

**Legend:**

- **AB** = Auxiliary Building
- **FH** = Fuel Handling Building
- **TB** = Turbine Building
- **NH** = North Half
- **SH** = South Half
- **HX** = Heat Exchanger
- **El** = Elevation
- **HVAC** = Heating, Ventilation & Air Cond.
- U1&2 = Units 1 and 2 have separate facilities/equipment

### Table 2–Ten–Year Chronological Record of Past DCISC DCPP Tours (through June 2017)

<table>
<thead>
<tr>
<th>Tour No.</th>
<th>Date(s)</th>
<th>Participants</th>
<th>Locations-Components Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>08–1</td>
<td>8/21/07</td>
<td>WFC, RFW</td>
<td>I&amp;C Components in Various Locations in AB, CR &amp; TB</td>
</tr>
<tr>
<td><strong>08–2</strong></td>
<td><strong>10/24/07</strong></td>
<td><strong>Public Tour</strong></td>
<td><strong>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</strong></td>
</tr>
<tr>
<td>08–3</td>
<td>9/18/07</td>
<td>ADR</td>
<td>Joint Media Center</td>
</tr>
<tr>
<td>08–4</td>
<td>11/13/07</td>
<td>WFC, VSB, RFW</td>
<td>Human Performance &amp; Safety Simulation Lab</td>
</tr>
<tr>
<td>08–5</td>
<td>12/19/07</td>
<td>ADR, JEB</td>
<td>New Steam Generator Storage Area</td>
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<tr>
<td><strong>08–6</strong></td>
<td><strong>1/23/08</strong></td>
<td><strong>Public Tour</strong></td>
<td><strong>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</strong></td>
</tr>
<tr>
<td>08–7</td>
<td>2/27/08</td>
<td>RJB, JEB</td>
<td>Control Room, Turbine Floor &amp; SG Work in Yard</td>
</tr>
<tr>
<td>08–8</td>
<td>3/10/08</td>
<td>ADR, JEB</td>
<td>SG Work in Yard, Fuel Handling Bldg., Control Room, Outage Meeting</td>
</tr>
<tr>
<td><strong>08–9</strong></td>
<td><strong>6/25/08</strong></td>
<td><strong>Public Tour</strong></td>
<td><strong>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</strong></td>
</tr>
<tr>
<td>09–1</td>
<td>7/16/08</td>
<td>WFC, RFW</td>
<td>Radwaste Processing &amp; Storage, CVCS Filter Gallery, LRWS Ion Exchange Cubicles, Unit 2 Equipment Drains &amp; Tank, LRWS &amp; GRWS Discharge Radiation Monitors, Unit 2 Waste Gas Compressor and Decay Tank, Chemical Drain Tank, L&amp;HS Tank, B.5.b Equipment Storage</td>
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<tr>
<td>09–2</td>
<td>8/27/08</td>
<td>RJB, JEB</td>
<td>Intake Structure, ASW Pump, Main Bank Transformer</td>
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<tr>
<td>09–3</td>
<td>9/16/08</td>
<td>PFP, RFW</td>
<td>New Unit 1 SG Storage, Warehouse</td>
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<tr>
<td><strong>09–4</strong></td>
<td><strong>10/7/08</strong></td>
<td><strong>Public Tour</strong></td>
<td><strong>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</strong></td>
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<tr>
<td>09–5</td>
<td>11/5/08</td>
<td>RJB, RFW</td>
<td>Human Performance &amp; Safety</td>
</tr>
<tr>
<td>Date</td>
<td>Date</td>
<td>Participants</td>
<td>Description</td>
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<td>09–6</td>
<td>12/17/08</td>
<td>PFP, JEB</td>
<td>Fire Protection Equipment</td>
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<td><strong>09–7</strong></td>
<td><strong>2/11/09</strong></td>
<td><strong>Public Tour</strong></td>
<td><strong>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</strong></td>
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<td>09–8</td>
<td>3/3/09</td>
<td>RJB, JEB</td>
<td>SG Replacement, Turbine Building, EDG 1–2, MFW Pumps, CDN Pumps, Condensate Storage Tank, Outage Control Center</td>
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<tr>
<td>09–9</td>
<td>5/19/09</td>
<td>PFP, DCL, RFW</td>
<td>Turbine Building, EDG 1–3, Control Room, Intake Area, Discharge Cove, RCA Portal, SFPs 1 &amp; 2, Hot-Cold Machine Shops, Yard Area, Transformers</td>
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<td>10–1</td>
<td>7/22/09</td>
<td>PFP, DCL, JEB</td>
<td>ISFSI, Admin. Building Protective Window Film</td>
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<td>10–2</td>
<td>8/10/09</td>
<td>PL, WFC, RFW</td>
<td>Turbine Building (all levels), Emergency Diesel Generator Room, Control Room, Alternate Shutdown Panel, Plant Yard, Main Transformers, Ocean Intake &amp; Discharge</td>
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<td>10–3</td>
<td>9/2/09</td>
<td>RJB, JEB</td>
<td>Control Room Simulator, Technical Support Ctr, Emergency Operations Ctr, Joint Information Ctr</td>
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<td><strong>10–4</strong></td>
<td><strong>12/9/09</strong></td>
<td><strong>Public Tour</strong></td>
<td><strong>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</strong></td>
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<tr>
<td>10–5</td>
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<td>PFP, RFW</td>
<td>Turbine Deck Units 1 &amp; 2, Control Room</td>
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<td><strong>10–6</strong></td>
<td><strong>2/10/10</strong></td>
<td><strong>Public Tour</strong></td>
<td><strong>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</strong></td>
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<tr>
<td>10–7</td>
<td>3/16/10</td>
<td>RJB, RFW</td>
<td>Control Room Simulator, Turbine Building, Alternate Shutdown Control Panel, Emergency Diesel Generator Room, Plant Yard, Main Transformers, Main Steam Safety Valves</td>
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<td>10–8</td>
<td>5/12/10</td>
<td>PFP, RFW</td>
<td>Units 1 &amp; 2 Spent Fuel Pools, SFP Pump, SFP Cleanup System, SFP Heat Exchanger, Training Building</td>
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<tr>
<td>Date</td>
<td>Event/Date</td>
<td>Description</td>
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<td>10–9</td>
<td>6/2/10</td>
<td><strong>Public Tour</strong> Tall Bookcase Seismic Bracing, Operations Ready Room Tall Bookcase Seismic Bracing</td>
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<td>11–1</td>
<td>7/6/10</td>
<td>PFP, DCL Simulator, EOF, JIC</td>
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<tr>
<td>11–2</td>
<td>8/4/10</td>
<td>RJB, JEB Main Lube Oil Room, CARDOX System</td>
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<tr>
<td>11–3</td>
<td>8/11/10</td>
<td>PFP, RFW Simulator, EOF, JIC</td>
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<td>11–4</td>
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<td><strong>Public Tour</strong> Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
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<td>11–5</td>
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<td><strong>Public Tour</strong> Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
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<td>4/19/11</td>
<td>PL, RFW Unit 1 Vital Batteries and Racks, Battery Chargers, Switchgear, Vital Inverters and one train of Non–Vital Batteries and Chargers.</td>
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<td>11–7</td>
<td>5/25/11</td>
<td>PFP, DCL Auxiliary Building Control Panel, Control Room, Unit 2 Spent Fuel Pool, Containment, AB, TB</td>
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<td>11–8</td>
<td>6/22/11</td>
<td><strong>Public Tour</strong> Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
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<td>12–1</td>
<td>8/10/11</td>
<td>RJB. RFW Observe Licensed Operator Training in Training Bldg.</td>
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<td>12–2</td>
<td>11/16/11</td>
<td>PL, RFW Turbine–Driven Auxiliary Feedwater Pumps</td>
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<td>12–3</td>
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<td><strong>Public Tour</strong> Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
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<td>12–4</td>
<td>12/13/11</td>
<td>PRF, RFW Compressed Air System Components</td>
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<td>3/14/12</td>
<td>PL, RFW Control Room Simulator, Emergency Operations Center, Joint Information Center</td>
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<td>12–7</td>
<td>5/22/12</td>
<td>PFP, RFW Control Room, Turbine Building All Levels, Yard, Cold Machine Shop, I&amp;C Shop. Outage</td>
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<td>Coordination Center</td>
<td>Date</td>
<td>Tour Type</td>
<td>Description</td>
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<td>12–8</td>
<td>Public Tour</td>
<td>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
</tr>
<tr>
<td></td>
<td>13–1</td>
<td>Public Tour</td>
<td>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
</tr>
<tr>
<td></td>
<td>13–2</td>
<td>Public Tour</td>
<td>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
</tr>
<tr>
<td></td>
<td>13–3</td>
<td></td>
<td>Control Room Simulator, Emergency Operations Center, Joint Information Center</td>
</tr>
<tr>
<td></td>
<td>13–4</td>
<td></td>
<td>Control Room Area, I&amp;C Lab, Admin. Bldg.</td>
</tr>
<tr>
<td></td>
<td>13–5</td>
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<td>Control Room Simulator</td>
</tr>
<tr>
<td></td>
<td>13–6</td>
<td>Public Tour</td>
<td>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
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<tr>
<td></td>
<td>13–7</td>
<td></td>
<td>Mechanical Maintenance Shop</td>
</tr>
<tr>
<td></td>
<td>13–8</td>
<td>Public Tour</td>
<td>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
</tr>
<tr>
<td></td>
<td>14–1</td>
<td></td>
<td>Mechanical Maintenance Training Facility</td>
</tr>
<tr>
<td></td>
<td>14–2</td>
<td></td>
<td>Turbine/Generator Deck, Control Room, Condenser, Emergency Diesel Generators, Electrical Switchgear Room, Seismic Instrumentation and Detectors, Storage of B.5.b (Greater than design basis) emergency items, Main and Auxiliary Transformers</td>
</tr>
<tr>
<td></td>
<td>14–3</td>
<td>Public Tour</td>
<td>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
</tr>
<tr>
<td></td>
<td>14–4</td>
<td></td>
<td>Control Room, Turbine Building</td>
</tr>
<tr>
<td></td>
<td>14–5</td>
<td></td>
<td>Main Administration Building, Engineering Offices</td>
</tr>
<tr>
<td></td>
<td>14–6</td>
<td>Public Tour</td>
<td>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
</tr>
<tr>
<td></td>
<td>14–7</td>
<td></td>
<td>Simulator, Alternate Operations Support Center, Emergency Operations Center, Joint Media</td>
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<table>
<thead>
<tr>
<th>Center</th>
<th>Date</th>
<th>Tour Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>14–8</td>
<td>6/11/14</td>
<td>Public</td>
<td>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
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<tr>
<td>15–1</td>
<td>10/15/14</td>
<td>Public</td>
<td>Control Room Simulator, Security Building, Intake, Overlook, ISFSI</td>
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<td>15–2</td>
<td>11/19/14</td>
<td>RJB, RFW</td>
<td>Liquid &amp; Gaseous Radioactive Waste Systems</td>
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<tr>
<td>15–3</td>
<td>12/2/14</td>
<td>PFP, DCL</td>
<td>Training Building 2&lt;sup&gt;nd&lt;/sup&gt; Floor</td>
</tr>
<tr>
<td>15–3</td>
<td>12/3/14</td>
<td>PFP, DCL</td>
<td>Independent Spent Fuel Storage Facility (ISFSI)</td>
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<tr>
<td>15–4</td>
<td>2/4/15</td>
<td>Public</td>
<td>Control Room Simulator, Main Turbine Deck, Control Room View, ISFSI</td>
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<tr>
<td>15–5</td>
<td>3/30/15</td>
<td>RJB, DCL</td>
<td>Unit 2 Spent Fuel Area</td>
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<td>3/30/15</td>
<td>RJB, DCL</td>
<td>Outdoor Air Compressor Pads</td>
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<td>15–7</td>
<td>5/29/15</td>
<td>PFP, DCL</td>
<td>Administrative Building 5&lt;sup&gt;th&lt;/sup&gt; Floor</td>
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<td>15–8</td>
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<tr>
<td>16–1</td>
<td>6/10/15</td>
<td>RJB, RFW</td>
<td>Simulator, Control Room</td>
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<tr>
<td>16–2</td>
<td>10/21/15</td>
<td>Public</td>
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<tr>
<td>16–3</td>
<td>9/9/15</td>
<td>RJB, RFW</td>
<td>Simulator, Emergency Operations Center, Joint Media Center</td>
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<tr>
<td>16–4</td>
<td>12/8/15</td>
<td>PFP, RFW</td>
<td>Glasstop Simulator</td>
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<tr>
<td>16–6</td>
<td>3/9/16</td>
<td>PFP, RFW</td>
<td>Units 1 &amp; 2 Residual Heat Removal Pumps</td>
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<tr>
<td>16–7</td>
<td>5/17/16</td>
<td>RJB, RFW</td>
<td>NFPA-805 Modifications</td>
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<tr>
<td>17–1</td>
<td>7/20/16</td>
<td>PFP, RFW</td>
<td>DCPP Safety &amp; Health Expo</td>
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<tr>
<td>17–2</td>
<td>11/2/16</td>
<td>RJB, RFW</td>
<td>Simulator, Emergency Operations Center, Joint Media Center</td>
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<td>17–3</td>
<td>12/7/16</td>
<td>PFP, RDM</td>
<td>Turbine Building General Tour</td>
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<tr>
<td>17–4</td>
<td>1/18/17</td>
<td>RJB, RFW</td>
<td>Emergency Diesel Generator</td>
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<tr>
<th>#</th>
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<tbody>
<tr>
<td>17-5</td>
<td>2/8/17</td>
<td>Public Tour</td>
<td>Control Room Simulator, ISFSI, Intake, Outfall</td>
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<tr>
<td>17-6</td>
<td>3/22/17</td>
<td>RJB, RFW</td>
<td>Heater Drain Pumps, Main Feedwater Pumps, Main Turbine Oil Separators, Condenser, Yellowbird Tower</td>
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</tbody>
</table>
| 17-7 | 5/10/17   | PFP, RFW            | 1. Unit 1 CCW pumps, heat exchangers, instrumentation, and piping and valves  
2. Turbine deck and lower floors with work on the High Pressure Turbine Rotor, Low Pressure Turbine Rotor, and selected turbine stop and control valves. Intake Structure with work on Traveling Screens and Circulating Water Pumps  
3. Containment during Outage 1R20 |
| 17-8 | 6/6/17    | Public Tour         | Control Room Simulator, ISFSI, Intake, Outfall                                                  |
| 18–1 | 7/25/17   | PFP, RFW            | Unit 1 DC Power System                                                                          |
| 18–2 | 8/9/17    | PL, RFW             | Reactor Coolant System Chemical Sampling System                                                  |
| 18-3 | 9/6/17    | RJB, RDM            | Auxiliary Saltwater System, Intake Structure                                                     |
| 18-3 | 11/14/17  | RJB, RFW            | Auxiliary Feedwater System – Unit 1                                                              |
| 18–4 | 12/13/17  | PFP, RDM            | Emergency Diesel Generator (EDG) Room 2-2                                                         |
| 18–5 | 1/17/18   | PL, RFW             | Operator Rounds in EDG Rooms                                                                    |
| 18–6 | 2/7/18    | Public Tour         | Mechanical Maintenance Facility, ISFSI, Intake, Outfall                                           |
| 18–7 | 3/7/18    | RJB, RDM            | Non-Containment Outage Tour                                                                      |
| 18–8 | 3/7/18    | RJB, RDM            | Containment Outage Tour                                                                          |
| 18–9 | 4/17/18   | PL, RFW             | 4kV Electrical System, Unit 2                                                                     |
| 18–10| 5/2/18    | PFP, RDM            | Administration Building, I&C Shop                                                                |

* Systems/areas marked with “∗” have also been visited on many tours due to their location along routes frequently traveled.
Legend:

ADR = David Rossin
AFW = Auxiliary Feedwater
CCW = Component Cooling Water
CFCU = Containment Fan Cooler Unit
CR = Control Room
CW = Circulating Water (condenser)
DCL = Dave Linnen
DFO = Diesel Fuel Oil
EDG = Emergency Diesel Generator
EGP = Gail dePlanque
EOF = Emergency Operations Facility
FDW = Feedwater
HC = Hyla Cass
HHW = Herb Woodson
ISFSI = Independent Spent Fuel Storage Inst
JEB = Jim E. Booker
JIC = Joint Information Center
OCC = Outage Coordination Center
PFP = Per F. Peterson
PL = Peter Lam
PRC = Phil Clark
RCA = Radiation Control Area
RFW = Ferman Wardell
RHR = Residual Heat Removal
RJB = Robert J. Budnitz
RTL = Bob Lancet
SFP = Spent Fuel Pool
SG = Steam Generator
SI = Safety Injection System
SPDS = Safety Parameter Display System
TB = Turbine Building
TSC = Technical Support Center
WEK = Bill Kastenberg
WFC = Bill Conway
WHO = Warren Owen
The DCISC Open Items List is an on-going list of items the DCISC tracks for follow-up, monitoring, or action. The list is updated at each of the three regularly scheduled DCISC Public Meetings per year.

Open Item Types: M = Monitor F = follow-up I = Issue Items in Italics are new or revised

FF = Fact-finding Meeting, PM = Public Meeting, Q = Quarter

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Type</th>
<th>Open Item Category/Description</th>
<th>Last Actions</th>
<th>Next Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td></td>
<td>Conduct of Operations (CO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO-7</td>
<td>M</td>
<td>Review DCPP storm response experience and strategy every two years [or as necessary] during or after annual winter storm season.</td>
<td>4/15FF 5/17FF</td>
<td>As necessary</td>
</tr>
<tr>
<td>CO-8</td>
<td>M</td>
<td>Monitor all reactor trips – automatic and manual (review trip LERs at public meetings). [No trips since 2014.]</td>
<td>7/11FF 1/14FF 8/14FF</td>
<td>Post-trip FFs &amp; PMs</td>
</tr>
<tr>
<td>CO-9</td>
<td>F</td>
<td>Reactivity Management – review every 18 months. [Reviewed Reactivity Management 5/16FF and 4/18FF – satisfactory.]</td>
<td>See list at end of OIL</td>
<td>Regularly</td>
</tr>
<tr>
<td>CO-10</td>
<td>M</td>
<td>Mispositioning Errors (Equipment Status) – monitor the status of mispositioning errors and actions to resolve. [Reviewed at 11/15FF – satisfactory.] [Reviewed QV assessment of 2R20 outage. Some mispositioning issues. Follow up on resolution.]</td>
<td>6/14FF 11/15FF 4/18FF</td>
<td>7/18FF</td>
</tr>
<tr>
<td>CO-11</td>
<td>M</td>
<td>Operator concerns and issues – review periodically the status of operator concerns and</td>
<td>8/16FF 12/17FF</td>
<td>12/18FF</td>
</tr>
<tr>
<td>CO-13</td>
<td>M</td>
<td>Review any implementations of the CAISO load following policy that result in DCPP transients. Review any initiatives to operate DCPP in different modes, such as load following due to renewable energy fluctuations, during its final years of operation. Include 230kV voltage stability issues. Dr. Peterson observed there is potential that an increase in the risk of transmission problems or outages might affect the availability of alternate off site power sources for DCPP due to increasing incentives to curtail power output because of production or grid-related reasons. Mr. Peck and Dr. Peterson agreed this might be a suitable topic for a future DCISC fact-finding which should include representatives from the PG&amp;E transmission organization. [Reviewed at Dec. 2017 FF. Review Annually.]</td>
<td>6/16PM 3/16FF 12/17FF</td>
<td>12/18 FF</td>
</tr>
<tr>
<td>CO-14</td>
<td>F</td>
<td>The DCISC team found the operator retention project to be effectively managed but the Committee should follow this</td>
<td>6/17PM 8/17FF 3/18FF</td>
<td>6/18PM 4Q18FF</td>
</tr>
</tbody>
</table>
issue closely with reference to licensed operators and well as the station in general. [Reviewed operator staffing adequacy 8/17FF - satisfactory.] [Reviewed at 3/18FF - satisfactory.]

<table>
<thead>
<tr>
<th>CM</th>
<th>Conduct of Maintenance (CM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM-7</td>
<td>I</td>
</tr>
<tr>
<td>CM-10</td>
<td>M</td>
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<tr>
<td>CM-13</td>
<td>M</td>
</tr>
<tr>
<td>CM-</td>
<td>M</td>
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</tbody>
</table>
Wireless Technology within the Power Block – DCPP Electronic Device Project is focused on increasing the use of electronic devices, including tablets, in connection with maintenance tasks and for recording data during inspection rounds. This is intended to improve efficiency and reduce paper. A few electronic work packages have been issued. A second project involves use of electronic devices and increased use of wireless information technology (IT) within the Power Block. The Power Block consists of those portions of the plant used to generate electricity including the Turbine Building, the Auxiliary Building and the Control Rooms. One of the problems with use of wireless technology is the potential for radio interference with a plant control system, which must be properly shielded and protected. [Review electronic work packages.] [Reviewed at 9/16FF – satisfactory.] How are the much larger data sets being managed? [Reviewed at Dec. 2017FF – satisfactory.]

| 14 | Wireless Technology within the Power Block – DCPP Electronic Device Project is focused on increasing the use of electronic devices, including tablets, in connection with maintenance tasks and for recording data during inspection rounds. This is intended to improve efficiency and reduce paper. A few electronic work packages have been issued. A second project involves use of electronic devices and increased use of wireless information technology (IT) within the Power Block. The Power Block consists of those portions of the plant used to generate electricity including the Turbine Building, the Auxiliary Building and the Control Rooms. One of the problems with use of wireless technology is the potential for radio interference with a plant control system, which must be properly shielded and protected. [Review electronic work packages.] [Reviewed at 9/16FF – satisfactory.] How are the much larger data sets being managed? [Reviewed at Dec. 2017FF – satisfactory.] | 12/17FF |

| EN | Engineering Program (EN) |
| EN-16 | F | DCPP Systems – review a system (or structure or component), system health, long-term plan, Maintenance Rule performance & walkdown with System Engineer at FFs. [Note: Systems reviewed are listed with dates at the end of the Open Items List.] | See list at end of OIL |
| EN-19 | F | Review every 12-18 months major Engineering Programs, | See list at end of OIL |

[EN-16 F DCPP Systems – review a system (or structure or component), system health, long-term plan, Maintenance Rule performance & walkdown with System Engineer at FFs. [Note: Systems reviewed are listed with dates at the end of the Open Items List.]]

See list at end of OIL

Regularly
including Configuration Management, Management, System Engineering (system health & long-term plans), Valve Testing, Margin Management, Staffing, etc. [Note: Programs reviewed are listed with dates at the end of the Open Items List.] [5/18FF: The recent turnover of System Engineers has been high, and the DCISC should follow up on this issue at a future Fact-finding Meeting.]

| EN-20   | F | Each Member should review or observe Plant Health Committee meetings. [Note: next action changed to “Regularly” and noted in table at the end of the OIL.] Ferman or Rick will check to see what other meetings would be of interest to the DCSIC. {Are there other regular meetings the DCISC should attend?} [Observed CARB at 5/18FF.] | See list at end of OIL | Regularly |

| EN-31   | F | The fact-finding team received an overview of the [Engineering Excellence] plan and should follow up in the future with a more detailed review of selected elements of the plan. | 6/16PM 8/17FF | 8/18FF |

| HP      | Human Performance: Human Errors and Improving Safety & Efficiency of Plant Performance |

<p>| HP-1    | M | Review human performance &amp; human behavior items (including error reduction programs, HP PIs, aberrant behavior statistics, FFD, stress reduction programs, Personnel Accountability Policy, Human Performance Steering Committee &amp; Subcomm, Centers of Excellence, Org. | 3/15FF 8/16FF | Post-2R20 9/18FF RJB |</p>
<table>
<thead>
<tr>
<th>HP-25</th>
<th>M</th>
<th>Further observations and improvements in the Management Observation Program should be reviewed by DCISC. [Reviewed 7/17FF – satisfactory.]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10/15PM 7/17FF 1Q19FF</td>
</tr>
<tr>
<td>HS</td>
<td>Health, Nuclear Safety Culture and Safety Conscious Work Environment</td>
<td></td>
</tr>
<tr>
<td>HS-6</td>
<td>F</td>
<td>Follow DCPP progress in establishing/improving its safety culture (and its subset Safety Conscious Work Environment, including Safety Culture Monitoring Panel, and including Employee Concerns &amp; Differing Professional Opinion Programs). [Reviewed ECP 10/17FF – sat.]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/17FF 7/17FF 10/17FF 2Q19FF</td>
</tr>
<tr>
<td>PI</td>
<td>Performance Improvement Programs</td>
<td></td>
</tr>
<tr>
<td>PI-1</td>
<td>DCPP Performance Improvement Programs: Corrective Action, Self-Assessment, Operating Experience [and line use of OE], Benchmarking, etc. Programs reviewed are listed with dates at the end of the Open Items List.] [Met with 3 PICOs Nov 2017 FF – satisfactory] [Observed CARB Mtg. 5/18FF – satisfactory.]</td>
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<td></td>
<td></td>
<td>See list at end of OIL At least once per year</td>
</tr>
<tr>
<td>EP-2</td>
<td>M</td>
<td>Attend and observe DCPP emergency drills and exercises annually [including Hostile Action Based Exercises],</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9/9/15 11/16FF 1/17FF 2/17PM Next exercise</td>
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<thead>
<tr>
<th>RA</th>
<th>Risk Assessment and Management (RA)</th>
</tr>
</thead>
</table>
| RA-6     | Monitor Seismic Fragility Analysis progress. [Reviewed at 9/17 FF – satisfactory.] [Review after next submittal to NRC.]
| RA-7     | Review Seismic PRA annually. [Reviewed Seismic PRA 8/16FF – satisfactory.] [Review DCPP seismic PRA April 2018 submittal.]
| NS       | Nuclear Safety Oversight and Review (NS) |
| NS-5     | Monitor NSOC meetings periodically to observe their processes and their review of nuclear safety issues. [Reviewed at 11/15FF – satisfactory.] [2018 NSOC schedule not yet available.]
<p>| NS-9     | Monitor DCPP’s program to |</p>
<table>
<thead>
<tr>
<th>Area</th>
<th>Item</th>
<th>Frequency</th>
<th>Details</th>
<th>Date(s)</th>
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<tbody>
<tr>
<td>RP</td>
<td>RP-3</td>
<td>M</td>
<td>Regularly review outage RP performance.</td>
<td>2/16PM 10/17PM</td>
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<tr>
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<td></td>
<td>7/18FF 2R20</td>
</tr>
<tr>
<td>RP</td>
<td>RP-12</td>
<td>M</td>
<td>Review annual DCPP radiological release report each year. Review at Summer or Fall FFs. [Reviewed radiation release reports 9/16FF – satisfactory.]</td>
<td>9/16FF 7/17FF</td>
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<td></td>
<td>3/4Q18FF</td>
</tr>
<tr>
<td>QP</td>
<td>QP-3</td>
<td>M</td>
<td>Review the activities, organization and results of QV audits as well as PG&amp;E’s outside biennial audits, including timeliness of corrective actions. Review annually – include 4th quarter QPAR with yearly results.</td>
<td>3/17FF 1/18FF</td>
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<td>4Q18FF</td>
</tr>
<tr>
<td>QP</td>
<td>QP-9</td>
<td>F</td>
<td>Software QA Program - [Reviewed at March 2018 FF – satisfactory.]</td>
<td>See list at end of OIL</td>
</tr>
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<td></td>
<td></td>
<td>Each RFO</td>
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<tr>
<td>ER</td>
<td>ER-5</td>
<td>M</td>
<td>Monitor the Equipment Reliability Process approximately annually. The indicators for Deficient Critical Components Backlog and Operational Work-arounds rated as needing improvement and the DCISC should continue its review of this item in the future. [Reviewed critical</td>
<td>7/15FF 4/16FF 1/18FF</td>
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<td>1Q19FF</td>
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<td>Organizational Effectiveness &amp; Development (OE)</td>
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<tr>
<td>OE-1</td>
<td>F</td>
<td>Review DCPP Operating Plan each January after development. [Reviewed at 1/16FF &amp; on agenda for 2/16PM.] [Reviewed at 3/18FF – satisfactory.]</td>
<td>2/17PM</td>
<td>3/18FF</td>
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<td>SE-39</td>
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</tbody>
</table>
per se not reviewed but reviewed only in the context of impact on plant operation. Review DCPP progress in implementing their cybersecurity program in compliance with NRC schedule. Implementation complete. [5/18FF: The DCISC should continue to review the Cybersecurity Program every two to three years.]

<table>
<thead>
<tr>
<th>SF</th>
<th>Independent Spent Fuel Storage Installation–ISFSI (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-1</td>
<td>Monitor ISFSI operations, including cask transfer. Review following next campaign.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SC</th>
<th>Seismic &amp; Tsunami (SC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC-4</td>
<td>M Monitor new DCPP risk-based Tsunami Hazard &amp; Local</td>
</tr>
<tr>
<td>Item</td>
<td>Type</td>
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<tr>
<td>Intense Precipitation Flooding Analyses. [Coordinate with BDB-1, Fukushima review.] Dr. Budnitz observed that determination of the annual probability of a 29.9-foot tsunami would be important in context of assessing any threat to the plant and until some sort of state of knowledge of the probability is established, that is a probabilistic understanding of the epistemic uncertainty. Awaiting DCPP’s actions in response to the Committee’s request to have further study done regarding the tsunami hazard and risk. [Reviewed at Dec. 2018 FF. NRC closed issue.]</td>
<td></td>
</tr>
<tr>
<td>SC-12 F</td>
<td>Workplace seismic safety – review annually. [Reviewed at 5/18FF – some problems – follow up on resolution and Control Room procedures “crash cart” stability.</td>
</tr>
<tr>
<td>FP-6 M</td>
<td>Monitor DCPP’s process of converting to the National Fire Protection Association’s Regulation 805 (NFPA 805)</td>
</tr>
</tbody>
</table>
standard. [Reviewed at 5/16FF – NRC approval issued. DCPP has a year to complete procedures, training, etc.] Modifications [for NFPA-805] to the plant were completed in November 2016 and procedures and training will need to be complete by April 2017. The DCPP should next review this issue in late 2018 following implementation of the Unit 2 self-approval process, which is planned for June 2018.

<table>
<thead>
<tr>
<th>LD</th>
<th>Learning &amp; Development Programs (LD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD-3</td>
<td>M</td>
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</tbody>
</table>

| LD-6 | F | Observe operator license, re-qualification, classes periodically in FF meetings. Include Enhanced Simulator Training.] [Reviewed Ops TCOA training & Eng. DC Power System] [Reviewed FLEX training 11/17FF – sat.] | 9/16FF 12/16FF | 3or4Q18 FF |

<table>
<thead>
<tr>
<th>NR</th>
<th>Nuclear Regulatory Commission Items (NR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NR-3</td>
<td>M</td>
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</table>

| NR-4 | F | Meet with NRC Resident Inspectors regularly. [Note: Next Action changed to "Regularly." ] | Most FFs | Regularly |

| LR | License Renewal (LR) |

<p>| CL | Closed Loop Cooling (CL) |</p>
<table>
<thead>
<tr>
<th>BDB</th>
<th>Beyond Design Basis Events (e.g, Fukushima Event)</th>
<th>5/16FF</th>
<th>11/16FF</th>
<th>7/17FF</th>
<th>11/17FF</th>
<th>5/18FF</th>
<th>2Q19FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDB-6</td>
<td>DCPP FLEX Status – review status of progress on FLEX, including EASW screen plugging, SFP level instrumentation; SAMG, EDMG, EOP consolidation; portable instrumentation; operator actions; temporary connections; equipment storage. Review BDB &amp; FLEX storage re: PPR &amp; dosimetry. Review FLEX training. [DCISC should observe future FLEX training and FLEX overall. [Reviewed EASW pump test results at 11/16FF. Results satisfactory.] [Reference seismic fragility – RA6 – RA7] [Observed FLEX operator training Nov 2017 FF – satisfactory.][ Observed SFP level instrumentation and FLEX connection 5/18FF.]</td>
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<tr>
<td>DEC</td>
<td>Decommissioning</td>
<td></td>
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</tr>
<tr>
<td>DEC-1</td>
<td>Review DCPP decommissioning plans periodically as a result of the Joint Proposal forced plant shutdown in 2025. Review the timing of spent fuel transfer from wet to dry storage and when the spent fuel pools are decommissioned the plant will lose the capability to open multipurpose canisters for inspection. DCISC should actively review the decommissioning plans for DCPP because of the potential impact on staffing and future options with respect to managing spent fuel. Dr. Peterson observed there have been multiple approaches taken to decommissioning in terms of rate and timing and</td>
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</table>
the DCISC will need to review and discuss with its appointing entities whether and to what extent it will engage in a review of PG&E’s decommissioning plans for DCPP. [Reviewed at 3/18 FF. DCPP is forming decommissioning organization to look into decommissioning options.]

| DEC-3 | F | DCISC is at this time principally interested in decommissioning due to the potential impacts during the period of plant operation and will seek clarification about whether the DCISC should play a role post-shutdown. [Consultants preparing DCISC decommissioning activity matrix for discussion at 6/18PM.] | 10/17PM | 6/18PM |
| DEC-4 | F | Dr. Peterson commented that ...it would be worthwhile to follow up and identify the differing categories of waste that will be produced during decommissioning and their respective safe disposal paths and to ensure that there will not be any stranded waste left at the site. | 10/17PM | 7/18FF? |

**O**

**O-1**

<table>
<thead>
<tr>
<th>Date</th>
<th>PM</th>
<th>Item</th>
<th>Description</th>
<th>Action</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/16 PM 10</td>
<td>F</td>
<td>10</td>
<td>Permanent corrective action installing [4kV] solid state relays will be completed during refueling outages 1R21 2R21. The fact-finding team concluded reasonable progress has been made but the DCISC should continue to monitor station progress with regard to the potential open phase conditions, which could affect plant safety systems. [Reviewed at 5/16FF – satisfactory. Continue to monitor.]</td>
<td>2/16PM 5/16FF</td>
<td>Post 1R21 &amp; 2R21 RFOs</td>
</tr>
<tr>
<td>2/17 PM 2</td>
<td>F</td>
<td>10</td>
<td>Mr. Wardell recommended that the DCISC review the Westinghouse report [on GSI-191] when it is available. [DCPP switching to deterministic analysis, no need for Westinghouse probabilistic report.]</td>
<td>6/17PM 7/18FF</td>
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<tr>
<td>10</td>
<td>F</td>
<td>Dr. Peterson remarked and Mr. Frauenheim agreed that a review of the amount of data and information managed by DCPP would be a worthwhile topic for a future fact-finding. [Reviewed at Dec 2017 FF. Review Eng. Dept. data trending at future FF.]</td>
<td>6/17PM 12/17FF 5/18 FF</td>
<td>Close</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>F</td>
<td>Dr. Budnitz stated he would inquire of the PRA group whether the CAP trend in reducing items adverse to quality and in the reduction of human error has propagated through to the way human error is analyzed in PRAs. [Completed in 3/18FF – close.]</td>
<td>6/17PM 3/18FF</td>
<td>Close</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>F</td>
<td>Dr. Budnitz remarked that during his last fact-finding on human performance the errors</td>
<td>6/17PM 3/18FF</td>
<td>Close</td>
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</tr>
<tr>
<td>Oct. 2017 PM 2</td>
<td>F</td>
<td>reviewed were mostly errors of commission as opposed to errors of omission. He inquired of Mr. Frauenheim (DCPP) whether the plant has attempted to determine the numbers of each in the data set Mr. Frauenheim presented to the DCISC. Dr. Budnitz stated he would follow up on this issue during a future fact-finding. [How about PFP’s 12/17FF with Frauenheim?] [Completed in 3/18FF – close.]</td>
<td>10/17PM</td>
<td>Close</td>
<td></td>
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<tr>
<td>7</td>
<td>F</td>
<td>Mr. Wardell recommended a fact-finding visit be made early in 2018 to confirm the completion of the [Control Room Ventilation System] modifications (modification required to duct work and filters and flow switches) and to then close this issue on the Open Items List. [Reviewed at 4/18FF – modifications completed – close and review on a normal schedule.]</td>
<td>10/17PM 2/18PM</td>
<td>6/18PM?</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>Dr. Peterson stated the informational video now being produced for the Committee should provide a vehicle to introduce the Committee to the public and to describe how the Committee functions and performs its safety review function and the time on the ride back to the Energy Education Center from the plant should be employed to afford the public the opportunity for the public to ask questions of the Committee. [Reviewed at 2/18PM. Changes needed.]</td>
<td>10/17PM</td>
<td>10/18PM</td>
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</table>
accepted to take the lead in identifying such persons (to investigate and identify a person with experience in decommissioning a nuclear power plant). Dr. Peterson commented he is interested in understanding the disposition path for all the various materials and components which will result from decommissioning a nuclear power plant. [Discussed at 2/18PM. DCISC to invite Dr. David Victor invited to speak at 6/18PM, but invitation accepted for 10/18PM.]

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<tr>
<th>Date</th>
<th>Action</th>
<th>Description</th>
<th>Date</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Feb 2018 PM 1</td>
<td>F</td>
<td>Include direction, for ease of reference, to include the “ML” number in the future when referring to documents of the Nuclear Regulatory Commission (NRC)</td>
<td>2/18PM</td>
<td>Close</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>Ms. Becker inquired if the PG&amp;E analysis of the tsunami and locally intense precipitation has been shared with the California Public Utilities Commission’s (CPUC) Independent Peer Review Panel (IPRP) and Dr. Budnitz agreed that it made sense to share data on this topic with the IPRP.</td>
<td>2/18PM</td>
<td>Status?</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>The DCISC committed to review during its next review of seismic interaction with plant furnishings the ability of these crash carts not to fall over and spill their contents in the event of a seismic event. [Added to Item SC-12. Close here.]</td>
<td>2/18PM</td>
<td>Close</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>Dr. Peterson observed there is also an issue regarding how</td>
<td>2/18PM</td>
<td>4Q18FF</td>
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</table>
the transportation cask would be moved to a federal repository, whether by barge, road or rail, and he suggested it would be worthwhile for the Committee to follow up to verify the technical and logistic practicality of these different approaches.

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<tr>
<td>5</td>
<td>F</td>
<td>Mr. McWhorter stated there are still questions [on ISFSI cask inspections] which will need further follow up by the Committee and that DCPP is continuing to work with the industry as part of its license renewal effort for the ISFSI and the DCISC team concluded that the Cask Transfer Facility provides certain options for inspection, repackaging or repair of a MPC if necessary after closure of the spent fuel pools.</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>Dr. Peterson remarked that such data is now very inexpensive to collect and to monitor and suggested a potential recommendation for the DCISC’s consideration might be related to data retention periods. [Reviewed at 5/18FF – satisfactory – close.]</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>DCISC should be attentive to ensure that DCPP continues with the initiatives to improve EDG reliability and in the future the Committee should review the repair parts evaluation process in more detail as that process is used to dedicate a non safety-related valve for safety-related service. [Reviewed at 5/18FF – satisfactory – close.]</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>The DCISC team concluded plans are in place to address areas identified for improvement in the Operations Department and the DCISC should continue to review Operations Department performance on a regular basis. [Added to CO-11 – close there.]</td>
</tr>
<tr>
<td>9</td>
<td>F</td>
<td>The DCISC team concluded overall grid stability in the local area remains good and PG&amp;E and the Committee should continue to monitor this issue. [Included in Item CO-13 – close here.]</td>
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<tr>
<td>10</td>
<td>F</td>
<td>Mr. McWhorter recommended the DCISC again review the eWM process in one year. [Included in Item CM-14 – close here.]</td>
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<tr>
<td>11</td>
<td>F</td>
<td>Mr. McWhorter reported data obtained from specific equipment in the plant is customarily reviewed by the Engineering organization to a greater degree than by the Performance Improvement organization and the Committee may want to follow up on this issue in the future. The DCISC team concluded that the Performance Improvement Program is effecting in reviewing the Corrective Action Program for trends but there is an opportunity presented to review plant policies on data retention for instrument data related to equipment performance programs. In response to Consultant Wardell’s inquiry as to whether</td>
</tr>
</tbody>
</table>
the issue related to a systematic approach to periodic review of data retention and data management by DCPP was a one-time situation or a recurring issue warranting a recommendation from the DCISC, Dr. Peterson and Mr. McWhorter agreed that further inquiry with the Engineering organization during future fact-finding might be warranted before adopting a recommendation. [Reviewed at 5/18FF – satisfactory – close here.]

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<td>12</td>
<td>F</td>
<td>Following the approval of the December 2017 Fact Finding Report, the Committee discussed and determined, by a vote with Drs. Lam and Peterson in favor and Dr. Budnitz opposed, that a public tour should be conducted in conjunction with the June 13–14, 2018, public meeting. [Tour is on the 6/18PM agenda – close.]</td>
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<td></td>
<td></td>
<td>2/18PM Close</td>
</tr>
<tr>
<td>13</td>
<td>F</td>
<td>Dr. Lam and Dr. Peterson stated the Committee will accept Mr. Lochbaum’s letter into its records and review his information. [Completed – no additional Committee action – close.]</td>
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<td>2/18PM Close</td>
</tr>
<tr>
<td>14</td>
<td>F</td>
<td>Dr. Peterson remarked this was an area [NRC required staffing] on which the DCISC should follow up including actions required should certain staffing requirements not continue to be met.</td>
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<tr>
<td></td>
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<td>2/18PM 3Q18FF</td>
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<tr>
<td>15</td>
<td>F</td>
<td>Dr. Peterson stated the DCISC should schedule a future fact-</td>
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<tr>
<td></td>
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<td>2/18PM 4Q18FF</td>
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<tr>
<td></td>
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<td>finding with the County Office of Emergency Services (OES) manager to review the impact of a future significant reduction in resources on OES planning.</td>
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<tr>
<td>16</td>
<td>F</td>
<td>Dr. Peterson remarked that there has been a great deal of effort by the Committee concerning the question of the potential effect of a submarine landslide-induced tsunami on DCPP and, as it has now been determined that such an event is not a safety issue at the plant site as the risk is bounded by other elements, the DCISC can close its inquiry relevant to the danger to DCPP. [Close Item SC-4.] 2/18PM</td>
</tr>
<tr>
<td>17</td>
<td>F</td>
<td>Dr. Peterson observed that the conclusions of the reports discussed by Mr. McWhorter should be taken very seriously by California officials and should be integrated into their broader set of responsibilities. 2/18PM Advise CA officials of report, then close.</td>
</tr>
<tr>
<td>18</td>
<td>F</td>
<td>Dr. Budnitz reported DCPP is separately now conducting an analysis of the consequence to the plant by a postulated compromise of the ASW System in order to work out the likelihood of a core damage accident and Dr. Budnitz stated this will be important information when it is available for review by the Committee. [Added to Item RA-5. Close here.] 2/18PM Close</td>
</tr>
<tr>
<td>19</td>
<td>F</td>
<td>Dr. Peterson remarked that, as this initiative [Delivering the Nuclear Promise] has the potential to provide significant opportunities to improve performance in Operations, 2/18PM 7/18FF</td>
</tr>
</tbody>
</table>
| 20 | F | Engineering and Maintenance organization, this is an important and interesting initiative for the DCISC to review in fact-finding as it may provide a mechanism to enhance safety and mitigate potential future retention problems.  

20 F Mr. Garcia confirmed Mr. Wardell’s request that the DCISC be afforded an opportunity during its March 2018 fact-finding to review the 2018 Operating Plan.  

[Reviewed at 3/18FF – satisfactory – close.]  

2/18PM Close |
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<tbody>
<tr>
<td>21</td>
<td>F</td>
<td>Dr. Peterson directed that the Committee Technical Consultants and Assistant Legal Counsel review the Open Items List and determine which types of activities would be expected to continue after cessation of generation and which would continue but in a changed format. Dr. Budnitz stated that he believed a consultant would be helpful in that context and it was agreed that the subject of engaging a consultant to assist in developing a review of decommissioning activities would be deferred to the June 13–14, 2018 public meeting but in the interim, before the June 2018 public meeting, the Technical Consultants and Assistant Legal Counsel should develop the Open Items List matrix described by Consultant McWhorter and a fact-finding should be conducted to review PG&amp;E’s plans for decommissioning. [Completed 2/18PM Close</td>
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<tr>
<td><strong>22</strong></td>
<td><strong>F</strong></td>
<td>Dr. Peterson commented that prior to the June public meeting it would be useful for the Members and the Technical Consultants to identify additional potential consultants, in addition to those previously identified by Dr. Budnitz. [Complete. Close.]</td>
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<td>2/18PM Close</td>
</tr>
<tr>
<td><strong>23</strong></td>
<td><strong>F</strong></td>
<td>Dr. Peterson directed that material from the DCISC last investigation during fact-finding of these issues [wildfires] be provided to Ms. Malboeuf. [Completed – close.]</td>
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<td>2/18PM Close</td>
</tr>
<tr>
<td><strong>24</strong></td>
<td><strong>F</strong></td>
<td>Mr. David Weisman was recognized. Ms. Weisman requested the Office of DCISC Legal Counsel to provide him with a copy of the power points presentations on post-shutdown decommissioning scenarios in context of the continuation of the DCISC, which were discussed earlier in this meeting. [Completed – close.]</td>
</tr>
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<td>2/18PM Close</td>
</tr>
</tbody>
</table>

DCPP Systems/Components Reviewed Periodically

- 4 kV – April 2018
- 230 kV – Dec 2017
- 500 kV – Dec 2017
- Aux Feedwater – Nov 2017
- Aux Saltwater – Sep 2017
- Aux Bldg Ventilation – Mar 2017
- Centrifugal Charging Pumps – Mar 2017
- Component Cooling Water – May 2017
- Compressed Air – Mar 2017
- Condensate – Apr 2016
- Containment Structure – Sep 2016
Containment Spray – August 2016
Control Room Simulator – Jun 2015
Control Room Ventilation – April 2018
Digital Systems – Dec 2013 & Oct 2014 PM
DC Power – Jul 2017
EDG – Dec 2017
High Pressure Injection – April 2015
Plant Protection System – Nov 2017
Radiation Monitoring – Jan 2018
Radwaste Processing – Aug 2017
Reactor Coolant – Sep 2014
RCS Process Control System – Nov 2016
Reactor Coolant Pumps – Jan 2015
Refueling Equipment – Mar 2017
RCS Process Control – Jun 2013
RHR – Mar 2016
Safety Injection Pumps Mar 2015
Spent Fuel Pool – May 2018
Steam Generators – Nov 2014

DCPP Programs Reviewed Periodically

AOV – May 2018
Benchmarking – May 2015 (review biennially)
Boric Acid Corrosion Control – Apr 2018 (review biennially)
Buried Piping & Tanks – Jan 2017
Chemistry – Apr 2016
Cranes – Aug 2016
Configuration Management – Jul 2015 & Sep 2015
Corrective Action – CARB May 2018
Door Life Cycle Management Plan – Mar 2014
Emergency Preparedness Exercises – 2/17PM
Employee Concerns Program – Oct. 2017
Equipment Environmental Qualification – Aug 2017
Excellence Plan – March 2018
Fire Doors – Nov 2017
Fire Protection (Non-NFPA-805) – Mar 2017
Fire Protection (NFPA-805) – Sep 2017
Flow Accelerated Corrosion – Apr 2016
FME – Sep 2017
Integrated Risk Assessment Program – Jun 2015
Large Motors – Mar 2016
Long-Term Capital Planning Process – Dec 2016
AOV – Jun 2015
Margin Management – Jan 2017 [Next review 2Q18FF]
MIDAS – Mar 2015 [Review in 2018]
Nuclear Fuel Program – Aug 2017
On-Line Maintenance – Apr 2018
Operating Experience – May 2015 (review biennially)
Operability Assessment Program – March 2017
Operational Decision Making – Apr 2015
PRA Programs (non-seismic) – Sep 2017
Performance Improvement – Nov 2017
Performance Review Quarterly Meeting – May 2015
Plant Health Committee – Sep 2017
Reactivity Management – April 2018
Self-Assessment – Sep 2016
Single Point Vulnerabilities – Jan 2015
Seismic PRA – Sep 2017
Seismically Induced System Interactions – 5/17FF (review biennially)
Software QA -- March 2018
System Engineering – Mar 2015
Transformers, Large – May 2018
Trending Analysis – Jan 2014
Troubleshooting – Jan 2015
Tsunami Hazard Analysis – Sep 2017
Vibration Monitoring – Dec 2015
The following exhibits describe contacts by members of the public during the reporting period.

- Exhibit G.1 DCISC Telephone/Correspondence Log
- Exhibit G.2 Documents Received by the DCISC [192 page PDF file]
- Exhibit G.3 Comments Received at Public Meetings
28th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2017—June 30, 2018

Preface | Executive Summary
Volume I TOC | Volume II TOC | PG& Response | Contact the DCISC

28th Annual Report, Volume II, Exhibit H, DCISC Recommendations and PG&E Responses

DCISC Recommendations & PG&E Responses

The DCISC makes recommendations in each of its annual reports based on reviews and investigations made during the reporting period. PG&E responds to each recommendation, and the responses are included in Section 9.0 of this annual report. This Exhibit H includes the previous DCISC reporting period recommendations, PG&E responses, and the status of DCISC disposition.

Table 1—DCISC Recommendations & DCPP Responses from Last Reporting Period (7/1/2016–6/30/2017)

<table>
<thead>
<tr>
<th>Cumulative Rec. No.</th>
<th>DCISC Recommendation</th>
<th>Conclusion or Recommendation Reference</th>
<th>PG&amp;E Response/Action</th>
<th>PG&amp;E Response/Action Reference</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>222</td>
<td><strong>Recommendations:</strong></td>
<td>Annual Report Executive Summary0</td>
<td><strong>PG&amp;E Response:</strong></td>
<td>2016/2017 DCISC Annual Report,</td>
<td>Accepted</td>
</tr>
<tr>
<td></td>
<td>PG&amp;E should perform</td>
<td></td>
<td>On November 13, 2017,</td>
<td>Section 9.0, PG&amp;E Response to</td>
<td></td>
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<td></td>
<td>additional study of</td>
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<td>Pacific Gas and</td>
<td>DCISC Recommendations</td>
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<td></td>
<td>submarine landslide-</td>
<td></td>
<td>Electric Company's</td>
<td>February 7, 2018 DCISC Public</td>
<td></td>
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<td></td>
<td>induced tsunami</td>
<td></td>
<td>(PG&amp;E) received</td>
<td>Meeting (Annual Report Exhibit</td>
<td></td>
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<tr>
<td></td>
<td>hazards at DCPP and</td>
<td></td>
<td>the Diablo Canyon</td>
<td>B.6)</td>
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<td></td>
<td>its environs.</td>
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<td>Independent Safety</td>
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<td>**Basis for</td>
<td></td>
<td>Committee’s (DCISC)</td>
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<tr>
<td></td>
<td>Recommendation:**</td>
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<td>Twenty-Seventh Annual</td>
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<td>tsunami volume (related to its force on structures), or other possible endpoints. The DCISC endorses developing an estimate (or a useful upper bound) on the annual frequency of a tsunami-caused core-damage accident at DCPP. Such a Core-damage Frequency (CDF) estimate could be used by decision-</td>
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makers and the public to understand whether the overall CDF risk from tsunamis is (or is not) an important contributor to the total CDF from all accidents at DCPP. Developing a probabilistic "understanding" does not, in the DCISC's view, necessarily mean performing a full-blown quantitative probabilistic analysis of the tsunami hazard. Instead, it might involve something less, such as a demonstrably conservative bounding analysis of the annual probabilities of various tsunami "sizes," or an analysis that aims for a realistic probabilistic description but might have very large uncertainties, if that is the best that can be accomplished. Perhaps the desired upper-bound CDF estimate would be easier to develop in a defensible way than a quantified realistic CDF.

(4.20.3)

(that will be submitted to the NRC), PG&E has conservatively assessed a bounding risk assessment of potential seismically induced tsunamis creating waves larger than 14m and 26m. To assess the significance of the generation of a tsunami wave coincident with an earthquake that impacts DCPP, a sensitivity calculation was performed. This sensitivity shows that inclusion of a conditional tsunami has an insignificant impact on the risk to the seismic core damage frequency or seismic large early release frequency. We are pleased that the DCISC has once again concluded that PG&E operated Diablo Canyon Power Plant (DCPP) safely during the report period. As you are aware, operating the plant conservatively to protect public health and safety is our highest priority, and we will continue to ensure that we fulfill this commitment. We welcome the DCISC's independent
| Annual Report Conclusion | Plant operated safely | We are pleased that the DCISC has once again concluded that PG&E operated Diablo Canyon Power Plant (DCPP) safely during the report period. As you are aware, operating the plant conservatively to protect public health and safety is our highest priority, and we will continue to ensure that we fulfill this commitment.

We welcome the DCISC's independent review and oversight, which contributes to the continued safe operation of DCPP. |
General Information About the Diablo Canyon Independent Safety Committee

Introducing the Independent Safety Committee

The Diablo Canyon Independent Safety Committee (DCISC) was created by the State of California's Public Utilities Commission (PUC) and held its first meeting in May 1990. The DCISC is a three-person Committee whose members are charged with reviewing and making recommendations concerning the safety of operations at Pacific Gas and Electric Company's (PG&E) Diablo Canyon Nuclear Power Plant ("Diablo Canyon"), located on a 750-acre site along the central California coastline in San Luis Obispo County. Diablo Canyon provides electricity for more than two million northern and central Californians from operation of its two 1,100 megawatt Westinghouse 4-loop pressurized water reactors fueled by uranium dioxide. Diablo Canyon began commercial operation in 1985 and is currently licensed by the U.S. Nuclear Regulatory Commission (NRC) to continue operating until 2025. The Committee members are assisted in their important work by technical consultants and legal counsel.

Formation of the Independent Safety Committee

The DCISC was established as part of a settlement agreement entered into in June 1988 between the Division of Ratepayer Advocates (DRA) of the PUC, the California Attorney General and PG&E concerning the operation of Diablo Canyon. The settlement agreement was approved in PUC Decision 86-12-083 and provided that

"An Independent Safety Committee shall be established consisting of three members, one each appointed by the Governor of the State of California, the Attorney General and the Chairperson of the California Energy Commission, respectively, serving staggered three-year terms. The Committee shall review Diablo Canyon operations for the purpose of assessing the safety of operations and suggesting any recommendations for safe operations. Neither the Committee nor its members shall have any responsibility or authority for plant operations, and they shall have no authority to
The DCISC publishes an extensive Annual Report for the fiscal year ending June 30. In addition to summarizing the Committee’s activities and its review of Diablo Canyon operations, the Annual Report documents the members’ conclusions, concerns and recommendations regarding Diablo Canyon's operational safety. In twenty-three Annual Reports through 2012-2013, the DCISC has made 220 formal recommendations to PG&E for improving the safety of Diablo Canyon operations. PG&E’s response to each becomes a part of the annual report. All the DCISC Annual Reports are available for review by any interested members of the public at the Reference Department at the R E Kennedy Library, located on the campus of California Polytechnic State University at San Luis Obispo and the Annual Report is provided to local public libraries and published on the DCISC website, www.dcisc.org.

In May of 1997, in response to electric utility rate deregulation, the PUC issued Decision 97-05-088 which, while setting aside the 1988 settlement agreement, found that the DCISC remained a key element of monitoring safety of operations at Diablo Canyon. In May of 2004, in Decision 04-05-055, the PUC concluded the DCISC should retain discretion to determine how best to accomplish its mission and modified requirements for DCISC membership and nomination procedures and added a requirement that the DCISC undertake public outreach in the local San Luis Obispo community. In January 2007, in Decision 07-01-028, the PUC granted the DCISC's application for a Restated Charter.

**DCISC Operation: Public Meetings & Fact Findings**

The DCISC typically conducts three public meetings each year in the San Luis Obispo area. Each meeting usually occurs in four or five separate sessions during two days. Dates, times and locations for these meetings are posted on the Committee’s website, advertised in local newspapers and notices are sent to state agencies, the news media and those persons who have requested advanced notice of the public meetings. Public meetings may also include a tour of the Diablo Canyon Power Plant which is open to a limited number of members of the public along with members of the media. All meetings include an opportunity for the public to address comments and provide information to the Committee Members. PG&E representatives are present to make informational presentations to the Committee on topics requested by the Members. The meeting agenda and supporting documents are filed and available to members of the public at the Reference Department of the Cal-Poly Library, minutes of each public meeting are prepared and approved by the DCISC and included in the annual report, and the public meetings are webcast in real-time, as well as webcast and archived, on www.slospan.org and are videotaped for broadcast on the local public access television station.
The DCISC also conducts frequent fact finding visits by individual members and consultants to the plant site and to other locations as necessary to assess issues, review plant programs and activities, interview and meet with PG&E management and employees, follow-up on current items on the DCISC’s Open Items List and to identify agenda items for future public meetings. These fact finding visits generally occupy one or two intensive days of research and investigation concerning PG&E’s current activities and programs. Committee representatives also frequently observe meetings of PG&E’s internal safety review organizations and Committees.

A detailed written report, summarizing their activities, is prepared for each fact finding visit by the participants. Comments concerning these reports are sought from each of the other members and consultants, oral reports are presented during public meetings and, when approved by the Committee at a public meeting, the fact finding reports are provided to PG&E. All fact finding reports are included as a part of the Committee’s Annual Report

Appointment of DCISC Members

A request for applications is publicly noticed by the PUC. After receipt of the applications and an opportunity for public comment on the applicants, a short list of candidates is selected by the PUC. This list is provided to the nominating Agency which then appoints a member. As required by PUC decisions which created and continued the Committee, the PUC proposes as candidates only persons with knowledge, background and experience in the field of nuclear power facilities and nuclear safety issues. In July 1989, when PUC President G. Mitchell Wilk announced the initial list of nine candidates nominated for appointment to the DCISC, he noted that “an independent safety Committee clearly requires members who could demonstrate objectivity and independence. For this reason, none of the nominees has testified for PG&E or any other party before the PUC or the Nuclear Regulatory Commission in any proceeding regarding Diablo Canyon”. These restrictions have applied to all subsequent nominees, who are required to file annual conflict of interest reports in accordance with California's Fair Political Practices Act and the implementing provisions of the PUC decision which created the Committee.

Public Outreach, Comment, Information and Communication

The Committee’s public outreach activities include conducting three noticed public meetings in the San Luis Obispo area each year, public tours of Diablo Canyon Power Plant, conducting advertised informal open houses, meeting with concerned citizens and groups, broadcast of its public meetings on the local public access television channel and on the internet and responding to questions and requests for information received by letter, telephone and email. The DCISC welcomes comment and communication from members of the public and provides an opportunity for such dialogue during every session of its public meetings. The DCISC provides extensive, publicly available information concerning the safety of
Diablo Canyon operations The office of the DCISC Legal Counsel also maintains a toll-free within California 800 telephone number as well as the DCISC website, including a link to the DCISC's email address, to respond to the questions or requests for information from members of the public. On request, the DCISC will consider arranging a meeting with one or more members of the public and a Committee member. Written comments or questions may also be directed to the DCISC Members by contacting the office of the DCISC Legal Counsel Diablo Canyon Independent Safety Committee Office of the Legal Counsel, 857 Cass Street, Suite D, Monterey, California 93940 (800) 439-4688 (In California) (831) 647-1044 (Outside California). Worldwide Web Page: www.dcisc.org E-mail dcsafety@dcisc.org.

Current Committee Members

Robert J Budnitz

On October 10, 2007, Robert J Budnitz, Pd.D., was appointed by California Attorney General Edmund G. Brown Jr. to a term on the Committee expiring June 30, 2010. On April 15, 2010, Attorney General Brown announced the reappointment of Dr. Budnitz to a second three-year term on the Committee commencing July 1, 2010 through June 30, 2013. At a regular meeting on June 27, 2013 the CPUC ratified its President’s selection of Dr. Budnitz as one of two candidates for appointment by Attorney General Kamala Harris to serve a three-year term on the DCISC.

Dr. Robert J. Budnitz has been involved with nuclear-reactor safety and radioactive-waste safety for many years. He is on the scientific staff at the University of California’s Lawrence Berkeley National Laboratory, where he works on nuclear power safety and security and radioactive waste management. From 2002 to 2007 he was at UC’s Lawrence Livermore National Laboratory, during which period he worked on a two-year special assignment (late 2002 to late 2004) in Washington to assist the Director of DOE’s Office of Civilian Radioactive Waste Management to develop a new Science & Technology Program. Prior to joining LLNL in 2002, he ran a one-person consulting practice in Berkeley CA for over two decades. In 1978-1980, he was a senior officer on the staff of the U.S. Nuclear Regulatory Commission, serving as Deputy Director and then Director of the NRC Office of Nuclear Regulatory Research. In this two-year period, Dr. Budnitz was responsible for formulating and guiding the large NRC research program that constituted over $200 million/year at that time. His responsibilities included assuring that all major areas of reactor-safety research, waste-management research, and fuel-cycle-safety research necessary to serve the mission of NRC were adequately supported. From 1967–1978 he was on the staff of the Lawrence Berkeley National Laboratory, serving in 1975–1978 as Associate Director of LBL and Head of LBNL’s Energy & Environment Division. During this period, the programs under his direction were in a large mix of diverse areas relevant to DOE, including energy efficiency, deep-geologic radioactive waste disposal, solar energy,
geothermal energy, fusion energy, transportation technology, chemical engineering for alternate fuels, environmental instrumentation, air-pollution phenomena, and energy policy analysis. He earned a Ph.D. in experimental physics from Harvard in 1968.

Peter Lam

On June 3, 2009, Peter Lam Ph.D., was appointed by the Chair of the California Energy Commission (CEC) to a three-year term on the Committee commenting July 1, 2009 through June 30, 2012. On July 12, 2012 the CEC Chair announced Dr. Lam’s reappointment to a second three-year term on the Committee commencing July 1, 2012 through June 30, 2015.

Dr. Peter Lam, Administrative Judge Emeritus of the U.S. Nuclear Regulatory Commission, is an international authority on nuclear reactor operating experience and a leading expert on nuclear reactor safety and risk assessment. Dr. Lam is now the principal of EMM International, a consulting company with a group of experts in the nuclear industry. In his 18 years of public service as an Administrative Judge Dr. Lam has presided over numerous public proceedings to decide technical issues of national and international significance involving the use of nuclear energy and materials. Judge Lam’s jurisdiction covered all 104 nuclear power plants, some 21,000 medical and material licensees, and nuclear waste storage in the United States. The ultimate resolution of these significant technical issues has contributed to the enhancement of nuclear reactor safety.

Prior to his judicial appointment 18 years ago, Dr. Lam had extensive technical and managerial experience in the nuclear energy business over a period of 20 years. He was a nuclear engineer at General Electric Company, participating in the design and analysis of BWR advanced fuels. Dr. Lam served as a program manager at Argonne National Laboratory managing the research and development of advanced fast reactor metal fuels. He was a manager at Science Applications, Inc. and as a consultant at NUS Corporation, both major consulting firms in the nuclear industry.

Dr. Lam’s responsibilities there involved the management of probabilistic risk assessments of operating nuclear reactors. He managed a group of technical specialists in the U.S. Nuclear Regulatory Commission in the analysis and evaluation of nuclear reactor operating experience. Dr. Lam was also a visiting faculty member at California State University at San Jose, and at George Washington University.

Dr. Lam has published 71 technical papers and reports in national and international journals and in proprietary company publications, which focus on major issues in nuclear transport theory, nuclear reactor fuel design, nuclear reactor operating experience, and nuclear reader safety. Judge Lam has also issued over 110 published judicial decisions related to some 50 cases of litigations.
These judicial decisions resolve a wide range of technical and legal issues regarding nuclear reactor safety, nuclear waste disposal, and other civilian use of nuclear technology.

Dr. Lam has presented lectures at IAEA international conferences in Austria, Korea, and Spain, on significant results in comprehensive analyses of nuclear reactor operating experience. He has chaired an IAEA working group to develop a technical treatise for the analysis and evaluation of operating experience of the world’s nuclear reactors. These activities contribute to the international exchange of important information to improve nuclear reactor safety.

Dr. Lam earned a Ph.D. and a M.S., both in nuclear engineering, from Stanford University in 1971, and 1968, respectively. He earned a B.S. in mechanical engineering, from Oregon State University in 1967. His 4-year undergraduate study at Oregon State University and his 4-year graduate study at Stanford University were fully funded by eight consecutive scholarships and fellowships.

**Per F. Peterson**


Per F Peterson is the Floyd Professor of Nuclear Engineering at the University of California, Berkeley. He previously chaired the Nuclear Engineering department from 2000 to 2005 and from 2009 to 2012 and chaired the Energy and Resources Group at U.C. Berkeley from 1998 to 2000. He received his B.S. in Mechanical Engineering at the University of Nevada, Reno, in 1982. After working at Bechtel on high-level radioactive waste processing from 1982 to 1985, he received a MS degree in Mechanical Engineering at the University of California Berkeley in 1986 and a Ph.D. in 1988. He was a JSPS Fellow at the Tokyo Institute of Technology from 1989 to 1990 and a National Science Foundation Presidential Young Investigator from 1990 to 1995. He is past chairman of the Thermal Hydraulics Division (1996–1997) and a Fellow (2002) of the American Nuclear Society, a recipient of the Fusion Power Associates Excellence in Fusion Engineering Award (1999). and has served as editor for three technical journals.

Prof. Peterson's research in the 1990s contributed to the development of the passive safety systems used in the GE ESBWR and Westinghouse AP-1000 reactor designs. Currently, his research group focuses primarily on heat transfer, fluid mechanics, and regulation and licensing for high temperature reactors, principally...
designs that use liquid fluoride salts as coolants He is author of over 110 archival journal articles and over 120 conference publications on these topics.

On January 29, 2010, US Department of Energy Secretary Dr. Steven Chu appointed Prof. Peterson as a member of the Blue Ribbon Commission on America’s Nuclear Future, established by President Obama to provide recommendations for recommending solutions to manage the Nation’s spent fuel and high-level waste. He co-chaired the BRC’s Reactor and Fuel Cycle Technology Subcommittee with Senator Pete Domenici. He has served as a member or chair of numerous advisory Committees for the national laboratories and National Research Council. He participated in the development of the Generation IV Roadmap in 2002 as a member of the Evaluation Methodology Group, and has co-chaired its Proliferation Resistance and Physical Protection Working Group since 2002.
Aging Management

is a program for monitoring and dispositioning materials and components whose characteristics change with time or use. PG&E defines aging management as “Engineering, operations, and maintenance activities to control age-related degradation and to mitigate failures of systems, structures, or components (SSC) that are due to aging mechanisms.”

As Low As Reasonably Achievable (ALARA)

refers to maintaining offsite radioactive releases and occupational radiation exposures as low as achievable in a reasonable, cost-effective manner.

Bank

As used in “main bank transformer” or “main transformer bank” references refers to a set of installed electric transformers.

Benchmarking

is the act of reviewing and evaluating practices at other nuclear plants, which are known for excellence in a specific area, for incorporation or improvement at one’s plant.

Capacity Factor

is the fraction of power actually produced compared to the maximum which could be produced by operating at full power during a period of time (expressed in percent).

Civil Penalty

is a penalty in the form of a monetary fine levied by the Nuclear Regulatory Commission for a significant violation of its regulations.

Control Rods

are long slender metal-clad rods which move into or out-of nuclear fuel assemblies in the reactor core to control the rate of the nuclear fission process. The rods contain a neutron absorbing material which, when inserted into the fuel, absorb neutrons, slowing down the fission rate and thus the heat generation rate and reducing the power level of the reactor.

Cross-cutting Aspect

is a nuclear plant activity that affects most or all of NRC’s safety cornerstones,
which include the plant’s corrective action program, human performance, and "safety-conscious work environment." A Substantive Cross-cutting Issue refers to a performance deficiency characteristic that compromises more areas than just the specific situation in which it occurred.

Design Bases
are the current features and criteria upon which the nuclear plant is designed and are also the bases for Nuclear Regulatory Commission review and approval.

Diesel Generator (DG)
is a standby source of emergency electrical power needed to power pumps and valves to provide cooling water to the fuel in the reactor to prevent its overheating and possible melting. The diesel generator is designed to start up and provide power automatically if normal power is lost.

Emergency Operations Center (EOC)
is the facility away from the immediate vicinity of the plant which is used to direct the operations for mitigation of and recovery from an accident.

Emergency Preparedness (EP)
is the assurance that the plant and its personnel are practiced and prepared for postulated emergencies to be able to mitigate them and recover with a minimum of damage and health effects.

Engineered Safety Features (ESF)
are the features (systems and equipment) engineered into the plant to mitigate the effects of anticipated and postulated accidents.

Erosion/Corrosion
is a phenomenon which takes place in carbon steel power plant water systems. The inside metal pipe will continually corrode due to galvanic action, forming a magnetite coating as erosion (due to high water velocity and/or changes in flow direction) continually wears away the magnetite layer, permitting the corrosion layer to reform, etc. The continual combination of effects wears away and thins the pipe wall.

Escalated Enforcement Action
is action taken by NRC beyond a notice of violation of its requirements for a single severe violation or recurring violations. Examples include a civil penalty, suspension of operations, and modification or revocation of a license to operate a nuclear plant.

Final Safety Analysis Report (FSAR)
is the document which describes the plant design, safety analysis, and operations for Nuclear Regulatory Commission review and approval for licensing for plant operation.

Fitness for Duty (FFD)
describes the state of an employee (cleared to access the nuclear plant) being in sound enough physical and mental condition to adequately and safely carry out his or her duties without adverse effects.

High Impact Team (HIT)

is a term denoting a multi-disciplinary or multi-functional team of people put together to focus on solving a particular problem or perform a particular task. The disciplines included are those necessary to effectively accomplish the task.

High Level Waste (HLW)

is highly radioactive waste, usually in the form of spent fuel (or fuel which has been discharged from the reactor as waste) containing a high level (as defined by NRC regulations) of radioactive fission products. HLW is handled remotely, using water or a thick container as a radiation shield.

Individual Plant Examination (IPE)

is a level 2 Probabilistic Risk Assessment (PRA) analysis of plant accident sequences. The analysis includes core damage progression through the release of radioactive material to the containment and the subsequent containment failure but stops short of determining potential impact on the public or property. The NRC requested all nuclear plants be analyzed in this way to get a better understanding of severe accident behavior. An IPEEE is an IPE which is initiated by External Events to the plant.

INPO, the Institute of Nuclear Power Operators

is a nuclear industry group formed after the Three Mile Island accident to help improve nuclear plant operations through regular assessments of each nuclear plant, evaluations, best practices, and nuclear operator training accreditation.

ISFSI,

or Independent Spent Fuel Storage Installation, is the term for DCPP’s on-site storage facility for the dry cask storage of spent nuclear fuel.

Inservice Inspection (ISI) and Inservice Testing (IST)

are the practices of inspecting and testing certain selected components periodically during their service lives to determine degradation patterns and to repair, if necessary, any degradation beyond acceptable limits.

Leg

with reference to the Hot Leg or Cold Leg refers to piping trains leading to or from the reactor vessel. The Hot Leg removes heat and the Cold Leg provides cooling water to the vessel and nuclear core.

Licensee Event Reports (LERs)

are reports from the plant operator to the Nuclear Regulatory Commission describing off-normal events or conditions outside established limits at a nuclear plant.

Line Organization refers to the direct reporting supervisory chain in an organization
through which orders and information flow. It is also known as the “chain of command.”

Loss of Offsite Power (LOOP)

is an occurrence whereby the normal supply of electrical power from offsite is interrupted. Nuclear reactors need power from offsite when shutdown for spent fuel cooling and residual heat removal. There are usually several sources of offsite power; however, loss of all sources would result in the automatic start-up of the diesel generators to supply power.

Low Level Waste (LLW)

is waste containing a low level of radioactivity as defined by NRC regulations. LLW is usually in the form of scrap paper, plastic, tape, tubing, filters, scrap parts, dewatered resins, etc. LLW requires packaging to prevent the spread of contamination but little radiation shielding.

Maintenance Rule

is the NRC proposed rule which requires that nuclear power plant licensees monitor the performance or condition, or provide effective preventative maintenance of certain structures, systems and components against licensee-established goals. The Rule becomes effective July 10, 1996.

Microbiologically-Influenced (or Induced) Corrosion (MIC)

is corrosion, usually in the form of pitting, on steel piping systems containing stagnant or low-flow water conditions. The corrosion is caused by surface-attached microbe-produced chemicals which attack the piping surface. Depending on severity, MIC is controlled by mechanical and chemical cleaning combined with biocides.

Mid-Loop Operation

is an infrequently-used refueling outage procedure in which, after shutdown and a cooling period, reactor coolant is lowered below the hot and cold legs, permitting work to be performed in a relatively dry environment. The operation is a relatively high-risk condition due to the potential for loss of cooling.

Misposition

means a positionable component, such as a valve, placed or left out of the required position for existing plant conditions when the component’s required position is tracked by a station status control tool, such as a procedure, drawing, or valve list.

Motor-Operated Valves

Are valves opened or closed by remotely-or locally-operated integral electric motors. The valves are used in power plant piping systems to divert, block or control the flow of steam or water.

Notification

formerly known as an “Action Request” or “AR” is a document, which is used to
identify and track resolution of a problem and incorporate it into the Corrective Action Program.

**Nuclear Excellence Team (NET)**

is a organization of several well-qualified senior people whose mission is “To improve plant performance through the use of performance-based self-assessments within the NPG (Nuclear Power Generation) organization." The Team is augmented by at least one other PG&E and one outside individual with expertise appropriate to the particular investigation.

**Nuclear Regulatory Commission (NRC)**

is the Federal agency which regulates and licenses the peaceful uses of domestic nuclear and radioactive applications such as nuclear power plants, experimental nuclear reactors, medical and industrial radioisotope applications, radioactive waste, etc.

**Nuclear Steam Supply System (NSSS)**

is the nuclear reactor and its closely associated heat removal systems which produce steam for the turbine. The NSSS usually includes the nuclear reactor, nuclear fuel, reactor coolant pumps, pressurizer, steam generators, and connected piping.

**Operational Capacity Factor**

is the capacity factor as measured between, but not including, refueling outages.

**Primary Side and Secondary Side**

refer, respectively, to the Reactor Coolant System, which is used to remove heat from the nuclear reactor and the Main Steam and Feedwater Systems which provide cooling to the Steam Generators and generate and provide steam to the Turbines.

**Probabilistic Risk Assessment (PRA)**

is a formal process for quantifying the frequencies and consequences of accidents to predict public health risk.

**Protected Area**

is the outermost area of the nuclear plant which is protected by physical means, a security system, and security force to prevent unauthorized entry (see also Vital Area).

**Quality Assurance (QA)**

comprises all those planned and systematic actions necessary to provide confidence that a structure, system or component will perform satisfactorily is service.

**Reactor Coolant System (RCS)**

is the collection of piping, reactor vessel, steam generators, pumps, pressurizer, and associated valves which function to circulate water through the reactor to
remove heat.

**Reactor Oversight Process**

is the process by which the NRC monitors and evaluates the performance of commercial nuclear power plants. Designed to focus on those plant activities that are most important to safety, the process uses inspection findings and performance indicators to assess each plant’s safety performance.

**Refueling Outage**

is a normal shutdown of a nuclear power unit to permit refueling of the reactor, along with maintenance, inspections and modifications. Typical DCPP refueling outages occur about every 18 months and last for about two months. The outages are numbered by unit number (1 or 2), “R”, and the consecutive outage number. For example, “1R5” is the fifth refueling outage for Unit 1 since start-up.

**Reliability Centered Maintenance (RCM)**

is the practice of maintaining equipment on the basis of the logical application of reliability data and expert knowledge of the equipment, i.e., a systems approach. Normal preventive maintenance (PM) is performed on the basis of time, i.e., maintenance operations are performed on a schedule to prevent poor performance or failure.

**Residual Heat Removal (RHR)**

is the removal of the residual heat generated in the reactor fuel after reactor shutdown to prevent the fuel overheating and possibly melting. The heat removal is performed by a set of pumps, piping, valves and heat exchange equipment circulating water by the fuel while the reactor is shut down.

**Safety System Functional Audit and Review (SSFAR)**

is an investigation of a single plant safety system from all perspectives such as design basis, operations, maintenance, engineering, testing, materials, problems and resolutions, quality control, etc. The review is performed by a multi-functional team and can last several months.

**Simulator**

is a simulated nuclear power reactor control room with gauges, instruments and controls connected to a computer. The computer is programmed to behave like a nuclear reactor and respond to operator actions and commands. The simulator is used in training nuclear operators in controlling the reactor and responding to simulated transients and accidents.

**Single Point Vulnerability (SPV)**

is an individual component, which does not have a significant level of component redundancy and whose failure alone could adversely impact the system or plant performance. DCPP defines a SPV as “a High-Critical component whose failure results in a plant trip or derate > 2%.

**Spent Fuel Pool (SFP)**
is an in-plant stainless-steel-lined concrete pool of water into which highly radioactive spent nuclear fuel is stored when it has been discharged from the reactor. The spent fuel is maintained in the pool until its ultimate disposal is determined.

**Steam Dump Valve**

is a device to discharge (dump) steam from the power plant piping to lower its pressure and reduce the energy in the line. This is done to permit faster shutdowns.

**Steam Generator**

is a large, vertical, inverted-U-tube-and-shell heat exchanger with hot reactor coolant on its tube side transferring heat to and boiling the non-nuclear feedwater to form steam on the shell side. Besides transferring heat, the steam generator is important as a barrier between the nuclear and non-nuclear coolants.

**Surveillance**

is the process of testing, inspecting, or calibrating components and systems to assure that the necessary quality is maintained, operation is within safety limits, and operation will be maintained within limiting conditions.

**Technical Specifications (TS)**

Are the rules and limitations by which the plant is operated. They consist of safety limits, limiting safety system and control settings, limiting conditions for operation, surveillance requirements, description of important design features, administrative controls, and required periodic and special notifications and reports.

**Technical Support Center (TSC)**

is the in-plant facility which directs plant activities in mitigating accidents and minimizing their effects.

**Trains**

refers to individual functional lines of system piping, components, or wiring which are usually independent of other parallel lines, which have the same redundant function.

**Trip**

(or scram) is the shutting down of the nuclear reactor by inserting control rods which shut down the nuclear fission process. An automatic trip is initiated by plant monitoring systems when one or more parameters differ from preset limits. A manual trip is initiated by plant operators in an off-normal event to prevent preset limits from being exceeded or as a backup to the automatic system.

**Vital Area**

is an area inside the plant within the Protected Area which contains equipment vital for safe operation.
Notice of Meeting

A legal notice of the public meeting and several display advertisements were published in local newspapers and mailed to the media and those persons on the Committee’s service list. Information on the public tour and a copy of the meeting agenda were also posted on the Committee’s website at www.dcisc.org.

Agenda

I Call to Order – Roll Call

The October 18, 2017, public meeting of the Diablo Canyon Independent Safety Committee (DCISC), the eighty-eighth public meeting of the Committee, was called to order by Committee Chair Dr. Peter Lam at 9:00 A.M. in the Point San Luis Conference Room at the Avila Lighthouse Suites in Avila Beach, California. Dr. Lam welcomed the members of the public in attendance. The public meetings of the Committee are viewed in live streaming video at www.dcisc.org and www.slospan.org and are videotaped for later broadcast on the local public access television station. Dr. Lam introduced and briefly reviewed the appointment to the DCISC for each of the other DCISC Members and their professional backgrounds. Dr. Budnitz reviewed Dr. Lam’s professional background. Dr. Lam commented the DCISC was established 28 years ago by the California Public Utilities Commission (CPUC) with its only role being the review of the operational safety of Pacific Gas & Electric Company’s (PG&E) Diablo Canyon Nuclear Power Plant (DCPP).

Present:

Committee Member Robert J. Budnitz
Committee Member Peter Lam
II Introductions

Dr. Lam introduced and briefly reviewed the professional backgrounds of the Committee’s Technical Consultants, Mr. Richard D. McWhorter, Jr. and Mr. R. Ferman Wardell and DCISC Assistant Legal Counsel Robert W. Rathie.

Dr. Lam recognized and acknowledged the presence of Mr. Albert Lundeen, Deputy Executive Director for Strategic Planning and Media for the California Energy Commission (CEC). Mr. Lundeen thanked Dr. Lam and he conveyed greetings to the Members from CEC Chair Dr. Robert B. Weisenmiller and remarked that the DCISC is unique and its focus on safety will be critical during what he described as a transitional period for DCPP. Mr. Lundeen commended the DCISC for the accessible and open manner in which it conducts its business. Mr. Lundeen observed the CEC is now developing its 2017 Integrated Energy Policy Report (IEPR) which will define the energy policies for California including those related to nuclear energy and the public comment on the IEPR is now open.

Dr. Lam recognized and introduced DCPP Chief Nuclear Officer Support Manager, Mr. Hector Garcia, who acts as the principal liaison with the DCISC and who plays a key role on behalf of PG&E in working with the DCISC to coordinate activities and provide information.

III Public Comments and Communications

The Chair inquired whether there were any members of the public present who wished to address remarks to the Committee on items not appearing on the agenda for the public meeting and he reviewed the advice from the agenda concerning items or issues which are brought to the attention of the Members by the public during public meetings.

Ms. Rochelle Becker, Executive Director of the Alliance for Nuclear Responsibility (A4NR), was recognized. Ms. Becker requested that the DCISC undertake efforts to determine whether the Committee might continue to perform a role in reviewing decommissioning activities at DCPP after the plant shuts down generation operations. Ms. Becker remarked that under the Joint Proposal by PG&E and six other parties, including A4NR, to retire DCPP at the end of its current operating licenses (Joint Proposal) that the plant could shut down no later than 2025 but she remarked that closure might occur earlier and the Committee should be prepared by seeking guidance from the CPUC for a post-shutdown role. Ms. Becker urged the Members to take whatever steps might be necessary to allow the DCISC to continue in its role of performing an independent safety review during the post-
Dr. Budnitz stated that the DCISC is only now just beginning to evaluate and review PG&E’s decommissioning plans, staffing, programs, budgets, and similar issues and he believes those activities to be within its current Restated Charter from the CPUC but he acknowledged there is a question concerning whether the Committee would have a role, and if so what that role might be and how it might or should be defined, once the operating licenses for both units expire. Dr. Peterson commented that this is an issue for which the Committee should seek advice from its Legal Counsel. Dr. Peterson observed the present Restated Charter for the Committee would not necessarily encompass a role for the DCISC once the plant ceases generation operations and there are very likely policy issues to be addressed and those persons responsible for establishing policy need to be alerted. Assistant Counsel Rathie remarked that the Committee might consider opening a dialogue with the CPUC on this issue.

Dr. Budnitz observed the matter of conducting an inquiry into an expanded role for the Committee might actually be subject to challenge as being outside the remit of the present Restated Charter and that it would be good to obtain clarity on this matter prior to DCPP beginning its transition to post-generation status. Ms. Becker commented that the A4NR could file a petition to modify the present Restated Charter but the Committee would need to be willing to take a position in support or to show interest in that effort. Mr. Rathie observed that in a Decision by the CPUC which continued the Committee’s existence there was language stating that the DCISC should retain discretion to determine how best to accomplish its mission and therefore the Committee has some ability under the Restated Charter to review issues related to decommissioning while generation operations continue. Dr. Peterson remarked that the policy framework which the DCISC implements is established externally and any ambiguity as to the safety oversight role of the DCISC is something about which the Committee should obtain guidance and clarity sooner rather than later. Ms. Becker asked Mr. Rathie to provide the reference for his comment on the Committee’s discretion regarding its mission. That reference, to CPUC Decision 04-05-055 issued on May 24, 2004, was subsequently provided to Ms. Becker.

Dr. Lam stated, absent legal clarification, he was prepared to broadly interpret the Restated Charter to include review of operational safety and decommissioning activities but he concurred with Dr. Peterson on the need to obtain further clarification in this matter. Dr. Peterson remarked it was important that the DCISC not unilaterally expand its mission outside the scope of the clear mandate to review operational safety in the Restated Charter but he observed there will be activities related to plant decommissioning that will be undertaken far in advance of final shutdown of Unit 1, which is scheduled to be the first of DCPP’s two nuclear reactors to shut down with Unit 2 scheduled to shut down one year after Unit 1. Accordingly there will be some significant and overlapping decommissioning activities occurring for Unit-1 while Unit-2 remains in operation and therefore.
decommissioning activities would necessarily have the potential to impact generation operations as that term is understood in context of the Restated Charter. **Mr. McWhorter suggested that an item be added to the Committee’s Open Items List concerning the matter of possibly establishing a post-shutdown role for the DCISC to review issues related to plant decommissioning.** Dr. Peterson commented it was important that the DCISC not be perceived as lobbying for a role to review post-shutdown decommissioning issues but rather is simply bringing the matter to the attention of policymakers as, while a post-shutdown role might make sense, it is not a decision that the Committee is able to make on its own. Dr. Peterson remarked the State of California faces significant issues concerning the manner in which spent nuclear fuel will be stored and managed and a mandate to review nuclear fuel storage throughout the state might better serve the residents than having the Committee look only at issues related to DCPP. Ms. Becker stated the Committee might consider inviting Mr. David Victor of the San Onofre Community Engagement Panel to provide an update on what is being done in Southern California. Dr. Peterson confirmed his understanding that there have been certain issues identified related to the San Onofre Nuclear Generating Station (SONGS) decommissioning that may have future implications for DCPP.

Dr. David Weisman, Outreach Coordinator for A4NR, was recognized. Mr. Weisman provided to the Committee testimony submitted by Mr. Victor to the Nuclear Regulatory Commission (NRC) on what Mr. Weisman described as the goals, challenges, and successes of the San Onofre Community Engagement Panel. Mr. Weisman remarked that seven years ago the DCISC opined on the matter of PG&E’s application to relicense DCP which was something that was scheduled to occur following the current licensing period and was, like decommissioning, a speculative matter. Dr. Budnitz replied that certain activities which were undertaken for relicensing had a direct impact on plant operations as PG&E was preparing to make certain changes and Dr. Budnitz commented that this was also true in context of DCP’s preparation for decommissioning as to the effect on operational safety of necessary changes or, in the alternative, the failure to make such change will be assessed by the DCISC.

**IV Action Items**

**A. DCISC’s 27th Annual Report on Safety of Diablo Canyon Operations; July 1, 2016 —June 30, 2017.**

The Chair requested Consultant Wardell to lead the discussion concerning preparation of the 27th Annual Report. Mr. Wardell reported three drafts were circulated for review and a draft of the Executive Summary was provided for final review and as the basis for this discussion regarding approval of the report. At the Chair’s request Mr. Wardell read the single recommendation of the DCISC from its 27th Annual Report:
PG&E should perform additional study of submarine landslide-induced tsunami hazards at DCPP and its environs.

Mr. Wardell then reviewed the basis, taken directly from the Annual Report, for that recommendation as follows:

“The DCISC believes that a probabilistic analysis would provide the annual frequency of various tsunami “sizes” at the DCPP site, including estimates of the various uncertainties. Here the word “size” might have one of several meanings, including tsunami maximum height, tsunami run-up, tsunami volume (related to its force on structures), or other possible endpoints. The DCISC endorses developing an estimate (or a useful upper bound) on the annual frequency of a tsunami-caused core-damage accident at DCPP. Such a Core-damage Frequency (CDF) estimate could be used by decision-makers and the public to understand whether the overall CDF risk from tsunamis is (or is not) an important contributor to the total CDF from all accidents at DCPP. Developing a probabilistic “understanding” does not, in the DCISC’s view, necessarily mean performing a full-blown quantitative probabilistic analysis of the tsunami hazard. Instead, it might involve something less, such as a demonstrably conservative bounding analysis of the annual probabilities of various tsunami “sizes,” or an analysis that aims for a realistic probabilistic description but might have very large uncertainties, if that is the best that can be accomplished. Perhaps the desired upper-bound CDF estimate would be easier to develop in a defensible way than a quantified realistic CDF.”

Consultant McWhorter observed the Recommendation was a carry-over from last year’s report period because, as of June 30, 2017 the end of the 27th Annual Report period, PG&E had not provided an update or any analysis concerning the subject matter of the Recommendation and he noted that as of September 2017, an update has been provided which will be reviewed during this public meeting. Dr. Peterson observed unlike the NRC the DCISC does not have the ability to direct PG&E to take any action as the DCISC’s authority is limited to making recommendations to which PG&E has always been responsive. In the event the Committee was not satisfied with PG&E’s response to one of its recommendations the DCISC has the ability to raise the matter with the CPUC, the NRC, or with the responsible officials and entities who appoint its members, the Governor, the California Attorney General and the Chair of the California Energy Commission.

Consultant Wardell reported that the overall conclusion of this and all previous DCISC Annual Reports is that PG&E has operated the plant safely during the report period.

The DCISC Annual Reports are made available in two bound volumes, as a compact disk and on the Committee’s website at www.dcisc.org. The report is made available to the public and sent to the CPUC and the entities appointing...
members of the DCISC and to other interested parties and provided for inclusion in the collections of the California Polytechnic University at San Luis Obispo (Cal Poly) R.E. Kennedy Library and local libraries in San Luis Obispo County.

On a motion by Dr. Budnitz, seconded by Dr. Peterson, the Committee unanimously accepted its Twenty-Seventh Annual Report on the Safety of Diablo Canyon Operations for the period July 1, 2016—June 30, 2017. Mr. Rathie reported the 27th Annual Report will now be provided to PG&E for its review and response which will be considered by the Committee at its February 7–8, 2018, public meeting and then incorporated in the final report.


In response to the Chair’s request Assistant Legal Counsel Rathie reported that a report was provided showing the expenditures by the Committee to date and the grant funds received for the Committee’s operations which are provided by PG&E’s ratepayers in accordance with the CPUC Decision which authorized the continued operation of the Committee. He reported the DCISC should complete its activities during calendar year 2017 without exceeding the funds allocated for its operations and will likely once again be in a position to remit the unspent funds back to the ratepayers. Mr. Rathie directed the Members’ attention to the agenda packet with the list of planned activities for the remainder of 2017 and for 2018 and 2019. He commented that the date for the October 2018 public meeting was changed from October 17–18, 2018 to October 10–11, 2018 [subsequently changed again from October 10–11 to October 24–25, 2018, see Section V below].

C. Discussion of Issues on Open Items List.

Dr. Lam requested Consultant Wardell lead a review of items on the Open Items List, which he described as a very important tool used by the Committee to track and also to follow issues, concerns, and information requests identified for subsequent action or receipt during fact-finding and public meetings. Items discussed or concerning which action was taken included the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Re:</th>
<th>Action Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO-7</td>
<td>DCPP Storm Response</td>
<td>Retain &amp; add “as necessary”</td>
</tr>
<tr>
<td>CM-14</td>
<td>Portable Electric Device Use</td>
<td>Title changed &amp; Management of Large Data Sets</td>
</tr>
<tr>
<td>EN-20</td>
<td>Review Plant Health Committee Mtgs.</td>
<td>For 10/17FF PL/RFW Review re other standing mtgs.</td>
</tr>
<tr>
<td>HP-1</td>
<td>Human Performance &amp; Behavior</td>
<td>For 9/17 FF(RJB/RDM)</td>
</tr>
<tr>
<td>RA-6</td>
<td>Seismic Fragility Analysis</td>
<td>Combine w/RA-7 when DCPP</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Action</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>RP-3</td>
<td>Rev. Radiation Protection During Outage</td>
<td>Schedule after 2R20</td>
</tr>
<tr>
<td>RP-12</td>
<td>Rev. Radiological Release Report</td>
<td>Schedule for 3/4 Qtr 18</td>
</tr>
<tr>
<td>QP9</td>
<td>Software QA Programs</td>
<td>Delete reference to 2006 FF</td>
</tr>
<tr>
<td>SE-39</td>
<td>Concrete Intake Structure Review</td>
<td>Schedule after 2R20 &amp; make last action 9/17FF</td>
</tr>
<tr>
<td>SE-42</td>
<td>Safety System Functional Failures</td>
<td>Add nos. re improved performance Schedule for 3Q19FF &amp; make last action 6/17PM</td>
</tr>
<tr>
<td>SE-51</td>
<td>Plant Protection System Upgrade</td>
<td>Schedule for 2/18PM</td>
</tr>
<tr>
<td>SG-6</td>
<td>Steam Generators Performance Metrics</td>
<td>Move to Outage Mgmnt. Section (OM) &amp; include w/post outage rev.</td>
</tr>
<tr>
<td>OM-5</td>
<td>Foreign Material Exclusion</td>
<td>Make last action 9/17FF &amp; schedule next action Mid-2019</td>
</tr>
<tr>
<td>SEC-3</td>
<td>Security &amp; Operations</td>
<td>Add that security only reviewed in context of impact on operations &amp; cyber security reviewed in accord with NRC requirements</td>
</tr>
<tr>
<td>SF-1</td>
<td>Monitor ISFSI operations</td>
<td>Schedule next action 3Q18FF</td>
</tr>
<tr>
<td>SF-2</td>
<td>Cask &amp; Pool Spent Fuel Storage</td>
<td>Add ref. re rev. of Humboldt Bay Power Plant &amp; rail access issues &amp; Schedule for 2019</td>
</tr>
<tr>
<td>SC-4</td>
<td>Tsunami &amp; Local Intense Precipitation</td>
<td>Make last action 10/17PM Schedule for 2Q18FF &amp; 6/18PM</td>
</tr>
<tr>
<td>FP-6</td>
<td>Conversion to NFPA-805 Regulation</td>
<td>Make last action 10/17PM Schedule for 4Q18 after Unit-2 outage review</td>
</tr>
<tr>
<td>BDB-6</td>
<td>DCPP FLEX Status</td>
<td>See RA-6 and RA-7 above</td>
</tr>
<tr>
<td>DEC-1</td>
<td>Decommissioning Plans</td>
<td>Make last action 10/17PM Schedule for 1Q18 delete RJB</td>
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<tr>
<td>DEC-2</td>
<td>Spent Fuel Repackaging Make next action 12/17FF PFP</td>
<td></td>
</tr>
<tr>
<td>6/17PM-2</td>
<td>Review of Westinghouse GSI-191 Report</td>
<td>Moot due to deterministic analysis cancel 4Q17FF review &amp; hold for receipt of DCPP report.</td>
</tr>
<tr>
<td>10/16PM-5</td>
<td>Systems, Structures &amp; Components</td>
<td>Make last action 10/17PM &amp; Close</td>
</tr>
<tr>
<td>10/16-17</td>
<td>Joint Proposal &amp; Offsite Power</td>
<td>Make last action 10/17PM &amp; Close</td>
</tr>
<tr>
<td>6/17PM-2</td>
<td>95001 Inspection “White Finding”</td>
<td>Make next action 11/17FF RJB/RFW</td>
</tr>
<tr>
<td>6/17PM-7</td>
<td>Transmission Problems/Offsite Power</td>
<td>Combine with 500kV System Item and make next action 12/17FF PFP/RCM</td>
</tr>
</tbody>
</table>

System/Program Review (pgs. 11-12)

| “Plant - Dec 2013” | Review re origin of reference |
| Fire Protection Non NFPA-805 | Make last action 9/17FF |
| PRA Programs (non seismic) | Make last action 9/17FF |
| Seismic PRA | Make last action 9/17FF |
| Tsunami Hazard Analysis | Make last action 9/17FF |

1 Key to abbreviations used: Public Meeting (PM), Quarter (Q), Fact-finding (FF), To Be Determined (TBD), Dr. Robert J. Budnitz (RJB), Dr. Per F. Peterson (PFP), and Mr. R. Ferman Wardell (RFW), Mr. Richard D. McWhorter (RDM), Quality Assurance (QA), Independent Spent Fuel Storage Installation (ISFSI).

Items identified on the list and not included in the above were identified by Mr. Wardell for closure and so approved.

Following the discussion of item RA-6 Dr. Budnitz reviewed with the Committee PG&E’s efforts to incorporate the use of FLEX equipment into probabilistic risk assessment (PRA) analyses including but not limited to inclusion of FLEX in the seismic PRA. This process will necessarily occupy several months and will include an assessment of activities never before analyzed in context of PRA. Dr. Budnitz remarked that if the methodology is determined to be sound in trial versions it will be employed throughout the entire U.S. nuclear industry. The methodology must be developed in accordance with the American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) standards and will be peer
reviewed. The PRA analysis of FLEX is hoped and expected to demonstrate that core damage frequency (CDF) has been reduced by a considerable factor. Dr. Peterson observed the concept of deploying FLEX equipment in the effort to retain safe shutdown capability goes back in time to the attacks of September 11, 2001, and the NRC’s B.5.b initiative, and subsequently was informed by the accident to the Fukushima Dai-ichi Nuclear Power Plant (Fukushima) in Japan on March 11, 2011, due to the earthquake and tsunami.

2 Add reference to the Open Items List that DCISC is at this time principally interested in decommissioning due to the potential impacts during the period of plant operation and will seek clarification about whether the DCISC should play a role post-shutdown.

3 FLEX is not an acronym but describes a strategy developed by the nuclear industry to identify diverse and flexible coping strategies to address the loss of safety-related systems due to beyond design basis events.

Ms. Sherry Lewis, representing the group San Luis Obispo Mothers for Peace, was recognized during the discussion of Open Item DEC-2 and Ms. Lewis commented that it is her belief the spent fuel from DCPP will remain on the plant site for some considerable period of time and there will be a continual need to assess its condition.

Ms. Rochelle Becker of the A4NR was recognized and inquired whether any additional information was available concerning Open Item SE-51, the upgrade to the Plant Protection System. Consultant McWhorter replied that DCPP has commenced categorizing its capital improvement projects as “must do” or “probably won’t do” and has prioritized a list of the projects that may or may not be done as part of the capital planning process for calendar year 2018. Mr. Wardell stated he expects that PG&E will be asked to make a presentation on this topic to the DCISC at the February 7–8, 2018, public meeting. He reported DCPP has assured the DCISC that no capital projects have been dropped for calendar year 2017. Dr. Budnitz remarked that these are among the most important decisions by PG&E concerning which the DCISC will monitor and review. Ms. Becker also requested that when there is a reference in the Open Items List to persons by name that an indication be included as to whether that person is a PG&E employee or a member of the public.

Mr. David Weisman of the A4NR was recognized. Mr. Weisman reported that an aircraft crash on December 7, 1987, occurred in San Luis Obispo County within a few miles of the epicenter of the blind thrust seismic fault involved in the 2003 San Simeon earthquake. Mr. Weisman commented that the Department of Energy has designated rail access for DCPP to facilitate nuclear waste removal and that transporting nuclear waste from DCPP by barge has been ruled out as too
hazardous given the danger of ocean currents in the vicinity of the oilfields located offshore in the Santa Barbara Channel. Dr. Budnitz responded and reported that after the September 11, 2001, terrorist attacks in New York City, U.S. nuclear plants were analyzed for their vulnerability to aircraft impact and the DCISC received a public presentation on that topic. The NRC concluded at that time U.S. nuclear plants including DCPP could withstand such an event and shut down safely. Since that time, the Department of Energy has sponsored a study which established a methodology for determining, with data from the Federal Aviation Administration, the probability that an aircraft impact would occur on a particular facility. Dr. Budnitz remarked, and Mr. Weisman agreed, that while the probability is very low it is not zero.

A short break followed.

V Committee Member Reports and Discussion

A. Public Outreach, Site Visits and Other Committee Activities:

The Members confirmed and, in the case of the October 2018 public meeting, rescheduled, public meetings of the DCISC for February 7–8, June 13–14, and October 24–25, 2018, and they then scheduled a public meeting for February 13–14, 2019.

Fact-finding visits were confirmed and scheduled as follows:


[2018] January 17–18 PL/RFW; March 6–7 RJB/RDM; April 18–19 PL/RFW; May 2–3 PFP/RDM; July 10–11 PFP/RFW; August 21–22 PL/RDM; September 5–6 RJB/RFW; November 7–8 RJB/RDM; December 12–13, 2018 PFP/RFW; and


Dr. Lam reported that as he is the appointee of the California Energy Commission (CEC), with Assistant Legal Counsel Rathie, he is scheduled to meet in Sacramento, California with the California Energy Commission Chair, Dr. Robert B. Weisenmiller, and representatives and technical staff of the California Energy Commission.

Following the discussion on Committee activities, the Chair called for public comment. There was no response to his invitation.

VI Staff-Consultant Reports and Receive, Approve and Authorize Transmittal of Fact Finding Reports to PG&E

The Chair requested Consultant Wardell to report on the July 25–26, 2017,
fact-finding visit with Dr. Peterson to DCPP. Mr. Wardell remarked he had expanded his presentation and included additional power point slides in accordance with direction provided at the June 2017 public meeting. He reviewed the topics discussed with PG&E during the July 25–26, 2017, visit as follows:

- **Meet with NRC Senior Resident Inspector** - Mr. Wardell stated the discussion included the emergency evacuation process and evacuation routes; matters related to NRC review of decommissioning, which would be conducted by a different NRC office from that which provides the resident inspectors on site while the plant is in generation operation; the NRC’s public information meeting held on August 29, 2017; issues concerning transportation of spent fuel; the four-year incentive plan proposed to retain qualified personnel to continue to operate the power plant during the period between approval of the Joint Proposal and plant shutdown; the NRC 95001 inspection related to the White finding for which Mr. Wardell reported the DCISC now has and will be reviewing the inspection report; and finally to discuss the frequency of the interaction between the NRC Resident Inspectors and the DCPP Site Vice President.

- **Fire Doors** - Mr. Wardell reported out of 414 Equipment Control Guidelines, a total of 280 are applicable to fire doors within the plant. The doors within the plant, including the fire doors, are very heavily used with tens of thousands of openings each year. In 2014 DCISC determined that the repair or replacement of impaired fire doors was not in accord with a frequency which the DCISC found satisfactory and the DCISC recommended that the repair or replacement program be accelerated. DCPP instituted a program to do so in 2016 and Mr. Wardell reported good progress has been achieved and the program is on schedule, with a change in focus from primarily replacing doors to now repairing more doors. Mr. Wardell reported this allows the doors to be returned to satisfactory status more economically and expeditiously. Dr. Peterson remarked that replacement of a door costs approximately $100,000, with the cost of the door itself representing only about $5,000 of that amount. Dr. Peterson observed that in some ways this high cost is adverse to safety and he stated he was somewhat disappointed not to have found more of a questioning attitude concerning why replacement of a door should be so expensive. Mr. Wardell reported that a significant portion of the total replacement cost represented corporate overhead which was not included in the total cost in prior years. Dr. Peterson acknowledged that replacement of the doors, some of which perform a function in retaining pressure, is not a simple matter as the door frames must also be replaced and often a temporary compensatory structure must be constructed to maintain integrity of function.

- **Annual Radiological Release Report** - Mr. Wardell stated this report is submitted by DCPP to the NRC each year and the current report showed only very small releases which made up only a fraction of the level allowed by the plant’s Technical Specifications.
- Annual Radiological Environmental Monitoring Report - Mr. Wardell commented this report monitors samples around the plant of water, vegetation, soil, animal, and worker exposure. The current report determined that a typical DCPP worker with a 40-hour work week would receive 1.0 millirem exposure in a one-year period.

- Control Room Ventilation System - Mr. Wardell stated the ventilation system, while serving to keep the Control Room comfortable and safe, can also be placed into a recirculation and filtration mode in the event of a radiation release in order to protect the operators. In 2013 a test determined that there was some in-leakage which was greater than permitted and compensatory measures were taken to install back draft dampers. DCPP has now received approval from the NRC to use an alternate source term which Mr. Wardell described as more realistic and the new in-leakage test and analysis performed demonstrated the ventilation system function to be at acceptable levels with some modification required to duct work and filters and flow switches which is now being performed and should be complete by the end of 2017. **Mr. Wardell recommended a fact-finding visit be made early in 2018 to confirm the completion of the modifications and to then close this issue on the Open Items List.**

- Direct Current (DC) Power System - the DC System has three separate trains, two of which are safety-related and one of which is not. Mr. Wardell reported that if the plant were to lose access to alternating current (AC), the DC System, composed of 180 batteries which are all kept constantly charged, would have the capability to supply power to mitigate accidents and keep the plant safe. The DCISC fact-finding team toured the DC System with the System Engineer.

- Plant Health Committee - Mr. Wardell described the Plant Health Committee as a director-level committee which reviews and monitors system and equipment component health and takes action to prevent or address issues with systems and components. The system engineers are called upon to make presentations to the Plant Health Committee. During the meeting attended by the DCISC representatives security equipment and gate valve reliability were discussed. Mr. Wardell stated the meetings were run effectively and efficiently and good results are achieved.

- Management Observation Program - this program provides non-intrusive management supervision of work being performed within the plant with the purpose of imparting management expectations to employees and to review human performance and employee safety issues. Mr. Wardell described the program as a valuable way to foster communications between employees, managers, and supervisors.

- Nuclear Fuel Performance - Mr. Wardell reported the DCISC reviews this issue following each refueling outage. Both units have had very few fuel defects, with Unit 1 not having a defect in the last 27 years and Unit 2 having experienced its last fuel defect six years ago. Mr. Wardell described the fuel
assemblies in which the fission process is generated and remarked that a crack or a hole in a fuel rod clad can result in fission products being released into the reactor coolant. The plant conducts chemistry sampling and performs visual inspection of the fuel assemblies during each refueling outage to assess the presence of damage to fuel. Mr. Wardell reported the DCISC fact-finding team found the fuel at DCPP to be in very good condition.

- Independent Spent Fuel Storage Installation - Mr. Wardell reported during 2016 there were 12 multipurpose storage canisters (MPCs) filled, each with 32 spent fuel assemblies and then transported to the ISFSI, placed into storage over packs and placed within the ISFSI and that there are now a total of 49 MPCs within the confines of the ISFSI. DCPP plans in 2018 to fill and transfer an additional 8 MPCs, in 2020 to fill and transfer 8 more MPCs, and in 2022 to fill and transfer 8 additional MPCs. The ISFSI has capacity to store all the fuel which would be produced by DCPP generation operations through 2025. Mr. Wardell reported there are no damaged fuel assemblies presently stored in the ISFSI and all damaged fuel remains in the Spent Fuel Pools and is located within a special canister. When all fuel is removed from the Spent Fuel Pools, the damaged fuel canister will be placed in a MPC and moved to the ISFSI. In accordance with the Joint Proposal, DCPP is presently studying ways in which it might accelerate the loading schedule for spent fuel.

- DCPP Safety Culture - Mr. Wardell reported this represents an important aspect in the operation of any nuclear facility and periodic assessments are performed by the plant and by the NRC. The culture is assessed in accordance with guidelines provided by the Institute of Nuclear Power Operations (INPO) and no problems have been identified at DCPP.

- Use of FLEX Equipment to Reduce Plant Risk - Mr. Wardell reported DCPP has FLEX equipment on the site and in storage ready for use and this equipment is maintained and tested periodically and is sometimes employed to reduce risk in everyday situations. As an example Mr. Wardell described the use of FLEX equipment, with its quick-connect features used during refueling outages in connection with the ability to maintain Containment venting. Dr. Budnitz stated during 2018 there will be additional training on the use and deployment of FLEX equipment and strategies for employing FLEX and the DCISC will make the effort to observe this training during future fact-finding and will review the effectiveness of the training. Dr. Peterson observed that the principal focus of FLEX is on reducing risk in plant operations but it is important to understand how FLEX equipment might also be used under a variety of beyond design basis events including seismic events and employment of FLEX is closely tied to the fragility analyses for various equipment as well as to plant access issues which may be expected to result from a beyond design basis accident. Dr. Budnitz described the three categories which trigger immediate application of FLEX as including: (1) total loss of the equipment necessary to access the ultimate heat sink; (2) a total loss of power; and (3) both (1) and (2) occurring at the same time. Mr. Wardell confirmed that FLEX equipment and
procedures are in place and at least one round of training has been conducted and this is a program which the entire nuclear industry is implementing.

- Cyber Security - Mr. Wardell stated the DCISC’s review is limited to whether the plant is achieving its goals relative to cyber security in accordance with the NRC requirements for identifying, modifying and protecting critical digital assets. He reported the final completion of these efforts is required by the end of 2017 and DCPP is expected to meet that deadline.

Dr. Peterson remarked that portions of the July 25–26, 2017, fact-finding were videotaped for use in the informational video the DCISC is in the process of producing for use during its public tours, on the Committee website and for other applications as appropriate.

Following Mr. Wardell’s presentation, Ms. Rochelle Becker, Executive Director of the A4NR, was recognized. Ms. Becker inquired concerning the current pattern of repairing fire doors versus their replacement and whether this was a different pattern than that employed previously. Mr. Wardell responded because of the addition of corporate overhead this has significantly increased the cost of replacement of a door and this was a factor in the plant opting to repair doors at a lesser cost rather than replacing them with the corresponding need to employ compensatory measures when replacing a door. Ms. Becker commented that compensatory measures had always been required when replacement was undertaken and that the process required today as described by Mr. Wardell is not new. Dr. Peterson commented the plant has also found that replacement of hardware rather than an entire door is often sufficient to restore full function and perhaps in the past more doors were replaced than was necessary. Dr. Peterson commented DCPP plant staff have always demonstrated excellent practices regarding assuring that fire and other security doors are properly closed and latched. Dr. Peterson commented and Mr. Wardell agreed that given the high cost of replacement, the option to repair a door when available allows more doors to be restored to good condition and full function in less time. Dr. Budnitz remarked that it was his understanding that at present perhaps 12–15 doors have been determined to have an impaired function. Ms. Becker inquired as to the point at which it becomes too expensive to replace rather than to repair a door. Dr. Peterson remarked that in the past DCPP might not have been keeping up with the repair or replacement at a rate that kept fire doors in an ideal condition. Ms. Becker noted that keeping up with repairs has been an issue for PG&E but as DCPP is a nuclear power plant and is expensive to operate it is necessary to make whatever repairs are required to make the facility safe. Mr. Wardell remarked the DCISC identified the issue of the prioritization of fire door functionality approximately two years ago and the plant has been doing a satisfactory job and staying current with repair and replacement since then but it is the addition of corporate overhead that has caused the price of replacement to increase. Ms. Becker observed that corporate overhead has always been a part of the price of this type of capital outlay. Mr. Wardell stated he did not have a further response as to corporate overhead element of the cost.
Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis stated it was her understanding that the plant has in the past experienced problems with fire doors inadvertently being left open. Mr. Wardell confirmed that was the case some years ago but he explained that since identification of that issue DCPP instituted a successful program to train its personnel on the need to ensure that doors are properly closed and latched after each use.

Mr. David Weisman of the A4NR was recognized. Mr. Weisman stated his comment concerned item RA-7 from the discussion of the Open Items List regarding DCISC review of DCPP’s seismic PRA, which is expected to be issued in November 2017, and he remarked that the NRC’s reevaluation of PG&E’s Senior Seismic Hazard Analysis Committee (SSHAC) seismic studies is now approximately six months to one year late and he questioned whether it would make better use of time to wait until the NRC reevaluation is received before reviewing PG&E’s seismic PRA. Dr. Budnitz acknowledge the logic in Mr. Weisman’s suggestion but stated the DCISC’s intention is to review both at the time they are made available because if there is something identified in either report it is important that this be brought to light sooner rather than later. Mr. Weisman stated a separate and independent review made sense but it is important that, due to the length of time which has and might continue to pass, both submittals remain on the DCISC’s Open Items List for eventual review. Consultant McWhorter and Dr. Budnitz reported that last week PG&E requested an extension of the time for submittal of its seismic PRA due to findings and recommendations received during peer review process and he confirmed that the NRC, present as an observer during the peer review process, is committed by its post-Fukushima directives to move forward on its review.

Upon a motion made by Dr. Budnitz, seconded by Dr. Lam, the July 25–26, 2017 Fact Finding Report was accepted by the DCISC and its transmittal to PG&E was authorized. The report will become a part of the Committee’s 28th Annual Report.

The Chair requested Assistant Legal Counsel Rathie to report on administrative, regulatory and legal matters. Mr. Rathie stated that in accordance with direction provided at the June 2017 public meeting, letters were sent inviting federal, state and local officials or their representatives to attend this public meeting of the Committee. He reported the 27th Annual Report which the Membership approved at this meeting will now be transmitted to PG&E for its response which will be considered by the Committee at the February 2018 public meeting and will become a part of the 27th Annual Report. Finally, he reported that activity on the Committee’s website has increased and now averages 1,780 unique visitors every month.

**VII Adjourn Morning Meeting**

The Chair adjourned the morning meeting of the DCISC at 12:30 P.M.
VIII Reconvene for Afternoon Meeting

Dr. Lam reconvened the afternoon meeting of the DCISC at 1:35 P.M. He recognized the presence in the audience of Mr. Gregory Haas, District Representative for U.S. Congressman The Honorable Salud Carbajal, representing California’s 24th Congressional District, and Ms. Annie Aguiniga, Assistant District Director for The Honorable State Senator William Monning, representing the 17th State Senate District of California. Mr. Haas and Ms. Aguiniga were asked if they wished to address any remarks to the DCISC.

Mr. Haas stated that on behalf of Congressman Carbajal he wanted to thank the Committee for the many years that the DCISC has been holding public meetings. Mr. Haas remarked Congressman Carbajal is very interested in the future of the Committee including what direction the DCISC may take concerning the foreseeable decommissioning of DCPP and in how the Committee can assist the Congressman and the local community in understanding and addressing the difficult and complex issues that have arisen and will arise concerning decommissioning and the eventual closure of DCPP. Mr. Haas stated that he expects there to be a continuing dialogue on these issues.

Ms. Aguiniga read a statement on Senator Monning’s behalf in which the Senator regretted he could not be present in person but in which he provided an update on his efforts in the California Legislature with regard to decommissioning DCPP including Senator Monning’s sponsorship of Senate Bill (SB) 968 which calls for a comprehensive economic assessment of the regional impacts resulting from the closure of DCPP to be completed no later than by July 1, 2018. Ms. Aguiniga remarked Senator Monning envisions that this assessment will be a part of the discussions and decisions being considered in context of the Joint Proposal and will provide a baseline of information to support recommendations for all associated parties to best address the economic impacts after DCPP closes. Cal Poly has been chosen as a third party evaluator for this economic impact assessment. Ms. Aguiniga stated Senator Monning would like the DCISC to continue to encourage public interaction and dialogue regarding the decommissioning of DCPP and the Senator thanked the DCISC for its continued oversight and efforts toward making the San Luis Obispo area safe.

IX Committee Member Comments

The Members thanked Mr. Haas and Ms. Aguiniga for their remarks. Dr. Lam recognized and acknowledged the presence in the audience of Mr. Cary Harbor, Director of Compliance, Risk and Business Planning for PG&E’s generation line of business.

X Public Comments and Communications

Dr. Lam invited members of the public to address the Committee on matters not on the agenda for this meeting.
Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis reported that Mothers for Peace is conducted a series of three educational lectures. The first, for which the selected topic is on-site storage of nuclear waste, is scheduled for October 20, 2017; the second, for which the topic is the proposed Yucca Mountain repository, is scheduled for November 10, 2017; and the third, for which the topic is transportation of radioactive waste, will be held on January 19, 2018. She provided cards to the Committee and for distribution to members of the public with this information.

**XI Staff-Consultant Reports and Receive, Approve and Authorize Transmittal of Fact Finding Reports to PG&E**

The Chair requested Consultant Wardell to report on the August 9–10, 2017, fact-finding visit to DCPP with Dr. Lam. Mr. Wardell reviewed the topics discussed with PG&E during that visit:

- **Meet with NRC Senior Resident Inspector** - Mr. Wardell reported the DCISC representatives discussed issues with the Senior Resident Inspector including those related to: seismic workplace safety; the November 14, 2017 FLEX inspection; the NRC’s review of PG&E’s March 2015 evaluation of the risk to the plant from a tsunami and from locally intense precipitation; the NRC’s approval of use of an alternate source term for the Control Room Ventilation System; modifications made, and to be made, to address the open phase power issue to preclude damage to equipment and the training and procedure changes required; and the NRC’s and the DCISC’s future plans to review the field monitoring teams which are deployed in the local area with radiation monitors during emergency drills or in the event of an actual emergency.

- **Containment In-service Inspection** - Mr. Wardell reported the Containment structure, which he described as an extremely strong concrete structure with a welded steel liner, undergoes a number of inspections and tests on a regular and periodic basis. During 1R20 the Unit 1 Containment welds were inspected and this inspection is performed every ten years. To date, there have been no issues identified with either Containment structure. Mr. Wardell displayed a photo which showed the inside of the Containment dome and the welds which were the subject of the inspection.

- **Liquid Radioactive Waste Processing System** - Mr. Wardell reported this system is used to process liquid waste and utilizes evaporators and filters to do so. He reported while most of the waste is recycled, some is monitored and then discharged to the ocean through the Auxiliary Salt Water System. Mr. Wardell reported approximately one million gallons of liquid waste is processed each year which is a major reduction from the volumes processed prior to 2000, when improved equipment and operations were implemented. He displayed a graph showing the amounts of liquid discharge from 1986 through 2009. Mr. Wardell reported the latest audit of the Radioactive Effluent Control Programs by the Quality Verification (QV) Department
concluded those programs were being effectively implemented.

- **DCISC Member Meeting with DCPP Site Vice President** - Dr. Lam met with DCPP Site Vice President Jim Welsch to discuss topics reviewed during the fact-finding visit.

- **Steam Generator Health** - Mr. Wardell reported the four steam generators (SGs) for each unit were replaced during 2008-2009 with SGs having improved tubes. DCPP inspects 100% of a unit’s SG tubes every third refueling outage and since their replacement these inspections have found all SG tubes in excellent condition.

- **Equipment Environmental Qualification Process** - this process is a testing and validation program used to verify that electrical equipment is qualified for use in the environmental for which it is intended. DCPP maintains an equipment qualification master list and the process is subject to periodic assessments and NRC inspection which have found the process to be satisfactory and appropriate to the task.

- **Engineering Excellence Plan** - Mr. Wardell reported the DCISC fact-finding team met with Assistant Engineering Director Bob Waltos and Mr. Wardell reported the Engineering Excellence Plan is aligned with the Generation Department Operating Plan, the Nuclear Culture Survey and the Joint Proposal concerning operations through 2025. The Engineering Excellence Plan is included in both the supervisor and line employee’s performance management plans.

- **Observe Chemistry Sampling Process** - Mr. Wardell reported on his observation of the testing by a Chemistry organization technician, David Alvarado, of samples obtained from the Chemical and Volume Control System (CVCS) for radioactive materials which might be indicative of a fuel defect. Mr. Wardell reported the technician followed the latest procedures in conducting the test and used proper human performance tools in performing the test. These tests are performed in two locations within the Radiation Control Area of the plant.

- **Operator Staffing Adequacy** - Dr. Lam met with Bill Lalon, a manager in the Operations Planning organization to discuss DCPP’s plans to retain adequate staffing of licensed and unlicensed operators. Mr. Wardell reported DCPP has a comprehensive five-year plan to address a variety of staffing contingencies and approval has been received to overstaff the Operations Department for this year. Dr. Lam reported that this is an area on which the DCISC has expressed significant concern following the announcement of the Joint Proposal to retire DCPP. He stated it appears PG&E has expended a great deal of effort in its planning and analysis efforts and Dr. Lam stated that, at this point in time, he is persuaded that the efforts by PG&E senior management and planning staff are adequate but he remarked there will be many issues to be addressed in the future that may not have been foreseen at this time. He stated the five-year plan represents a best guess estimate of the supply and attrition of plant staff and the plan includes detailed provisions for hiring and
training contingencies.

- Independent Spent Fuel Storage Installation (ISFSI) Loading Campaign - Mr. Wardell reported he reviewed this topic in depth during his earlier report on the July 2017 fact-finding visit.

Ms. Rochelle Becker of A4NR was recognized and she inquired from whence came the approval to overstaff the Operations Department for 2017. Mr. Wardell reported that approval for increased staffing was given internally by the Chief Nuclear Officer.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis inquired why the graph showing the liquid radioactive discharge showed data only up to 2009. Mr. Wardell and Dr. Budnitz replied that this was the information provided to the Committee but that the DCISC reviews the release report every year and since 2009 the releases have been very small, representing only a fraction of the amount allowed by the plant’s Technical Specifications. Dr. Budnitz reported that the significant reduction from amounts produced in prior years was achieved due to technical changes in the way effluent is handled, stored, and kept safe. Ms. Lewis stated she understood Dr. Budnitz’ reply but found the data provided by the graph and the answers of the Committee not to be very satisfactory. In response to Ms. Lewis’ inquiry about protective equipment necessary when handing nuclear fuel, Dr. Budnitz responded that the handling of fresh nuclear fuel does not present a significant radiological hazard to workers as the fresh fuel produces only small amounts of alpha radiation. Drs. Budnitz and Peterson reported that the principal hazard to workers occurs at the fresh fuel manufacturing facility and arises due to chemical toxicity issues which generally require the wearing of respirators but once the fresh fuel is placed within a fresh fuel rod there is little or no concern for hazards from radiation or from chemicals.

Following a motion by Dr. Budnitz, seconded by Dr. Peterson, the August 9–10, 2017 Fact Finding Report was accepted by the Committee.

The Chair requested Consultant McWhorter to report on the September 6–7, 2017, fact-finding visit to DCPP with Dr. Budnitz. Mr. McWhorter reviewed the topics discussed with PG&E during that visit including:

- Plant Health Committee - Mr. McWhorter reviewed three of the items considered by the Plant Health Committee (PHC). The first concerned the issue of a vital inverter input breaker which failed to latch during 1R20 following a trip test due to the reset mechanism becoming stuck due to dry grease. A plan was presented which the PHC deemed adequate to replace all these breakers and contingency plans are in place if a breaker does not latch in the interim. The second issue reviewed by the PHC involved cracking of some Unit 1 high pressure turbine blades discovered during routine testing. There were 20 indications discovered of which 2 were found to be the result of cracks with the potential to propagate such that continued operation to the
end of plant life could not be assured. Two groups of turbine blades, with 4 blades in each group were replaced. The issue of possible replacement of turbine blades will be planned for during Unit 2’s next refueling outage. The third item reviewed by the PHC concerned a walk-in item (i.e., an emergent item not on the meeting’s agenda) regarding a nonconforming condition involving the heat flux hot channel factor which is related to distribution of heat vertically within the core. Westinghouse determined the technical specifications were non conservative and additional actions were put into place which would require power to be reduced in excess of the requirements of the Technical Specifications to prevent exceeding the heat limit but Mr. McWhorter reported the change to the Technical Specifications has not yet been accepted by the NRC. The NRC has requested that the change to DCPP Technical Specifications be placed on hold until the NRC processes a license amendment from another plant which is participating in a pilot program for this issue. The PHC was requested to, and did, extend the internal tracking date for completion of this issue. Dr. Budnitz observed that this nonconforming condition was the subject of an interim analysis accepted by the NRC that justified continued operation. The DCISC team concluded the PHC performed efficiently and effectively with good participation and discussion of issues.

- Non Seismic Probabilistic Risk Assessment (PRA) Programs - Mr. McWhorter briefly reviewed the five non seismic areas which are the subject of plant PRA programs including: (1) the Fire PRA which forms the basis for the plant’s transition to and implementation of regulations mandated by the National Fire Protection Association (NFPA) Standard 805 entitled “Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Generating Plants” (NFPA-805) by which a plant can implement changes that do not increase the probability of core damage without the need for NRC approval; (2) the internal flooding PRA for which analysis by an updated model continues to show that contribution to total plant core damage frequency (CDF) from internal flooding events continues to be a small fraction of the overall probability of core damage; (3) low power and shutdown PRA which is on hold at present awaiting two other plants to apply the new ASME/ANS standard and Mr. McWhorter reported DCPP will be using newer Phoenix software in place of its current Safety Monitor Program to support both on-line and off-line maintenance beginning with 2R20 in 2018; (4) external event PRA for events including external flooding, aircraft impact (for which Department of Transportation data is used to screen out the risk and impact of the probability and consequences of an aircraft impact) and tornado missile impact; and (5) NRC Generic Issue 191 PRA regarding the impact of debris accumulation in the Containment sump on performance of pressurized water reactors for which Westinghouse is performing an analysis but for which DCPP has now determined to resolve by the use of a deterministic analysis. Mr. McWhorter stated DCPP expects approval of changes to its risk informed Technical Specifications in the near future and the fact-finding team concluded the PRA team at DCPP continues to do good work.
In response to Dr. Peterson’s inquiry, Dr. Budnitz confirmed that the seismic PRA uses the same basis and standards for its PRA modeling tools as is used for the other PRA analyses but the seismic PRA includes a different set of initiating events and the various PRA efforts may be understood as chapters of the same fundamental PRA data sets but are employed to address and deal with the narrow issues which arise in their respective contexts. Dr. Peterson remarked this was logical given that DCPP has a high seismic hazard factor but he observed that perhaps there is a fair amount of determinism overlaid into the probabilistic assessment, to which Dr. Budnitz stated the PRA community has struggled to assure that the seismic PRA efforts now underway are realistic and not conservative and he stated his opinion that there is now enough data available to have confidence that this is true.

- National Fire Protection Association (NFPA) 805 Program - Mr. McWhorter reported the NRC approved DCPP’s application for approval to transition to NFPA-805 regulations in April 2016 and the requirements for implementation including training and physical modifications. With the exception of certain items for which exceptions were granted, training and modification requirements needed to be in place by April 15, 2017. The DCISC team confirmed that DCPP has completed the transition to NFPA-805 implementing procedures and training and completion of physical modifications for Unit 1 is being accomplished in the 1R20 refueling outage during which the incipient fire protection and remote shut down panel plant modifications were made and the final remaining incipient fire detection modification for Unit 2 will be made during 2R20 in the spring of 2018. Without the cost of physical modification, the cost of the transition was approximately $19 million. Ms. McWhorter stated there was an issue identified just prior to the implementation date concerning the clarity of calculations regarding Containment penetration seals which required development of a fire protection engineering evaluation. DCPP will undergo a complete, additional, fire protection engineering evaluation to document the engineering basis for the NFPA-805 Program and allow implementation of the self-approval process to allow changes based on risk assessment which, unlike changes made under the former 10 CFR Appendix R to Part 50 regulations, will not require NRC approval. The process for Unit 1 should be complete by November 2017 and for Unit 2 during the spring of 2018. The program will then be managed using fire safety analysis software which is expected to be ready for use by the end of 2017. The fire PRA work is on hold until the self-approval process can be fully implemented after which the fire PRA will be updated to include the final modifications and the impact of the implementation of those modifications. The fact-finding team concluded that DCPP has completed implementation of NFPA-805 with the exception of the modifications required to Unit 2.

- Maintenance Department Performance - the DCISC representatives met with the new Director of Maintenance Services to discuss issues of concern identified by the Quality Verification (QV) organization concerning human
performance and electrical safety. The team also reviewed an apparent cause evaluation for a recent near miss of a serious accident when maintenance workers were about to connect a ground buggy to an energized 12kV bus cubicle which, if not halted by a supervisor who was in the area, would have created a sizeable arc flash event which might have caused injuries to the workers and damage to equipment. The cause of this near miss was a failure to follow electrical maintenance procedures or to use standard human performance tools. Dr. Budnitz remarked that this represents a very serious issue of a type not seen often at DCPP and had the supervisor not alerted the workers a huge electrical arc would have resulted that could have been very serious and this confirms that from time-to-time there are going to be safety culture problems which the plant must use every effort to prevent and the DCISC will await and review the analysis of this event by DCPP and the corrective measure taken. Mr. McWhorter stated the Maintenance Director reported on several recent personnel changes which have resulted in four of the five lead managers in the Maintenance Department being former holders of senior reactor operator licenses. Maintenance will also focus on optimizing outage scope by improving walk downs which are conducted four weeks prior to the work and on improving maintenance fundamentals in human performance and procedure adherence. Current staffing in the Maintenance organization is 232 persons which will soon be reduced to 228 and then trend downward to about 200 over the next few years. Mr. McWhorter stated the DCISC team was told this was due to reduction in preventive maintenance required as the plant approaches the end of its license period. Mr. McWhorter stated there have been valid concerns identified in the Maintenance Department for which actions are being taken and he recommended the DCISC conduct a further review of the Maintenance Department in late 2018.

Foreign Material Exclusion (FME) Program - Mr. McWhorter stated the purpose of the FME Program is to prevent undesired and potentially harmful intrusion of foreign material into plant systems and this most often occurs during outages. A negative trend was identified in 1R20 by two significant occurrences. The first involved a synthetic hood worn by a worker being dropped into the refueling canal and sucked into a residual heat removal pump where it disintegrated. There was no damage to the pump and analysis showed the chemicals involved would not have a long term impact. The second occurrence involved a worker dropping a box of rivets from scaffolding in the Turbine Building, some of which fell into a feed pump turbine that was open at the time for maintenance. Due to FME requirements much of the feed pump was covered but extensive efforts were required to retrieve the rivets. DCPP determined that contractor personnel were involved in the majority of the events that compromised FME and accordingly a dynamic learning activity for contractors, which was previously conducted but had been deleted from contractor outage training, and will now be revived and included in future training for contractors before outages. The DCISC team determined the
performance of the FME Program continues to be good although with specific events identified and lessons learned.

- Institute for Nuclear Power Operations (INPO) Evaluations Preparations - DCISC representatives met with the DCPP Station Director to discuss the upcoming INPO evaluation.

- Local Intense Precipitation Analysis - Mr. McWhorter reported this analysis was required by the NRC as part of the required post-Fukushima response and involves analysis of the risk from external flooding events which could give rise to flooding from Diablo Creek with the consequence that water could enter the lower levels of the Turbine or the Auxiliary Buildings. As a result sandbags have been staged in these buildings as an interim safety measure. However, DCPP’s analysis has determined the amount of water that could be produced by locally intense precipitation and flooding from Diablo Creek is less than the amount of water that could be produced by a circulating water pipe break inside the Turbine Building and therefore internal flooding as a result of locally intense precipitation is bounded by the analysis that already exist for a circulating water pipe break and no modifications are required. Mr. McWhorter stated if DCPP’s analysis is accepted by the NRC this will be the end of the issue and interim actions will no longer be required. In response to Dr. Peterson’s inquiry Mr. McWhorter, Dr. Budnitz and Dr. Lam discussed whether a commitment resulting from a 10 CFR 50.54(f) letter directive would be characterized as a Technical Specification requirement or as a part of a Updated Final Safety Analysis Report (UFSAR). DCPP Manager Mr. Hector Garcia responded that if the commitment becomes a part of the FSAR it is implemented as a procedure and the commitment would be through the FSAR with a procedure in place to make sure the activity occurs.

- Tsunami Hazard Analysis - Mr. McWhorter reviewed the history of the DCISC’s review of the tsunami hazard and risk to DCPP and its environs as a result of offshore, near-shore events that involve submarine landslides. The Committee previously engaged Dr. Robert T. Sewell, a recognized expert in the field of tsunami analysis, and Dr. Sewell made his report to the Committee and to the public in June 2016. In response to a DCISC Concern in the 26th Annual Report, PG&E has undertaken additional studies in this area. During the PRA peer review process a series of findings and observations were generated, one of which involved external events initiated by a seismic event involving both off shore and on shore landslides and PG&E will address this issue in its final seismic PRA document when it is submitted to the NRC. The DCISC fact-finding team reviewed a preliminary analysis which concluded that the probability of core damage from a seismically generated off shore landslide is several orders of magnitude less than the probability of core damage from the earthquake itself. The analysis included review of a tsunami possibly topping the 44-foot level of the Auxiliary Saltwater System snorkels as well as reaching the 85-foot plant level and the assumption in the analysis is that every earthquake of a magnitude of six or more would cause an off shore landslide with a hypothesized wide range of resulting submarine
landslides. **Dr. Peterson remarked it would be good for the DCISC to review the basis for the determination of the range of the size of these landslides when the DCISC reviews the final submittal.** Dr. Budnitz agreed and he confirmed that the preliminary analysis showed a significant margin. Mr. McWhorter reported the relationship between the size of the earthquake and the size of a resulting submarine landslide was based upon information submitted by PG&E to the NRC in March 2015 and Dr. Peterson observed that this information was based entirely upon a deterministic analysis. Dr. Budnitz reported the current preliminary analysis is a mix of deterministic and probabilistic analyses and he stated he was encouraged by PG&E’s work in this area as a result of the DCISC’s Concern. Mr. McWhorter reported that in the tsunami analysis no credit is taken for the employment of FLEX equipment. Dr. Budnitz reported that when the analysis is ready it will again be reviewed by the same peer review group, by the NRC and also by the DCISC.

- **Meet with NRC Senior Resident Inspector** - Mr. McWhorter reported the meeting included discussion of the fact-finding agenda as well as the report which was expected at that time to be issued soon on the results of the NRC’s 95001 inspection related to a recent White finding made by the NRC. Mr. McWhorter confirmed that the 95001 Inspection Report has now been issued and is being reviewed DCPP and the DCISC.

- **Seismic Probabilistic Risk Assessment Program** - the focus for this program is on DCPP’s response to the NRC’s post-Fukushima directives to perform a seismic PRA analysis which, as Mr. McWhorter reported previously, is nearly complete but which has resulted in several peer review group findings and observations including: a non seismically-qualified item being constructed over a seismically-qualified piece of equipment; the potential for seismically-caused fires due to high energy arcing in electrical cabinets or in lubrication oil reserves; as well as for a seismically-generated offshore landslide as discussed previously. He reported DCPP expects to schedule its submittal of the seismic PRA to the NRC in April 2018. **The DCISC team concluded that PG&E’s work appears to be sound and the DCISC should continue to follow developments with regard to resolution of the findings and observations and the submittal to the NRC.**

- **Auxiliary Saltwater System Health** - Mr. McWhorter reported the Auxiliary Saltwater (ASW) System is a safety-related system consisting of four pumps, with two pumps serving each unit, to supply cooling water from the Pacific Ocean to the component cooling water heat exchangers located in the Turbine Building. The pumps have the ability to be cross-tied to serve the other unit and the ASW System is relied upon for accident cooling by Containment Spray and Residual Heat Removal Systems. The DCISC team reviewed an issue with recurring corrosion on the ASW System pump packing studs which, when they were replaced with a corrosion resistant new material, resulted in corrosion of the pump packing gland and therefore reanalysis is being performed to identify compatible materials that can coexist in a wet,
saltwater, environment without becoming sacrificial anodes. Mr. McWhorter described this as a long term reliability issue. DCPP has also engaged a vendor to perform operability calculations to address a concern which arose during the summer of 2014 when Pacific Ocean temperatures off shore from the plant approached the analyzed limit established of less than 70 degrees Fahrenheit. Temperatures in excess of that limit would be outside the plant’s Technical Specifications. However, no date has yet been identified for completion of this work. The DCISC team also accompanied the system engineer for the Intake Structure on a walkdown of the Intake Structure. Mr. McWhorter reported the Intake Structure is a difficult facility to maintain due to its constantly wet environment and the DCISC representatives found it to be clean and apparently well maintained. Several areas of the concrete floor were recently cut away and replaced. McWhorter reported significant effort has also been expended in installing new drives and variable speed controllers for the traveling screens. Dr. Budnitz remarked that a significant number of the system engineers at DCPP are now younger engineers and uniformly the DCISC has found all these individuals to be well-trained, well-informed excellent engineers who are knowledgeable about their respective systems.

- DCISC Member Meeting with DCPP Officer - Dr. Budnitz met with Mr. Jon Franke, DCPP Vice President of Generation Technical Services, for a briefing on items of mutual interest.

Following a motion by Dr. Budnitz, seconded by Dr. Peterson, the September 6–7, 2017 Fact Finding Report was accepted by the Committee.

A short break followed.

**XII Informational Discussion by the Committee**

The Chair stated this time was set aside on the agenda for the Committee to discuss how to improve its effectiveness. Dr. Lam invited Mr. Harbor and Mr. Garcia to participate in the discussion with reference to any issues for which either might have a comment on behalf of DCPP. Several items identified on the agenda were discussed in turn as follows:

- **Presentation of Fact Finding Reports at Public Meetings.** Dr. Budnitz stated he asked that this topic be included as it is his belief allowing additional time during public meetings for the Committee’s Technical Consultants to present oral reports on fact-finding would be beneficial for the public and the Committee. Dr. Budnitz remarked that as state law provides that substantive discussion between the Members on topics within the Committee’s subject matter jurisdiction may only take place at properly noticed public meetings, the public meetings represent the only time the full membership has the ability to interact and discuss the reports on Committee fact-finding visits. Dr. Budnitz acknowledged that expanding the time for fact finding reports could result in less time available for informational
presentations by PG&E. Drs. Lam and Peterson stated they very much value the informational presentations by PG&E and the Committee should ensure sufficient time is available for the topics on which the DCISC has requested DCPP to make a presentation. Following discussion, the Committee Members determined that 45 minutes should be allowed for the presentation of each fact-finding report. It was also requested that the Consultants continue to expand the use of power points and photographs during their reports at public meetings to provide an additional level of detail.

Conduct of Public Meetings. Dr. Lam inquired as to the number of public meetings which the Committee is required to conduct each year. Assistant Legal Counsel Rathie replied that the Restated Charter does not set a specific number for DCISC public meetings. Drs. Peterson and Budnitz observed that, given the Joint Proposal which, if approved, would result in closure of DCPP at the end of its current operating licenses in 2024 and 2025 respectively, this is not the time to look at reducing the number of public meetings or fact findings by the Committee. Dr. Peterson commented that should the Committee have a role to review decommissioning issues after both reactors are shut down, the number of items on the Open Items List will become substantially smaller and accordingly the number of public meetings might be reduced at that time. Dr. Budnitz stated it was his opinion that it was premature for the DCISC to consider what or if it could or should have a role to review decommissioning issues after both reactors shut down. Dr. Budnitz observed, however, that to date there has not been a situation where the DCISC was dissatisfied with PG&E or DCPP’s performance so as to discern a need to escalate the matter to the Committee’s appointing authorities. He remarked that in the future this might not always be the case depending on many of the issues which will emerge as the plant moves toward closure. In such a case it may be that the DCISC will perceive a need to conduct more public meetings and additional fact-finding.

Consultant McWhorter remarked that with the present three public meetings per year schedule each Member generally conducts a fact-finding visit to the plant in the interim between public meetings. Mr. McWhorter observed that in the event the Committee has in the future fewer items to cover during its public meetings the meeting duration might be reduced from two days to one day. In response to Dr. Lam’s inquiry, Dr. Budnitz discussed the duration and frequency of the meetings of DCPP’s internal Nuclear Safety Oversight Committee (NSOC) in comparison to the duration and frequency of the DCISC review and public meeting activities and found that both groups spend approximately twelve days at DCPP in each calendar year, although NSOC has the benefit of having the entire Committee on-site for the entire period when the NSOC meets on its four-day meeting schedule with three such meetings each year. Following their discussion, the Members agreed to maintain the current schedule of conducting three public meetings each year.

Public Tours. Assistant Legal Counsel Rathie reported that over the past ten
years the DCISC public tours have averaged 39 persons participating on each
tour and there has been no significant variation in this number by month. He
stated that most tour participants give addresses within California and the
majority of participants are residents of or have some connection to the San
Luis Obispo/Central Coast area. In response to the Committee’s inquiry, Mr.
Harbor reported that PG&E currently conducts approximately 150-200 tours
every year which accommodate approximately 3,000 total persons. Dr.
Budnitz remarked he would favor a schedule wherein the Committee would
conduct only one tour with members of the public every year. Drs. Peterson
and Lam remarked that not only do the tours give the members of the public
an opportunity to interact informally with the DCISC Members, they also allow
the Members and Technical Consultants to learn about issues which are of
particular importance or interest to the public and they remarked that the
tours were in furtherance of the mandate to the Committee from the CPUC to
conduct public outreach in the local area. Mr. Harbor stated PG&E fully
supports the concept of public outreach afforded by plant tours.

In response to a query from Ms. Lewis, Drs. Peterson, Lam and Budnitz stated that
they did not believe the majority of participants on the DCISC tours had a personal
connection to PG&E or to DCPP but rather the desire to tour the plant by a wide
spectrum of members of the public stems from an interest in nuclear power or a
curiosity about Diablo Canyon Power Plant in particular. Assistant Legal Counsel
Rathie reported that when the Committee’s Office of Legal Counsel accepts
reservations for the plant tours inquiry is made as to the caller’s affiliation or
interest and that from these inquiries, over a period of many years, no discernable
segment of the population emerged as a dominant source of reservations for the
DCISC’s public tours. Consultant McWhorter opined that as the interaction between
the Members, the Technical Consultants and the public appears to provide a
principal incentive for the public in taking the DCISC public tour, perhaps more
time might be set aside on the bus ride to and from the plant to allow the public to
ask questions of Members and Technical Consultants. Dr. Peterson stated the
informational video now being produced for the Committee should provide a
vehicle to introduce the Committee to the public and to describe how the
Committee functions and performs its safety review function and the time on the
ride back to the Energy Education Center from the plant should be
employed to afford the public the opportunity for the public to ask
questions of the Committee.

Dr. Budnitz expressed his opinion that the format of the presentation made at the
Energy Education Center by PG&E before the tours should be revised to eliminate
any discussion of the energy situation in California and to allow more of the
presentation to be made by the DCISC. Dr. Budnitz and Mr. Wardell both remarked
that more of the presentation should focus on activities that take place within the
plant and on nuclear power fundamentals. Drs. Lam and Peterson expressed their
desire to continue to provide an opportunity for PG&E to make a presentation,
including affording discretion as to the content of that presentation, at the Energy
Education Center in conjunction with the public tour and the remarks by the DCISC Chair, the Members, and the Technical Consultants. They observed that employing an informational video as a vehicle to explain the role of the Committee could accompany the DCISC remarks.

Following this discussion, the Membership opted to continue to provide discretion to PG&E to make its presentation to the public at the Energy Education Center during DCISC public tours and confirmed the consensus of the Committee to resume public tours of DCPP with members of the public at the Committee’s February 2018 public meeting.

- **Outreach to Government Officials.** Dr. Budnitz stated that it has been some time since he has been afforded the opportunity to meet with either the Attorney General or the Attorney General’s representatives. Dr. Budnitz stated he last met with now Governor Brown when the Governor served as the Attorney General and since that meeting he has only had one opportunity to meet with a deputy attorney general and staff members. Dr. Lam remarked the California Energy Commission (CEC) has been very engaged in meeting with him as the Energy Commission appointee to the DCISC and the CEC has sent a number of representatives, including on one occasion the CEC Chair, to attend the Committee’s public meetings and a representative of the CEC is in attendance here today. Dr. Peterson remarked that he did not find it unusual that the CEC would be the most involved with the Committee as nuclear power is central to the mission of the CEC. Dr. Peterson reported that as the Governor’s appointee to the DCISC he met on one occasion with Governor Brown and since then he has met annually with the Governor’s Director of the Office of Planning and Research who is involved with energy policy. The Members determined that efforts should continue to be made and outreach conducted to facilitate, if possible, annual meetings between DCISC Members and the state officials or agencies which are responsible for making appointments to the Committee.

- **Annual Report.** The Members briefly reviewed the process of development and preparation of the Committee’s Annual Report and determined that there did not appear to be a basis for changing the current practices employed in preparation, distribution and in the method for making Committee Recommendations and for receiving information from PG&E in response to its Annual Reports. Mr. Harbor stated that from PG&E’s perspective the Committee’s Annual Reports have been comprehensive and reviewing and responding to the Annual Reports does not impose an undue burden on PG&E.

- **Engagement of Consultants for Special Projects.** The Members discussed and confirmed that the Committee has the ability, should a need arise, to engage special consultants for discrete tasks or investigative research into topical areas for which the consultant has special expertise. Dr. Budnitz remarked that decommissioning may prove to be such an area and he suggested that the Committee may want to investigate and identify a person
with experience in decommissioning a nuclear power plant to assist the DCISC in the identification of decommissioning-related issues. **Dr. Budnitz made an offer which the other Members accepted to take the lead in identifying such persons.** Dr. Peterson commented he is interested in understanding the disposition path for all the various materials and components which will result from decommissioning a nuclear power plant. Dr. Peterson suggested that perhaps someone associated with the decommissioning of the San Onofre Nuclear Generating Station (SONGS) might be available and willing to provide a presentation to the DCISC during a future public meeting or to act as a consultant to the DCISC, as SONGS experience may not be entirely dissimilar to DCPP’s as both power plants are located on the California coastline and are subject to similar permitting and other regulatory requirements and constraints. **Consultant McWhorter commented that the experience and lessons learned from plants which have been afforded a period of advance notice prior to decommissioning might also prove useful.**

Dr. Lam suggested that the engagement of a special consultant to review decommissioning may be timely after clarification is received concerning whether there will be a role for the DCISC after the plant shuts down. Dr. Budnitz stated he understood Dr. Lam’s comment and he observed that in the interim between now and final shut down the DCISC will need to maintain an active interest in decommissioning, as during that period decommissioning activities will intersect with operational safety considerations which will remain within the Committee’s purview. **Dr. Peterson requested that a reference be added to the topic on Decommissioning on the Open Items List to the effect that the DCISC is at this time principally interested in decommissioning due to the potential impact during the period of generation operations and will seek clarification about whether the DCISC should play a role post-shutdown to review decommissioning issues.**

Ms. Rochelle Becker, Executive Director for the A4NR, was recognized. Ms. Becker remarked that it cannot be simply assumed that DCPP will remain in operation until the end of the final operating license in 2025, as the Joint Proposal provides that the plant will close no later than that date. She observed there are numerous factors which might result in the plant closing earlier. She encouraged and she stated she would support the DCISC in reaching out as soon as possible to the CPUC concerning a post-shutdown role to review decommissioning. Ms. Becker reported that there have been many meetings related to SONGS decommissioning including concerning waste issues and she encouraged the DCISC to review the records of those meetings to identify potential consultants and she suggested Mr. Geoffrey Fettus of the Natural Resources Defense Council as a person who was very well respected in this area. Ms. Becker remarked that SONGS closure did not have the community impacts that will result to the San Luis Obispo local area from the closure of DCPP but there are other plants which did have similar impacts when they closed including Kewaunee Nuclear Power Station in Wisconsin, the
Crystal River Nuclear Power Plant in Florida, and the Vermont Yankee Nuclear Power Plant in Vermont. Ms. Becker stated the appointing entities for the DCISC Members, with the exception of the CEC, have little input into the process. She encouraged the Committee to investigate the matters now pending, or soon to be pending, before the State Lands Commission, the State Water Resources Control Board, and the California Coastal Commission, as well as the CPUC, as these agencies will be required to address permitting issues in their proceedings and the San Luis Obispo area would benefit from being made aware of the issues by the efforts of the DCISC. **Dr. Budnitz requested the office of the DCISC Legal Counsel to review and opine concerning the role and options available to the DCISC to review decommissioning activities at DCPP post-shutdown and how to go about making inquiry or a request to implement any decision by the Committee concerning such a role.** Assistant Legal Counsel Rathie confirmed that the office of Legal Counsel would follow through concerning Dr. Budnitz’ request and the issues raised by the other Members and would report back. Mr. Rathie reported that the last operative change made to the Committee’s Charter by the CPUC was initiated by a request from the Committee and that a similar path might be appropriate should the Committee decide to pursue a post-shutdown role to review issues related to decommissioning.

Ms. Sherry Lewis of Mothers for Peace was recognized and Ms. Lewis urged the DCISC to heed Ms. Becker’s advice.

- **DCISC Interaction with PG&E.** After a brief review of this topic, the Members determined that the Committee’s interaction with PG&E to date has been fully acceptable and positive and there were no suggestions for change entertained at this time. Mr. Hector Garcia, Support Manager to the Chief Nuclear Officer, remarked that on behalf of PG&E the interaction with the DCISC has been very positive and professional and DCPP has tried to support all the requests brought to it by the Committee.

**XIII Adjourn Morning Meeting**

The Chair adjourned the afternoon meeting of the Committee at 4:55 P.M.

Dr. Lam reconvened the evening meeting of the DCISC at 5:15 P.M.

**XV Committee Member Comments**

There were no comments by Members at this time.

**XVI Public Comments and Communications**

Dr. Lam invited members of the public to address the Committee on matters not on the agenda for this meeting. There were no comments by members of the public at this time.
XVII Information Items Before the Committee

The Chair requested Mr. Harbor to introduce the first of the informational presentations for this public meeting. Mr. Harbor introduced Mr. Dennis Petersen, Director of Nuclear Work Management at DCPP, and Mr. Harbor reported Mr. Petersen holds a Bachelor of Science Degree in Aeronautical Engineering and has held a Senior Reactor Operator’s License and in his more than 30 years of nuclear experience. Mr. Petersen has held leadership roles in Operations, Quality Verification and Training organizations.

State of the Plant Update Including Key Events, Highlights and Station Activities since the DCISC’s June 2016 Public Meeting, Summary of Station Highlights and Performance.

Mr. Petersen commented he was filling in for this presentation for Ms. Paula Gerfen, Station Director/Plant Manager, who is on vacation. Mr. Petersen stated both units are now operating at 100 percent power with probabilistic risk assessments (PRAs) and all NRC Performance Indicators (PIs) in “Green” which is acceptable status. Mr. Peterson reported Unit 1 has operated at 100% power since the 1R20 refueling outage with the exception of a planned curtailment to 25% power to perform repairs on an oscillating feedwater regulating valve following 1R20. Unit 2 has operated at 100% power since the last DCISC public meeting in June 2017, with the exception of an unplanned curtailment to 96% power to perform repairs on a moisture separator reheater low pressure drain tank dump valve. In response to Dr. Budnitz’ query Mr. Harbor remarked he was the Duty Station Director during the curtailment of Unit 2 and the curtailment was for a period of approximately six hours and was due to a thermal limit which would have otherwise been exceeded. In response to Consultant McWhorter’s inquiry concerning the Unit 1 feedwater regulating valve Mr. Petersen stated the problem was with a controller which was causing cyclical oscillation and no work was performed on the controller during 1R20.

Mr. Petersen displayed graphs showing the daily load profiles for both units for the past four months and for the past twelve months.

Mr. Petersen reviewed the Station Alert declared for Unit 2 on July 28, 2017, at 12:06 P.M. due to low oxygen levels in Containment. He reported the plant had been attempting to identify the cause of a nitrogen leak and, as Containment entry was planned for normal operator rounds, an atmospheric sample was obtained from Containment which showed oxygen levels in Containment were below required content. This coincided with an emergency action level for declaring a Station Alert. The cause of low oxygen levels was nitrogen leakage from a relief valve associated with the backup nitrogen accumulator for a power operated relief valve. An O-ring failed and as nitrogen was released in Containment it displaced oxygen. The Station Alert was terminated at 7:19 P.M. on the same day. In response to Dr. Budnitz’ observation, Mr. Petersen confirmed that although the
pressure operated relief valve was considered inoperable, its safety function was not compromised by the leak because of the air supply available in Containment. Mr. Peterson and Mr. Harbor confirmed that the root cause analysis was recently approved by the Corrective Action Review Board and was provided to the DCISC with the September document package.

Dr. Peterson confirmed with Mr. Petersen that for this Station Alert the Emergency Response Center was activated and staffed by both DCPP and San Luis Obispo County personnel and he discussed with Mr. Petersen the DCISC’s concern that emergency response exercises generally consist of a scenario which leads to a postulated emergency evacuation which, although possibly a correct decision during an exercise scenario, is not always required in the majority of actual events which involve things which are extremely unlikely to propagate further and therefore it is necessary to be cautious about calling for a precautionary evacuation. Mr. Petersen reported that no evacuations were conducted in connection with the July 28, 2017, Station Alert.

Mr. Petersen confirmed Dr. Peterson’s observation that the July 28, 2017, event was the second Station Alert in the history of DCPP and Mr. Petersen remarked the criteria for declaring a Station Alert due to this condition was in the process of being removed from the technical specifications and the NRC’s review is now in progress. He remarked the root cause analysis identified the issue of prioritization of a gas leak as an issue to be corrected along with certain other interim measures identified by the analysis.

Mr. Petersen reviewed the NRC’s 95001 inspection and reported the subject of the inspection was an undetected Emergency Core Cooling System (ECCS) interlock failure on Residual Heat Removal (RHR) Valve-8982B. He described this as a self-revealing issue which occurred during refueling outage 2R19 when the interlock position switch was found over rotated. This switch allows switchover of cold leg and hot leg recirculation for post-accident, long term, cooling. The NRC conducted the 95001 inspection (root cause effectiveness) during the week of June 12, 2017. After extensive review at the NRC regional headquarters, the NRC concluded that DCPP should be required to perform an additional evaluation in order to close out the issue. Mr. Petersen reported DCPP has now performed the additional assessment based on NRC comments and identified an additional improvement opportunity. DCPP will inform the NRC of its readiness for a focused 95001 inspection of the additional assessment results following approval by DCPP’s Corrective Action Review Board. Mr. Harbor confirmed the DCISC would be briefed, likely at the next fact-finding, on the additional improvement opportunity identified, including from an operating experience standpoint, when the Corrective Action Review Board has completed its review. The DCISC Members observed that it was most unusual to have an NRC inspection report include a differing professional opinion by one of the members of the inspection team. Dr. Lam stated he was very surprised to learn that, after a period of one year, the White finding remained open after the 95001 inspection, as dealing with that issue should have
required the unconditional commitment of resources and the undivided attention and focus of senior management and all members of the plant technical staff. Mr. Petersen stated this matter did have the undivided attention of plant staff and everything possible in the control of the plant was done to address the inspection requirements and to complete the required cause analysis and the fact the White finding remained open after the 95001 inspection involved an internal disagreement within the NRC. Mr. Harbor stated that PG&E remains open and receptive to all feedback and the issue will be addressed and closed out by the upcoming focused 95001 follow up inspection.

Mr. Petersen closed his presentation with a review of upcoming station activities:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date</th>
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<tbody>
<tr>
<td>NRC Biennial EP Inspection</td>
<td>November 2017</td>
</tr>
<tr>
<td>NRC TI-191 FLEX Inspection</td>
<td>November 2017</td>
</tr>
<tr>
<td>2R20 Refueling Outage</td>
<td>February 2018</td>
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</table>

Dr. Peterson remarked the DCISC is very interested in following FLEX training issues and the particular areas which will be the focus of the NRC FLEX inspection and Mr. Harbor stated the FLEX inspection procedures would be provided to the DCISC for review. Mr. Harbor confirmed that DCPP has initiated FLEX drills in context of emergency planning. In response to Dr. Peterson’s request, Mr. Petersen stated that DCPP would make available for the DCISC’s review during a future fact-finding some FLEX training videos and Dr. Peterson observed that it might be useful to have a compendium of parts of the training videos for presentation at a public meeting.

Mr. Harbor introduced Outage Manager Matt Coward to make the next presentation and reported Mr. Coward has more than 25 years of nuclear experience, holds a Bachelor of Science Degree in Mechanical Engineering and has held a Senior Reactor Operator license and leadership roles in the Engineering and Operations organizations.

Performance during the 20th Refueling Outage for Unit 1 (1R20)
Including Key Activities, Performance Indicators, Results Achieved, Fuel and Steam Generator Inspection Results, Open Items and Plans for the 20th Refueling Outage for Unit 2 (2R20).

Mr. Coward reported the 20th refueling outage for Unit 1 (1R20) commenced at midnight on April 23, 2017, and was completed 61 days later on June 23, 2017, at one minute past midnight. He summarized what he described as outage successes including the outage duration and achieving the outage without any Occupational Safety and Health (OSHA) recordable injuries. However, Mr. Coward stated a serious near miss incident resulted in a site clock reset. Mr. Coward reviewed and discussed with the DCISC the scope of work accomplished during 1R20 as follows:
Outage Scope (Maintenance and Modifications)

- Permanent cavity seal - a first time project for DCPP.
- Baffle-former bolt inspection and replacement - a first time project for DCPP with 61 bolts replaced.
- Control rod guide cards inspection and swap.
- Reactor Vessel cold leg nozzle ultrasonic inspections.
- Containment Fan Cooler Unit (CFCU) 1-5 cooling coil replacement - another first time project.
- CFCU 1-1 and 1-2 motor overhauls.
- Emergency Diesel Generator (EDG) 1-3 major Maintenance Outage Window (MOW).
- Low Pressure turbine “B” replaced.
- High Pressure turbine inspection and replacement of some turbine blades.
- Feed Water Pump 1-1 turbine overhaul.
- 500 kV breaker 632 replacement as part of PG&E’s upgrade of its switchyards.
- 230 kV dead end standoff insulators from the Turbine Building replaced.
- NFPA-805 modifications.
- Incipient fire detection modifications.

In response to Consultant Wardell’s inquiry Mr. Coward confirmed that NFPA-805 required modifications are now complete for Unit 1 and for Unit 2 with the exception of the incipient fire detection modifications for Unit 2 to be accomplished during 2R20.

Mr. Coward discussed what he described as positive accomplishments during 1R20 as follows:

- Outage Vertical Slice schedule reviews utilized to identify what he described as potential “pinch points” on the schedule.
- Use of the Emerging Issues Process to define problems and identify solutions.
- Vendor performance by Westinghouse for the control rod guide cards, baffle-former bolt replacement, permanent reactor cavity seals and refueling and by Siemens for the turbine generator work.
- Line ownership of As Low as Reasonably Achievable (ALARA) efforts to reduce dose.

Mr. Coward reviewed some of the outage lessons learned during 1R20 with the Committee:
Refueling equipment performance which delayed core off load and reload. In response to Consultant Wardell’s observations Mr. Coward reported that until 1R20 most refueling equipment issues were either related to the spent fuel pool bridge crane or the Containment manipulator crane. During 1R20 refueling equipment issues centered primarily on issues with the transfer cart which operates underwater and is used to upend and lay down fuel assemblies. Mr. Coward reported the spent fuel pool bridge crane for Unit 2 has been upgraded for 2R20. In response to Dr. Budnitz’ inquiry Mr. Coward remarked the problems with the transfer cart were related to how the cart was being operated and how the limit switches were set up and the problems were identified as gaps in procedures which have now been revised.

Greater than the usual number of late scaffolding support requests. In response to Dr. Budnitz’ question, Mr. Coward replied that the issue related to a process and did not have an impact on safety.

Emergency Diesel Generator (EDG) 1-3 Maintenance Outage Window (MOW) execution due to the need for personnel on other critical path activities. Mr. Coward observed that there will be no EDG maintenance outage window for 2R20. In response to Consultant McWhorter’s inquiry Mr. Coward reported this work was first time preventive maintenance and involved disassembling the cylinders to inspect the O-rings and there were some unexpected equipment condition issues that the vendor and DCPP were required to address related to whether certain components should be repaired or replaced and he confirmed that for one of these issues there was operating experience available.

Mr. Coward reviewed the goals set and results achieved for 1R20 as follows:

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious Near Miss Events</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Nuclear Safety Events</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Site Clock resets</td>
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<td>1</td>
</tr>
<tr>
<td>Outage duration (Days)</td>
<td>75</td>
<td>61</td>
</tr>
<tr>
<td>ALARA (Person Rem)</td>
<td>55</td>
<td>44.9</td>
</tr>
<tr>
<td>Power Ascension (Days)</td>
<td>5</td>
<td>4.125</td>
</tr>
</tbody>
</table>

Mr. Coward described the electrical bus and the breakers involved in the site level near miss event that occurred when electrical maintenance workers were about to connect a ground buggy which was placed in the wrong cubicle to a breaker which had it been racked in it would have ground a live bus. A supervisor nearby recognized the error and stopped the work. The DCPP electrical maintenance organization conducted a stand down and Mr. Coward stated multiple corrective actions will result when the apparent cause evaluation is complete.

Mr. Coward reported during 1R20 relative to nuclear safety, outage safety and
defense-in-depth levels, these were maintained above the requirements to ensure key safety functions were satisfied and that Technical Specifications and equipment control guidelines remained in compliance. He reported some of the high risk and infrequently performed tests and evolutions performed as planned during 1R20 included:

- Vital electrical bus transfer and engineered safeguards testing.
- Performance of heavy lifts over the reactor core.
- Movement of reactor vessel lower internals.
- Draining to lowered reactor coolant inventory for reactor disassembly and reassembly with fuel in the core.
- Draining to reduced reactor coolant inventory with fuel in the core for vacuum refill with 230 kV power unavailable.
- Initial criticality of the new reactor core.

Mr. Coward reported that 1R20 was completed with no recordable injuries and this performance represents the sixth consecutive DCPP refueling outage without a recordable injury. During 1R20 he stated DCPP brought in 1,301 temporary workers to assist in outage-related work activities and a number of DCPP employees took on tasks unrelated to their usual assignments.

Mr. Coward then provided an overview of refueling outage 2R20 for Unit-2 which is scheduled to begin in mid-February 2018. He described and discussed with the Committee the planned scope of work during 2R20 which includes the following:

- Control rod guide cards inspection and swap seven of them.
- Residual Heat Removal (RHR) WIB-245 weld overlay.
- High Pressure turbine inspection and blade replacements based on the recent outage experience during 1R20 DCPP is preemptively planning to replace two rows of turbine blades.
- Feed Water Pump 2-1 turbine overhaul which is the same work done during 1R20.
- Reactor Coolant Pump (RCP) 2-4 motor overhaul.
- Incipient fire detection modifications.
- Integrated Leak Rate Test (ILRT) last done during 2R14. This requires approximately 16 compressors to be brought in to pressurize Containment to 50 pounds per square inch to check for leakage through Containment penetrations. Once pressurized, the pressure is stabilized, verified and validated and the check is performed for leaks, following which the pressure is reduced.
- Replacement of 13 flux thimble tubes.
- Snubber Inspection Program.
- Service Cooling Water inlet line repair. The Service Cooling Water System provides cooling water to the non nuclear side to cool main turbine lube oil and main feed pump lube oil and the inlet line will be cleaned and coated with a liner.
- Open circuit protection modifications as performed on Unit-1 with the trip feature cut out during the first fuel cycle to avoid spurious alarms.
- Main Generator robotic inspection in support of the main generator rewind scheduled for 2R21.

In response to Dr. Budnitz’ request, Mr. Coward identified the integrated leak rate test and the weld overlays as items about which he has the most concern. He confirmed that 2R20 will have a shorter outage duration than that planned for 1R20.

Mr. David Weisman of the A4NR was recognized. Mr. Weisman inquired whether the main generator robotic inspection is a different evolution from that of the stator replacement work which he understood is planned for refueling outage 2R21 in 2021 when the Unit 2 main generator stator will be rewound. Ms. Harbor and Mr. Coward confirmed Mr. Weisman’s observation that the stator rewind is a repair and refurbishment of the existing generator stator.

Ms. Simone Malboeuf was recognized. Ms. Malboeuf inquired where DCPP obtained the 1,300 temporary workers used during 1R20. Mr. Coward and the Committee Members replied that these workers originate from a wide spectrum of sources with some highly trained specialty workers traveling from plant to plant to engage in refueling outage work which requires their specialized skill sets, some are residents of the local area, some are PG&E employees who are not DCPP employees, and some are employees of the vendors engaged to perform work during the outage.

Mr. Coward closed his presentation by screening a video of the work above the 140 Level in Containment to replace the cooling coils on the Containment Fan Cooler Units which was accomplished using a spider crane. Mr. Coward commented that while in Containment workers wear protective equipment, although by industry standards Containment at DCPP are extremely clean with very little radioactive contamination but in order to protect its workforce DCPP conducts all work in Containment under the assumption that everything is contaminated.

Mr. Harbor introduced and requested Mr. Tom Jones, Director of Strategic Initiatives, to make the next informational presentation. Mr. Harbor reported Mr. Jones holds a Bachelors’ Degree in Political Science and Government and has more than 20 years’ experience in government relations including work within the Nuclear Generation organization.
Update on the Joint Proposal.

Mr. Jones stated Administrative Law Judge (ALJ) Allen’s Proposed Decision concerning the CPUC’s disposition of the Joint Proposal has not been issued and is expected sometime later this month. He stated the final public participation hearings were held in two sessions in San Luis Obispo on September 14, 2017, and in response to Dr. Budnitz’ inquiry, Mr. Jones reported about 125 persons attended and approximately 50 persons spoke including representatives of local agencies and cities with the greatest number of those comments coming in support of the administrative record while a few speakers urged either the continued operation of the plant or its immediate closure. Areas of interest included:

- Emergency Planning
- Employee Retention
- Continued Operations
- Future Land Use
- Community Settlement Funds

In response to Dr. Lam’s query Mr. Jones stated ALJ Allen and the CPUC President Picker, who served as the assigned Commissioner for the proceeding, previously made a commitment to the local community to conduct the public participation hearings in the local area although there was no requirement that they do so. Dr. Lam remarked this speaks to the level of attention the presiding officer and the assigned Commissioner are giving to the matter of the Joint Proposal.

Mr. Jones remarked a key element of the Joint Proposal concerns employee engagement and the Excellence Plan, a document of some 25 pages, developed to maintain employee focus and reevaluate certain projects. He described as a key strategy the engagement of all employees at the station and Mr. Jones and Engineering Director Mr. Adam Peck have now spoken with more than 750 employees face-to-face and they expect to contact approximately 1,000 DCPP employees in this effort with a presentation and to hear their concerns and respond to their questions. The retention program and employee retraining initiative are of particular interest to employees. Mr. Jones remarked that during these presentations employees are provided with information on how to access information on the CPUC’s consideration of the Joint Proposal.

Mr. Jones displayed and discussed with the Committee a graphic depiction showing elements of the Excellence Plan which is used in briefing employees including project schedules, preventive maintenance, and work modifications to support operation through 2025, and the strategies for employee retention and schedules for redeployment training. Mr. Jones described the retention programs as including Tier 1 and Tier 2 bonuses along with severance pay as financial incentives to
encourage employees to remain at DCPP. He reported that PG&E is hopeful that a final decision may be issued by the CPUC by December 2017. In response to Consultant McWhorter’s question Mr. Jones confirmed as the Joint Proposal has not yet been approved no payments have been made to any employees under the Tier 1 incentive. If a final decision on the Joint Proposal is delayed until 2018 Mr. Jones confirmed this might require two payments to be made in a single year which would have some impact on financial planning for employees as the Tier 1 financial incentive is scheduled to be paid quarterly in advance but if an employee does not stay for the full Tier 1 term they would be required to pay back a prorated portion.

Mr. Jones presented and discussed a second graph showing the trend in employee’s acceptance of the DCPP employee retention agreement. He reported that initially 86% of DCPP employees entered into these agreements. He reported since the announcement on the Joint Proposal was made there have been 200 job offers made only five of which were turned down and the rate of acceptance of employee retention agreements has now increased to 92%. He reported that fewer of DCPP’s employees with 20-25 years of service and retirement eligibility elected to participate in the retention agreement and some early career employees opted not to enter into retention agreements as they do not expect to remain at DCPP for five or ten years. Since the retention agreements were offered 77 employees have separated from DCPP employment with 22 having signed retention agreements. Of these, the majority were due to retirement and, in response to Dr. Budnitz query, Mr. Jones reported the attrition rate for DCPP employment is about what it was prior to the announcement of the Joint Proposal.

Mr. Jones remarked that when the Proposed Decision is issued, he commended it to the DCISC for its consideration, evaluation, and possibly for a communication to the CPUC expressing the DCISC’s perspective.

**Overview of the Decommissioning Process and Initial Planning.**

Mr. Jones continued his presentation to the Committee and stated he would provide an update on matters related to decommissioning the plant. He reported in May 2017 the CPUC issued a decision on PG&E’s Nuclear Decommissioning Cost Triennial Proceeding (NDCTP), a proceeding which is before the CPUC every three years as a rate case to assess the requirement to fund the full decommissioning of the facility. Mr. Jones reported PG&E did not receive the increase it sought in the 2017 NDCTP and remains approved in the amount of $2.4 billion which Mr. Jones contrasted with the $4.4 billion approved for decommissioning the San Onofre Nuclear Generating Station (SONGS). He remarked the decommissioning of PG&E’s Humboldt Bay Nuclear Power Plant (HBPP) was determined to be going well and the company has recovered nearly all of the $400 million spent during the prudency review process but the support provided by PG&E for the increase and the estimate of costs for DCPP decommissioning was determined not to meet the standards for the burden of proof required by the CPUC.
Mr. Jones reported on PG&E’s efforts and activities to date concerning DCPP decommissioning as follows:

- All staff positions filled - consisting of 24 persons led by Senior Director Loren Sharp who also heads up the HBPP decommissioning efforts. The sole job of the decommissioning project staff at present is to properly inform the next NDCTP filing as to cost. Mr. Jones remarked that PG&E has determined that using generic formulas for DCPP decommissioning costs is insufficient due to California and DCPP-specific requirements including that all low level waste must be transported out of state and matters such as whether removal of the breakwater from Diablo Cove will be necessary or required. In response to Dr. Budnitz’ inquiry Mr. Jones stated that staffing is now adequate for the NDCTP-related cost estimate work but once permitting activity begins it may be possible to reduce the size of the decommissioning organization at the plant as other divisions within PG&E will become involved.

- Informing 2018/19 NDCTP - with the first filing with the CPUC due in 2018 or 2019.

- All bundles for requests for proposals for decommissioning-related work have been issued to vendors with experience in nuclear plant decommissioning. Mr. Jones reported there are three approaches to decommissioning a nuclear power plant: (1) for the utility to self-perform the work; (2) a hybrid approach similar to that used at HBPP where specialized contractors are brought in and work with the utility; and (3) to utilize a decommissioning oversight contractor, similar to what SONGS is doing. He reported that no decision has yet been made as to the approach to be used at DCPP. Mr. Jones reported only ten U.S. nuclear plants have been successful so far in retiring their 10 CFR Part 50 Licenses from the NRC which he described as PG&E’s ultimate goal for DCPP. In response to Consultant McWhorter’s inquiry, Mr. Jones stated that for retirement of the Part 50 License, although there are different standards for cleanup, all radioactive components would need to be removed from the site and the site restored and release of the site approved for other uses.

Mr. Jones described the key regulatory project milestones as follows:

- Issuance of the Proposed Decision on the Joint Proposal, including the proposed settlements therein, will commence a public comment period.

- Subsequent CPUC Hearing will be held on the Final Decision on the Joint Proposal.

- Diablo Community Engagement Panel following issuance of the Final Decision will provide feedback from a cross-section of members of the local community and a recruitment committee is now considering candidates and an application process.

- 2018/19 Filing of the NDCTP with possible approval late 2020.
Mr. Jones reported other issues will include the future uses of the land, the possible repurposing of assets, as well as transportation of materials through the community. Mr. Jones described the decommissioning process as, essentially, a large construction project in reverse which will have impacts under the California Environmental Quality Act (CEQA) as well as the need for permits from both the State Lands Commission and the California Coastal Commission and he remarked that PG&E has worked through issues with those regulatory bodies in the past and realizes that efforts to obtain these permits will be multiyear and efforts must begin soon if PG&E wishes to commence active decommissioning right after cessation of operations.

Mr. Jones, in response to Consultant McWhorter’s request, replied that DCPP is in the process of gathering information and posing inquiries on decommissioning from not only HBPP but also the Zion, Crystal River and SONGS nuclear power plants and he offered to share information on these efforts with the DCISC at a future fact-finding. He remarked that two of the lessons learned from the decommissioning of California plants concern the need to have permits in hand as the cost for safe store can be quite expensive, and that there are a number of different technologies available for reactor full segmentation.

Dr. Peterson stated he found Mr. Jones presentation quite helpful and the DCISC will be closely following DCPP’s progress as there is clearly the potential for a substantial impact on plant operations from decommissioning activities prior to shut down but the Committee will need to assess and determine whether there may be an appropriate role for the Committee post-shutdown. The Chair then called for public comments on Mr. Jones presentation.

Ms. Rochelle Becker, Executive Director of the A4NR, was recognized. Ms. Becker requested from Mr. Harbor a copy of the power point presentation used by Mr. Jones. She also reported that the A4NR website at www.A4NR.org has a video available from the public participation hearings.

Ms. Jane Swanson of San Luis Obispo Mothers for Peace was recognized. Ms. Swanson stated, given the three decommissioning scenarios described by Mr. Jones, she would appreciate information and verification of who would remain responsible for the radioactive waste in the spent fuel pools and the spent fuel storage casks each instance. Dr. Budnitz remarked that there is also a third category of waste which includes contaminated objects. Ms. Swanson stated that following cessation of operations there should still be an important role for the DCISC to play because the radioactive waste will still be located at the plant site and the public deserves to have independent eyes on that. Mr. Jones responded that although PG&E has yet to decide which of the three decommissioning strategies he described would be adopted for DCPP, as long as PG&E holds the license under either 10 CFR Part 50 for power operations, or the separate license under 10 CFR Part 72 for dry cask storage, PG&E will remain responsible for the
fuel. He reported that PG&E continues to hold both licenses for HBPP which ceased operation in 1976. Mr. Jones reported that when low level waste is shipped off the plant site, the company engaged for its transportation takes over responsibility for the waste under a license from the NRC under 10 CFR Part 61. Dr. Budnitz remarked that although remote there was a possibility that waste could be sent to a Department of Energy site which employs a different regulatory regime. Mr. Jones reported that costs and strategies would be reviewed during the next Nuclear Decommissioning Trust Triennial Proceeding.

Dr. Peterson commented that earlier during this public meeting the Committee discussed the matter of whether it should have a post-shutdown role in reviewing decommissioning and that such a role would necessarily result in a reduced scope but it would be worthwhile to follow up and identify the differing categories of waste that will be produced during decommissioning and their respective safe disposal paths and to ensure that there will not be any stranded waste left at the site.

Dr. Budnitz remarked the DCISC at this time is not prepared to make a determination on whether it should seek a post-shutdown role to review decommissioning from the CPUC. Part of this determination will necessarily include the process of how the Restated Charter from the CPUC might be changed if that should prove necessary. Dr. Budnitz reported the DCISC would also explore the idea of engaging a consultant with expertise in decommissioning to inform its discussion and determination. Dr. Peterson stated his perspective may be somewhat different from Dr. Budnitz’ as the Restated Charter, if taken literally, may lead to the conclusion that the DCISC does not have a post-shutdown role and the Committee may not be in the best or in an appropriate position to decide or to recommend whether it should have a continuing role. Dr. Peterson observed that is a policy decision and the DCISC’s role is to implement policy not to involve itself in policymaking. He stated he supported the DCISC playing a role in providing whatever useful information it can to the CPUC and to the entities who appoint its members but ultimately it is a policy decision that needs to be made by the CPUC and to include all the stakeholders as to whether the DCISC should continue post-shutdown. Dr. Budnitz confirmed the earlier consensus of the Members that their current work in reviewing issues and planning associated with decommissioning while the plant is still operating is fully within the mandate of the Restated Charter.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis stated that an objective party to review decommissioning issues post-shutdown was necessary and she questions why the Committee should not have input into that matter. Dr. Peterson replied and reiterated his view that the role of the DCISC is not as a policymaking or policy advising body but rather to serve as a source of the best possible information to the appropriate decision making bodies. Dr. Peterson remarked his personal opinions, or those of the other DCISC Members, on how the United States has managed its nuclear waste policies have never entered into their
decisions as members of the DCISC and he stated it is important that the policy process be allowed to play out in a transparent way. Dr. Budnitz stated that he did not agree with Dr. Peterson at this time but he further remarked that the only time the three Members can discuss and articulate their views on this matter is during a public meeting and that an exploration of the perspective of the value and benefits from having the DCISC continue post-shutdown would properly and correctly need to be balanced by a description of why the plant could be decommissioned safely, as many other plants have been, without the need for a committee such as the DCISC.

Ms. Simone Malboeuf was recognized. Ms. Malboeuf stated that her safety concern was due to the cyber attacks that have been reportedly perpetrated against nuclear power plants in the United States and she questioned whether DCPP has a plan for addressing the issue of computer system hacking and she observed that this could be a concern even after DCPP shuts down. Dr. Peterson stated that while the DCISC does not have oversight of or review security per se the Committee does review security-related issues in context of their interface with plant safety. He stated there is fairly strong alignment between good cyber security practices and those promoting safe and reliable operations. Dr. Peterson and Dr. Budnitz observed the architecture of plant protection and control systems provides a significant degree of separation from administrative functions and the attacks against U.S. nuclear power plants that have occurred so far have been directed on the administrative systems not plant protection and control systems. Dr. Peterson reported DCPP has been actively engaged in reviewing and upgrading the cyber security for all of its computer systems including making physical changes to modify hardware and make hacking more difficult and increase the reliability of these systems. He observed that the spent fuel storage casks employ no control systems and utilize passive safety features as do new reactor designs such that the manner of their activation is by disconnection from external sources of power and from digital control systems. Dr. Peterson stated that this was indicative of a better way to design a reactor system. In response to Ms. Malboeuf’s concern about an attack on the electric grid system Dr. Peterson replied DCPP is designed to shut down safely without access to the grid or to any source of off-site power and loss of access to the grid can occur for a number of reasons unrelated to a cyber attack.

Mr. Harbor thanked Ms. Malboeuf for her comments and he reported DCPP has implemented a Cyber Security Program and that relative to the plant safety systems that affect the ability of the reactors to shut down and to initiate a safety response, the computer systems associated with safe shut down are not connected to what is commonly known as the internet or the grid and are stand-alone systems. Mr. Harbor reported DCPP has had a team undertaking an extensive review of what are termed critical digital assets and has now employed what he termed blocks to prevent any interaction with other systems that could have an impact on plant safety and this includes protection from an internal attempt to disrupt a digital system. Mr. Harbor reported these efforts are part of the NRC
inspection regime to ensure they are implemented and effective and DCPP continues to focus on cyber security and to work to improve its digital systems.

XVIII Adjourn Evening Meeting

The Chair adjourned the afternoon meeting of the Committee at 7:15 P.M.

XIX Reconvene for Morning Meeting

The October 19, 2017, morning public meeting of the Diablo Canyon Independent Safety Committee was called to order by its Chair, Dr. Peter Lam at 9:00 A.M. Dr. Lam welcomed those persons present in the audience and watching the proceedings on live streaming video. Dr. Lam requested any of the members who wished to make remarks to do so at this time.

XX Committee Member Comments

The Chair reported that he was advised that the State of California would be conducting an earthquake preparedness drill at 10:19 A.M. this morning.

XXI Public Comments and Communications

The Chair reviewed the invitation to address the Committee on matters not on the agenda for this public meeting and invited any comments from members of the public who wished to address the Committee to do so now. There was no response to this invitation.

XXII Consent Agenda

The first item on the Consent Agenda was approval of the Minutes of the Committee’s June 7-8, 2017, public meeting held in Avila Beach, California. A draft of the June 2016 Minutes was included in the public agenda packet. The members and consultants reviewed the Minutes and provided revision of certain references to be included in the final version of the June 2017 Minutes and discussed follow up actions to be taken, provided clarification to legal counsel concerning typographical errors and the accuracy of certain references in the Minutes which were included in the public agenda packet for this meeting, and editorial comments and changes were received concerning the draft of the June 2017 Minutes.

Minutes of the Committee’s public meetings, in their final accepted form, become part of its Annual Reports on Safety of Diablo Canyon Nuclear Power Plant Operations (Annual Report). On a motion by Dr. Budnitz, seconded by Dr. Peterson, the Minutes of the Committee’s June 2017 public meeting were accepted subject to inclusion of the changes provided to the Committee’s Assistant Legal Counsel. The June 2017 Minutes will be part of the Committee’s 27th Annual Report.
The second item on the Consent Agenda concerned documents provided to the Committee. Dr. Lam reported that the Committee conducts its business in a transparent fashion and the public agenda packet included lists of all the documents provided to the DCISC for review by PG&E since the last public meeting of the Committee in June 2017.

XXIII Information Items Before the Committee (Cont’d)

The Chair requested Mr. Harbor to introduce the next presenter. Mr. Harbor introduced Director of Technical Services Mr. Jearl Strickland and reported Mr. Strickland holds a Bachelor of Science Degree in Civil Engineering, a Master’s Degree in Business Administration and has more than 35 years of nuclear experience including leadership roles in Engineering and Project Management organizations.

Update on Spent Fuel Storage Technical Issues Including PG&E & Industry Activities Related to Study of Potential Corrosion of Multi-Purpose Canisters (MPCs), Lessons Learned from Spent Fuel Activities at Decommissioned Facilities (including SONGS), and the Potential Implications for Accelerating Spent Fuel Transfer to the ISFSI and Decreasing Spent Fuel Inventory.

Mr. Strickland reported in this presentation he would be providing a program status update of activities related to the evaluation for external corrosion of multi-purpose canisters (MPCs) storage systems used in the United States and in Europe and of decommissioning considerations including accelerating used fuel transfer to the Independent Spent Fuel Storage Installation (ISFSI). Mr. Strickland displayed photos of the power plant showing the Fuel Handling Building containing the plant’s two spent fuel pools (SFP) serving Units 1 and 2 and the ISFSI, which is located approximately one-half mile from the coast at an elevation of 310 feet above sea level. He also displayed a photo of one of the SFPs and reported that when fuel is discharged from the reactor, after approximately three operational cycles, it is placed into storage in the respective SFP and after approximately seven years, as required by DCPP’s current license, it becomes a candidate for storage at the ISFSI.

Mr. Strickland displayed a photo of the Hi-Storm dry cask storage system in use at DCPP which is manufactured by the Holtec International firm. He reported dry cask storage is used at most U.S. nuclear power plants. Fuel is stored in sealed MPCs and the MPCs are placed in a steel and concrete over pack for radiation shielding and protection. At DCPP for reasons of seismic safety the over packs are bolted to an eight-foot thick steel reinforced concrete pad and Mr. Strickland stated DCPP is the only facility that utilizes this type of arrangement for its MPCs. In response to Dr. Budnitz’ inquiry, Mr. Strickland reported the MPC can also be used for interim storage as well as for transportation purposes to a longer-term storage facility. Mr. Strickland reported the over pack is comprised of two steel vessels with concrete
between them to provide shielding. The MPC with the over pack weighs approximately 175 tons while the weight of an MPC and a transportation-type package is approximately 125 tons.

Mr. Strickland displayed a photo of the ISFSI and reported the ISFSI can hold all fuel produced from the plant’s 40-year license and was built in modules, with 7 pads each of which holds up to 20 casks. Currently, three pads are in operation holding a total of 49 casks. Each MPC holds 32 fuel assemblies. DCPP completed pads 3 through 7 in 2014 when it was determined that the centralized spent fuel repository planned for Yucca Mountain, Nevada, would not be available in the foreseeable future.

Mr. Strickland stated with reference to the evaluation of the MPCs for external corrosion to date, no stress corrosion cracking has been identified on any MPC in the U.S. Activities at DCPP related to the potential for corrosion cracking include the Electric Power Research Institute (EPRI) publication of the DCPP ISFSI MPC Inspection Report in August 2016 (EPRI Report). DCPP volunteered to participate in the EPRI inspection study which did identify the presence of chloride crystals on the exterior surface of a MPC but found no corrosion. Mr. Strickland reported some initial MPC material lots were more susceptible to external corrosion, including locations around welds which have the potential for higher stresses which, combined with the presence of chloride and moisture, can create a corrosive environment. Mr. Strickland reported at present there is insufficient chloride concentration to initiate corrosion and no corrosion was found during inspection of MPCs. Mr. Strickland reported that during its early life the temperature of an MPC is very high, to a degree that does not allow condensation to develop but he commented it is important that the MPCs be continually monitored to address the presence of the elements which could induce cracking.

Mr. Strickland reported the stainless steel material used to fabricate the MPCs has changed from A304 stainless steel to A304L stainless with a lower carbon content to A316L stainless which is used today to provide even better protection from chloride induced stress corrosion cracking (CISCC).

The EPRI published its Aging Management Guidance for Potential Chloride Induced Stress Corrosion Cracking of Welded Canisters in March 2017 and he provided a copy to the DCISC of this document. The report provides recommendations for aging management and is currently under review for implementation and likely will be incorporated during ISFSI License Renewal. In response to Consultant McWhorter and Dr. Budnitz’ requests, Mr. Strickland identified key aspects of the aging management program to include robotic inspection techniques, types and frequencies of inspections, and implementation of aging management protocols as well as inclusion of remedial actions in the event something is discovered during an inspection. Mr. Strickland reported that while the NRC license for operation of a nuclear power plant is issued for a 40-year duration, the license period for an ISFSI facility is 20 years. The license for the DCPP ISFSI will expire in 2024 and
the plant will begin the relicensing process very soon. Mr. Strickland reported DCPP is actively participating in EPRI’s Extended Storage Collaboration Program and in EPRI’s Chloride Induced Stress Corrosion Cracking (CISCC) and Non Destructive Examination Committees as well as in American Society of Mechanical Engineers’ (ASME) Section XI and Non Destructive Examination (NDE) Code Committees. He confirmed Dr. Budnitz’ observation that typically the EPRI submits its studies to be evaluated by the NRC and, if endorsed by the NRC, the EPRI studies can be used by the NRC in regulation of its licensees. PG&E personnel serve on committees that are evaluating and implementing industry standards for MPC inspection techniques with technologies and criteria to be proposed for adoption in the ASME Boiler and Pressure Vessel Code and accepted by the NRC under a code case.

Mr. Strickland identified the spent fuel storage systems currently licensed by the NRC including:

- AREVA Trans-Nuclear - NUHOMS
- Holtec – HI-STORM and HI-STAR
- NAC International – MAGNASTOR

and the storage system used in Europe:

- GNS Castor (storage and transportation)

The Holtec Hi-Star System used at PG&E’s HBPP for storage and potentially for transportation consists of a welded MPC containing fuel with top and bottom lids bolted in place. The over pack is constructed of steel vessels with an internal neutron shield. The Hi-Star System uses lead instead of concrete in the interstitial space between the vessel walls and this results in a smaller, lighter MPC than those used at DCPP. In response to Consultant Wardell’s inquiry Mr. Strickland reported that in decommissioning the plant and retiring the SFPs, without a cask transfer facility and with only 5 MPCs, the decision to use Hi-Star made sense for HBPP. The Holtec Hi-Storm System used at DCPP consists of inner and outer steel vessels 1” thick with 26” of high density concrete used for shielding. The Hi-Storm System uses passive cooling and is seismically anchored for use at DCPP. The weight of the Hi-Storm System does not lend itself to being able to be transported and a Hi-Star storage container or another transportation container would be used to move the MPC for shipment off site. In response to Consultant McWhorter’s inquiry, Mr. Strickland reported that at DCPP a transfer cask is used to transport the MPC from the Fuel Handling Building to the ISFSI with transfer of the MPC into the over pack being accomplished at a cask transfer facility located just outside the ISFSI and PG&E is currently considering procuring a second transporter and transfer cask in order to use one with each SFP.

Mr. Strickland stated the European GNS Castor Casks are very different in that
they are used for both transport and storage and do not utilize a separate MPC. The GNS Castor Cask consists of a monolithic body made of cast iron and uses bolted closure lids. Axial boreholes are drilled into the cask wall and filled with polyethylene moderator rods. Mr. Strickland observed that several European nations reprocess spent fuel for reuse and the GNS Castor Casks are reusable.

With reference to plant decommissioning Mr. Strickland stated the Joint Proposal to retire DCPP requires PG&E to conduct an evaluation of optimizing the time that spent fuel remains in the SFPs in wet storage. Two studies are currently evaluating the options which include saving older fuel assemblies to mix with recently discharged fuel assemblies and possibly thereby shortening the duration of decommissioning. This is due to the fact that recently discharged fuel from the last few operational cycles will be hotter and the mix of older fuel within an MPC should enable recently discharged fuel to be taken out of the SFPs sooner. Mr. Strickland displayed a graph showing the spent fuel storage rack use and current forecast for SFP inventory. He reported the SFPs are currently essentially at their minimum inventories following the last refueling outage and another spent fuel loading campaign is planned for summer 2018 for 8 casks.

Mr. Strickland stated after the 2018 loading campaign a decision will be made as to whether to continue with the two additional planned loading campaigns in order to be able to have the last discharged fuel cool to the point where it can be off loaded to dry cask storage within a time line of 2033 or 2034. Preliminary results of studies by Holtec and Trans-Nuclear indicate that if fuel movement is delayed this may shorten the window to four to five years instead of from between seven and nine years for the discharge of the final fuel to the ISFSI. Dr. Peterson observed that during decommissioning there is a key point where irreversible action is taken to place the SFPs out of service and at that point the option to reopen and inspect the inside of the MPCs becomes much more difficult. Mr. Strickland agreed that this would need to be part of the decision making process, as would the possibility of a regional consolidated interim storage (CIS) facility becoming available. Dr. Peterson noted that two applications for a CIS facility are currently pending before the NRC but one application has now been placed on hold due to lack of funding. Dr. Peterson observed that there is currently no statutory authority for the Department of Energy (DOE) to use such a facility if it were to become available. Dr. Peterson observed and Mr. Strickland agreed that with the risks associated with completing decommissioning and leaving the spent fuel on site without access to a SFP it would be prudent to consolidate storage sooner rather than later to reduce risk but without the statutory authority for the DOE to use a CIS to receive fuel from decommissioned reactors it is unlikely to attract private sector investment. Dr. Peterson remarked that likely the best option for ratepayers is to initiate decommissioning activities very early on and once the Auxiliary Saltwater (ASW) System is shut down as that effectively precludes further use of the SFPs.

In response to Dr. Budnitz’ query Mr. Strickland confirmed that to date all fuel
transferred from the SFPs to the ISFSI has been undamaged and Mr. Strickland reported that there is presently no fuel in either SFP which must be considered as failed fuel for purposes of dry cask storage. Mr. Strickland confirmed that DCPP’s license for the ISFSI provides for a number of failed fuel assemblies to be stored and located in separate containers within a MPC but to date that license provision has not been required. In response to Dr. Lam’s inquiry, Mr. Strickland confirmed DCPP presently has the capability to open a MPC as this was part of the NRC’s licensing requirements and a demonstration of this capability was required to obtain the license for the ISFSI and he confirmed this capability will be retained until the last SFP is shut down. In response to Dr. Lam’s follow up inquiry Mr. Strickland stated that currently there is no process licensed for encapsulating a MPC in the event of some internal failure. Mr. Strickland confirmed Dr. Lam’s observation that, as far as optimizing the expedited transfer of all spent fuel to the ISFSI, the time under consideration would represent a shortening of that period by four or five years. Mr. Strickland stated his personal opinion that if possible this would be a worthwhile savings as while both wet and dry storage systems are safe, once all the fuel is in dry storage the opportunity is afforded to stop ASW operation and to not rely on heat exchangers or other processes to remove heat from the SFPs and the fuel assemblies, as well as eliminating the cost to keep the SFPs in operation which adds to the overall cost of decommissioning. Dr. Budnitz confirmed Mr. Strickland’s observation and he commented that while both wet and dry storage systems are safe, dry storage is the safer option. Dr. Peterson remarked that while the Holtec MPCs are licensed for transportation they have never been transported and if any issues were to emerge the lack of a SFP would limit the ability to correct any problem, including the potential need to use a smaller transport canister, so it would be better were the MPCs able to be moved to a CIS while a SFP was still in commission.

The Chair requested public comment on Mr. Strickland’s presentation.

Ms. Linda Seeley, representing Mothers for Peace, was recognized. Ms. Seeley stated Mothers for Peace oppose the concept of a CIS as there is a perception that moving the spent fuel off site means that the risks need no longer be dealt with. The areas of the country which might serve as the site for a CIS represent areas where she stated “everyone lives” due to the hazards posed by the presence of the spent fuel and by the aggregation of storage canisters from various sites without the ability or possibly the motivation by the site regulator to properly maintain or inspect the contents. She stated there are questions as to the effect on the MPCs from the rigors of transportation as they are massive objects weighing approximately 125 tons. Ms. Seeley reported that her group believes the most responsible and ethical alternative is to keep the storage casks within California because with the state’s political power they will be watched. She remarked that facilities such as those employed in Germany where the fuel casks would be stored in hardened bunkers with constant temperature and 24-hour radiation monitoring would be a preferred alternative. Ms. Seeley reported that Mothers for Peace would like to see DCPP become a model for the type of storage she suggested in order
that PG&E would continue to keep the community safe. She remarked that the Joint Proposal represented evidence of PG&E’s hard work to keep the community safe and this would be the next phase of that effort. Ms. Seeley stated that the MPCs at DCPP need to be taken care of now with 24-hour radiation monitoring in place. Dr. Budnitz commented that, while the safety of the MPCs which are and will be on site at DCPP during its operational period is within the remit to the DCISC from the CPUC, issues such as the transportation to and availability or use of a CIS repository are outside of the Committee’s remit.

Ms. Donna Gilmore of the group San Onofre Safety was recognized. Ms. Gilmore stated her background is as a systems analyst and she has been studying nuclear waste containment for some years now including having co-written a paper with Dr. Marvin Resnikoff on high burn-up fuel and she has worked closely with material engineers, nuclear engineers and nuclear physicists on these issues. She reported during a workshop on nuclear power conducted by the California Energy Commission Dr. Lam had invited her to attend this public meeting of the DCISC and to share information. Dr. Lam stated Ms. Gilmore was involved in early research on the issue of chloride induced stress corrosion cracking of MPCs and her research has led to increased public focus on this issue. Dr. Lam thanked Ms. Gilmore for her attendance.

Ms. Gilmore stated the information she would present to the Committee was available on the website www.sanonofresafety.org and all the information she would provide has links to government of scientific authority. Ms. Gilmore stated her involvement in nuclear power issues came about because of NRC statistics concerning complaints from employees regarding failure of their employers to address their concerns and that everything presented by the industry or a utility cannot be taken at face value.

Ms. Gilmore remarked the MPCs being used by the nuclear industry are designed for 20 years of operational life but the NRC has now made a decision that they may have to remain at plant sites indefinitely. She observed DCPP is subject to an ocean environment and as the MPCs are only ½ inch thick they are susceptible to cracking. She described the MPCs as thin-walled and inserted into thick concrete over packs and she noted that the air vents on the over packs were not shown in Mr. Strickland’s presentation or discussed previously and these vents afford convection cooling to the MPCs. Ms. Gilmore remarked that all the types of stainless steel described in Mr. Strickland’s presentation were susceptible to stress corrosion cracks due to salt air. Ms. Gilmore stated the MPCs cannot be inspected, cannot be repaired, and cannot be transported with cracks nor can they be monitored to prevent leaks or to provide a warning were something significant to occur. She remarked this is contrary to basic safety requirements for any system.

Ms. Gilmore reported the EPRI Report referred to by Mr. Strickland found sufficient sea salt and moisture to enable the deliquescence process to commence. She stated her inquiries with EPRI revealed that only about 10% of the surface of an
MPC can be tested for temperature or for the presence of corrosive particles and the EPRI Report found the MPCs were susceptible to cracking. Ms. Gilmore stated the President of the Holtec International firm has repeatedly confirmed that it is not practical to repair the Holtec MPCs and he further confirmed that if cracked the MPC would need to be replaced and she observed that without an available SFP that is not possible. Ms. Gilmore stated NRC Report (NUREG) 1927 Revision 1 contains the current MPC aging management plan and it provides that a crack of 75% or greater means the MPC must be taken out of service and she questioned how PG&E or any licensee might comply with that regulation without a SFP in service.

Ms. Gilmore observed there are 49 MPCs currently stored on site at the DCPP ISFSI and of these 2 were checked for salt particles and temperature with conditions found to meet those for chloride induced stress corrosion cracking although it is not known if any cracking has actually occurred as there is no way to inspect for same and she stated that she does not believe there will ever be the ability to inspect for cracks with the MPCs designed for use at DCPP. Ms. Gilmore observed that should a crack start it could propagate through the MPC wall within about 16 years. She questioned the wisdom of PG&E’s plans to purchase more of the Holtec MPCs. She stated that the San Onofre Nuclear Generating Station (SONGS), like DCPP, does not have a plan to handle cracking or leaking MPCs. She stated that other than use of a SFP, a “hot cell” represents the only other replacement option and this is very expensive to implement and does not presently exist at either facility nor are there plans for same.

Ms. Gilmore stated the plan for transporting the Holtec Hi-Storm MPCs includes use of a transportation cask which would be reused. She observed that when the NRC approved the use of thin walled MPCs it ignored aging issues by assuming that nothing would go wrong in the first 20 years but did not look at the issues beyond 20 years. She reported that high burn-up fuel was used at SONGS and is used at DCPP and this high burn-up fuel when placed in dry storage can experience damage to the fuel’s cladding and the NRC issued requests for information when it was considering licensing the Holtec casks on obtaining assurance that high burn-up fuel would not be shipped without verification that its cladding was undamaged. She stated her understanding that there was a total of 13 damaged fuel assemblies at DCPP as of 2013.

Ms. Gilmore reported that plants are not required to conduct continuous radiation monitoring of the dry cask stored fuel and there is no warning mechanism prior to a leak occurring. She commented that after the SFPs are emptied, as at the Rancho Seco Nuclear Generating Station (Rancho Seco) and at HBPP, their radiation monitors were removed and emergency planning was eliminated. She reported SONGS, DCPP, HBPP and Rancho Seco all use thin-walled canister systems with HBPP’s MPCs placed within thick-walled transport casks and stored below the ground.
Ms. Gilmore reported that French and German nuclear power plants use thick-walled casks made of ductile cast iron which are 19 3/4 inches thick as compared to some NRC-approved casks which are 14 1/2 inches thick. She reported Germany does not reprocess spent fuel and stores the casks in concrete buildings for environmental and security protection and the Germans have not experienced cracking issues. She recommended that the DCISC look thoroughly into the casks used in both Germany and France and make a recommendation for the use of the best available technology. She reported the casks used at the Fukushima Nuclear Power Plant in Japan survived the earthquake and the tsunami but when they were opened it was found that the aluminum fuel baskets that hold the fuel assemblies would not last their expected operational lifetimes of 60 years and she commented that aluminum baskets are in use in the U.S. without any idea of how they are performing. Ms. Gilmore reported that the MPCs in use in the U.S. are not designed to be opened and, to the best of her knowledge, not one loaded thin-walled MPC has ever been opened in a SFP. Dr. Peterson commented that some older thin-walled MPCs in Idaho have been opened and inspected using a SFP.

Ms. Gilmore observed that as DCPP’s license from the NRC for the ISFSI expires in 2023 there is an opportunity to do something before that date. She commented that the weight of the transport casks for the Holtec Hi-Storm system is 225 long tons not 125 long tons as reported by Mr. Strickland and the Hi-Star transport casks weigh 190 long tons. She commented that the California Coastal Commission requires that the casks be transportable and that remains an issue to be addressed. She remarked that having an approved transport cask does not mean that you can move an MPC as there are additional requirements from the NRC.

The Chair inquired of Mr. Harbor whether PG&E wished to make a response to Ms. Gilmore’s comments. Mr. Harbor stated that no response would be offered at this time.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis stated she has heard two sides of the issue and questioned what would happen next. Dr. Budnitz replied that the topic presented by Mr. Strickland and the comments made by Ms. Gilmore describe issues the DCISC has and will be actively pursuing. Dr. Lam reported that Ms. Gilmore’s efforts were some of the earliest efforts to make the public aware of this important issue. Ms. Lewis inquired as to Mr. Strickland’s statement that the casks were one inch thick and whether that was an accurate statement based on Ms. Gilmore’s comment that they were one-half to five-eighths-inch thick. Mr. Strickland stated his statement that the thickness was one-inch was in reference to the storage over pack, which for both the Hi-Storm and the Hi-Star systems is comprised of two walls each of which is one-inch thick carbon steel with approximately 26-inches of high density concrete between the two walls for shielding. The Holtec MPCs are one-half inch thick but, driven by comments made by Ms. Gilmore, SONGS has asked Holtec to increase the MPC thickness for its...
casks to $\frac{5}{8}$ths inches. Ms. Gilmore stated that SONGS made that decision due to awareness of the salt issue and her recommendation was to increase the thickness to between 10 and $19\frac{3}{4}$ inches.

Ms. Linda Seeley of Mothers for Peace was recognized. She inquired whether the MPC identified in 2014 the EPRI Report as having conditions for chloride induced stress corrosion cracking has been re inspected. Ms. Seeley also inquired about the frequency with which radiation at the ISFSI is measured as she has been told it is constantly being measured. Mr. Strickland responded that no additional inspections have been done since the EPRI Report was released and the conclusion of that document was that minimal numbers of salt crystals were present. He reported the industry is continuing to develop additional inspection techniques including the use of robotics and other instruments to do more detailed inspections which will be part of the overall aging management program for the ISFSI. He reported there are thermoluminescent devices which allow DCPP to validate that the ISFSI remains in compliance with its license from the NRC concerning dose at the perimeter of the facility. He reported the Operations Department conducts daily inspections to insure that none of the air vents on the over packs have become blocked and once every three months each of the Hi-Storm over packs receives a detailed radiation emission assessment.

Dr. Peterson stated there is a large difference in the design of the storage and transportation canisters used in Europe, Japan and in the U.S. and this is due to the fact that Europe and Japan reprocess spent fuel and therefore the storage time for the fuel is short and those canisters are designed to be readily opened and closed. He stated he has visited the La Hague Reprocessing Plant in France and observed the hot cell fuel assemblies being removed for reprocessing. The U.S. policy is to perform direct disposal of spent fuel so the focus of the U.S. design was on this capability instead of the ability to reprocess. The major purpose of a welded shut, sealed, design was to minimize the amount of fuel handling that would occur prior to its being placed in a direct geologic depository. He commented that the design for the Yucca Mountain facility included the capability of opening canisters and to be able to repackage spent fuel but it was anticipated that most of the fuel received at Yucca Mountain would have gone directly into geologic disposal and he stated these factors explain much of the difference between the MPCs which are designed to serve as interim storage and transportation and those designed for ultimate disposal. Dr. Peterson stated he was unsure whether any study by the DCISC of changing MPC design in a realistic period of time would be practical because the multiple functions needed for direct disposal would mean that the European designs could not be directly used as a comparison for this purpose and the time required to execute a 10 CFR Part 72 license for differing disposal systems and to find seismically-qualified locations on the site could represent a very long term endeavor and a simpler alternative would be to move the fuel to a CIS location should one be licenses with the associated capability of opening and inspecting and repackaging if necessary.
Ms. Gilmore stated the MPCs hold 32-37 assemblies and permanent repositories were designed for smaller MPCs using different materials, such as Alloy 22, and the MPCs used in the U.S. were not designed for immediate disposal in permanent repositories. Dr. Peterson stated the Alloy 22 canisters were designed for permanent placement at the Yucca Mountain facility and the idea for their design was to avoid having to reopen the canisters. Ms. Gilmore stated she had documentation that the canisters designed to hold 8 assemblies were purchased due to price savings and she stated she was informed by someone at the NRC that the licensing period for a Part 72 license would now be approximately 18 months. She stated that Germany no longer reprocesses fuel and there is no idea as to how well the MPCs are performing as there is no way to inspect them inside or out.

Dr. Lam stated he wished to disclose that twenty years ago he served as a federal Administrative Judge and sat on the Atomic Safety and Licensing Board panel that approved the license for the ISFSI for DCPP and that Mr. Strickland served as the licensing manager for PG&E in that matter. Dr. Lam stated at that time the issue of chloride induced stress corrosion cracking was not known to either PG&E or the Licensing Board or to the Holtec firm. Dr. Budnitz stated from 2002 to 2004 he served as the technical advisor to the Director of the Yucca Mountain Project in connection with the preparation of the license application for that facility and in that capacity he had an important role in guiding and reviewing the design of the Yucca Mountain facility that, if built, would have served as the point of receipt for all the spent fuel to be received at Yucca Mountain and he confirmed that the design of the receiving facility included the ability to open an MPC.

Dr. Lam thanked Mr. Strickland for a very informative presentation and asked Mr. Harbor to introduce the next PG&E speaker.

Mr. Harbor introduced Supervisor, Compliance and Regulatory Services, Mr. Jim Morris and stated Mr. Morris holds a Bachelor’s Degree in Nuclear Engineering and has more than twenty years’ experience in nuclear regulatory compliance. Mr. Morris thanked the Committee for the opportunity to make his presentation and commented he has more than thirty years’ experience in nuclear in total including as an engineer and a shift technical advisor and was part of the startup of both units of the South Texas Project.

**Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC Notices of Violation, and Issues Raised by NRC Resident Inspectors.**

Mr. Morris stated DCPP is rigorously inspected by the NRC and is committed to safety and to protecting the public health and safety. He stated in his presentation he would be covering the last three months, that is, the period July - September 2017 which involved ~1,600 hours of inspection time by the two on site resident NRC inspectors and by NRC regional inspection teams which periodically visit the
site. DCPP continues to achieve “Green” performance for all NRC Performance Indicators. He reported four very low safety-significant non cited violations (NCVs) were received from the NRC since the last DCISC meeting in June 2017. No new licensee event reports (LER) were issued from June through September 2017.

Mr. Morris displayed a slide with a chart which summarized the NRC Performance Indicators that all nuclear stations report to every quarter. The NRC audits and assesses the accuracy of these reports. The NRC Performance Indicators, which are also available to members of the public on the NRC’s website, include:

- Unplanned Scrams per 7000 Critical Hrs
- Unplanned Power Changes per 7000 Critical Hrs
- Unplanned Scrams with Complications
- Safety System Functional Failures
- Mitigating Systems Performance Index, Emergency AC Power System
- Mitigating Systems Performance Index, High Pressure Injection System
- Mitigating Systems Performance Index, Heat Removal System
- Mitigating Systems Performance Index, Residual Heat Removal System
- Mitigating Systems Performance Index, Cooling Water Systems
- Reactor Coolant System Activity
- Reactor Coolant System Leakage
- Drill/Exercise Performance
- ERO Drill Participation
- Alert & Notification System
- Occupational Exposure Control Effectiveness
- Radiological Effluent Occurrence

Mr. Morris provided a summary of the key definitions used in the NRC inspection significance determination process (SDP) and reported licensee safety significance is characterized as either Green (very low), White (low to moderate), Yellow (substantial), or Red (high) safety significance.

Mr. Morris reported on the four NCVs received since last DCISC public meeting. All four NCVs were determined to be “Green” with very low safety significance with no impact to public health & safety.

- NCV (Green) – NRC-identified failure to properly expand weld inspection scope during the last refueling outage. (NRC Cross-Cutting (C-C) Aspect H.3, Change Management.)
- NCV (Green) – A self-revealing failure to follow equipment clearance
procedures resulting in momentary loss of component cooling water to one of two heat exchangers in service at that time. The unit was shut down at the time and both heat exchangers were running with only one required when the loss of component cooling water occurred. (C-C Aspect H.14, Conservative Bias.)

- NCV (Severity Level (SL) IV violation, i.e., related to a Green SDP finding (SL IV)) – Failure to conduct required biennial medical examinations within a two-year period for operators who were not standing active watches due to medical leave or their assignment to other duties. (No C-C Aspect.) In response to Dr. Budnitz’ inquiry Mr. Morris stated that inquiry found the program for reviewing biennial medical examinations to be strong with respect to operators currently assigned to shift work but administrative procedural controls were deficient in following up on those individuals who were on leave or were assigned to other departments. Mr. Morris and Mr. Harbor reported these medical examinations assess the operator’s physical condition and Dr. Budnitz observed and Mr. Morris concurred that they sometimes result in a “no solo” designation meaning the operator is not permitted to undertake certain tasks in the plant without being accompanied and in the event of such a designation there are criteria established for the operator but with improvement and recovery of a level of physical fitness the “no solo” designation may be lifted.

- NCV (SL IV) – Failure to notify the NRC of a permanent medical condition within 30 days. (No C-C Aspect.)

Mr. Morris summarized DCPP performance as “Green” based on NRC Performance Indicators. The following Inspection Reports were issued since the last DCISC public meeting:

- 2nd Quarter Integrated Inspection Report (2017-002, 08/10/17) (ML 17223A120)
- NRC Supplemental Inspection Report and Assessment Follow-Up Letter (2017-008, 09/27/17) (ML 17271A931)

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis inquired as to the duration of the period during which component cooling water was not available to one of the heat exchangers then in service. Mr. Morris replied that the duration for loss of cooling water was less than ten minutes and Dr. Budnitz commented that as the loss of component cooling water occurred while the unit was out of service during a refueling outage the risk was much less than had the unit been operating. Mr. Harbor observed that this difference lies in the fact that were the unit in an operational mode there is only a limited period of time wherein the heat exchanger could be out of service and a much more in depth review would have been required. Dr. Peterson remarked that the opportunity to identify errors at a low level and use those opportunities to take corrective actions by a systematic process is important as that effort can reduce the frequency of mistakes that can
have a significantly higher risk significance.

In response to Dr. Lam’s inquiry, Mr. Morris and Mr. Garcia reported concerning the NRC 95001 inspection for a previous “White” finding, there are other groups besides Compliance and Regulatory Services involved with the review for the 95001 inspection and a root cause evaluation is being completed which will be presented to the Corrective Action Review Board for approval and then the NRC will be notified and will conduct a focused inspection and provide its evaluation of DCPP’s actions.

Prior to adjournment, the Members and Assistant Legal Counsel discussed the need for additional comments by Ms. Gilmore to be presented during the time set aside for public comment on matters not on the agenda at the commencement of the afternoon session.

XXIV Adjourn Morning Meeting

The Chair adjourned the morning meeting of the Committee at 11:05 A.M.

XXV Reconvene for Afternoon Meeting

The October 19, 2017, afternoon session of the Diablo Canyon Independent Safety Committee was called to order by its Chair, Dr. Peter Lam at 1:00 P.M. Dr. Lam welcomed those persons present in the audience and those watching the proceedings on live streaming video. Dr. Lam requested any of the members who wished to make remarks to do so at this time.

XXVI Committee Member Comments

There were no comments by Members at this time.

XXVII Public Comments and Communications

The Chair reviewed the invitation to address the Committee on matters not on the agenda for this public meeting and invited any comments from members of the public who wished to address the Committee to do so now.

Ms. Donna Gilmore of the group San Onofre Safety was recognized. Ms. Gilmore stated she has learned from a SONGS employee that the Areva firm has submitted an amendment request which if granted would permit a plant undergoing decommissioning to eliminate its spent fuel pool which she stated at the present time is not allowed. She remarked the request would also seek to change how peak MPC radiation levels are measured by measuring from the door and from the inlet vent and not from the outlet vent. She remarked the Holtec firm may also seek similar relief. Ms. Gilmore commented the Holtec system used at SONGS has a 10-year warranty on the concrete components and a 25-year warranty on the MPC but if the concrete fails then that voids the warranty on the MPC. Dr. Budnitz
commented he believes that a similar warranty was provided for DCPP and these warranties are similar throughout the industry. Ms. Gilmore stated with reference to an accelerated loading period for Holtec MPCs, Holtec did not provide evidence to demonstrate the MPCs could support the higher heat load but Holtec did receive permission to load one canister. Ms. Gilmore remarked the NRC license for the MPCs is for their use for storage not for transport and a license for transport would be addressed at the time the MPCs are to be moved off site. She reported the Areva transport casks weigh approximately 125 tons while the Holtec transport casks weigh 204 metric tons each. Ms. Gilmore observed the only inspection that can be made was done by EPRI and involves using a tool to take measurements and obtain samples through an air vent. She stated she wanted to particularly stress that the California Coastal Commission is requiring transportability in issuing a permit and she remarked that a cracked cask cannot be transported and she encouraged the DCISC to take this fact into consideration in the relicensing process [for the ISFSI]. Ms. Gilmore commented the use of A316L stainless steel is more expensive, as is the use of 5/8 inch thick stainless steel. Ms. Gilmore reported DCPP has 13 damaged fuel cans which she stated is in accordance with a report submitted by PG&E to the DOE. She remarked that the MPCs are not designed to be reusable and there is a question as to how well the aluminum baskets will hold up and no information is available on that issue at the present time. She reported the NRC is still analyzing and studying the effect that vibrations from transport by rail might have on high burn-up fuel as vibrations can cause the cladding on high burn-up fuel to fail and there are still significant issues to be addressed with transportation infrastructure and as to the effect of storage in New Mexico on the Ogallala aquifer from which eight states draw their water supplies. Ms. Gilmore stated she did not agree that a dry storage system for spent nuclear fuel, using what she described as thin-walled canisters, was safer that storage of the fuel in a spent fuel pool as there is no redundancy in the thin-walled canister system.

Ms. Linda Seeley of Mothers for Peace was recognized. Ms. Seeley inquired as to the statement earlier during the meeting by Mr. Strickland that there were no damaged fuel rods being stored at DCPP in light of Ms. Gilmore’s statement that there were 13 damaged fuel cans at DCPP and she observed these statements appear contradictory. Dr. Peterson responded and stated that at HBPP there are broken fuel rods while at DCPP some fuel rods have had leaks, that is, pinhole sized holes. Ms. Harbor confirmed Dr. Peterson’s statement and he commented that damage is a relative term and Mr. Strickland’s comments earlier referred to damage to the extent where the storage would need to be within a certain type of container as opposed to the relative difference when the damage consists of only a “fuel leaker.” Ms. Seeley remarked from her sewing experience that a hole never gets smaller, only larger, and she assumes the same applies to a hole in a nuclear fuel rod. Ms. Gilmore stated her comment was made in reference to the NRC definition of damaged fuel and in accordance with a report by PG&E to the DOE in 2013. **Dr. Peterson directed that an action be taken at the next fact-finding to learn precisely what the state is in terms of the number of leaking fuel...**
elements and how they are currently stored and where they are going to eventually be placed.

Ms. Jane Swanson of Mothers for Peace was recognized. Ms. Swanson made a request of the Committee to ask PG&E for an in-depth report at a future public meeting concerning what techniques and options are available to PG&E to deal with any MPCs or casks that might develop leaks.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis inquired concerning what was meant by the term “failed fuel.” Dr. Budnitz stated there is a specific definition which can be provided but the issue concerns radioactivity leaking from a fuel cladding into the reactor coolant. A leak above a certain threshold constitutes “failed fuel.” Dr. Budnitz reported that Unit 1 has operated for approximately 20 years without experiencing failed fuel while Unit 2 last experienced failed fuel about six years ago. Dr. Budnitz described this as better performance than the industry average. **Dr. Peterson identified an item for further inquiry by the Committee into the new inspection methods being developed by PG&E, EPRI, and Holtec to conduct in-service inspections to address and mitigate any degradation that might be discovered and to review the approaches being considered to understand the implications of having cracks or leaks associated with fuel storage.** Dr. Budnitz remarked that many years ago every power reactor experienced a few failed fuel pins every cycle and a very successful, major, engineering effort was undertaken by the nuclear industry to develop advanced fuel manufacturing, materials, and handling techniques which have resulted in a dramatic drop in the numbers of fuel failures. He observed fuel failure produces radioactivity in the coolant and makes it more difficult and sometimes impossible to do certain maintenance tasks because of access issues due to radioactivity and failed fuel makes the plant more vulnerable during an emerging incident with transients and stresses due to off-normal conditions. **In response to Ms. Lewis’ follow up inquiry, Dr. Budnitz reported there is a definition established for the term “failed fuel” and the DCISC would look into that issue and provide that definition.**

Ms. Gilmore stated the high burn-up fuel was not in use when DCPP experienced its last fuel failure and it has now been discovered that high burn-up fuel can degrade after it is placed in dry storage. Ms. Gilmore stated that when the NRC approved the use of high burn-up fuel it did not consider or evaluate how the fuel would perform in storage and efforts are now underway to make the review process more holistic. Ms. Gilmore stated the Areva and Holtec systems provide for assemblies, made of zirconium alloy, with the damaged fuel to be placed into steel damaged fuel cans which have open ends sealed with a type of mesh and therefore the defense-in-depth provided by intact cladding is not replaced by use of the damaged fuel cans and she reported that in other countries sealed damaged fuel cans are used.

**XXVIII Information Items Before the Committee (Cont’d.)**
Dr. Lam requested Mr. Harbor to introduce the next presentation.

Mr. Harbor introduced Mr. Mark Sharp, Design Engineering Manager at DCPP, and reported Mr. Sharp holds a Professional Engineer’s Certificate and a Bachelor of Science Degree in Mechanical Engineering and has more than twenty years’ experience in the nuclear industry with leadership roles in the Projects and Engineering organizations.

**Overview of Regulations and PG&E Programs for Classification of Structures, Systems and Components.**

Mr. Sharp stated one of his responsibilities includes configuration management to ensure alignment between regulatory requirements, the physical plant condition, and the analysis and documentation that support the two. To assist with that alignment a classification system has been developed. He reported his presentation would include an overview of regulations and PG&E programs for classification of systems, structures and components (SSCs).

Mr. Sharp stated DCPP’s design and construction and initial operation spanned more than twenty years. PG&E announced plans to construct DCPP in 1963. Construction began in 1968 and was mostly complete by 1973. Commercial operations commenced in 1985. During these years, federal regulations and industry standards were developing and changing and this fact has made the licensing of DCPP challenging and complicated. Once the operating licenses were granted, the regulatory framework was established and Units 1 and 2 were licensed, as are the majority of U.S. nuclear power plants, in accordance with the 1967 (draft) General Design Criteria (GDC) defined in NRC regulation 10 CFR Part 50, Appendix A.

Mr. Sharp reported GDC 1, 1967, Quality Standards, established the criteria for classifying systems, structures and components. GDC 2, 1967, Performance Standards, established performance criteria for systems, structures and components that prevent accidents or mitigate their consequences. SSCs are required to be designed to withstand natural phenomena such as earthquakes, fires, floods, tsunamis, etc. In some cases, the NRC adopted industry codes as regulatory requirements. NRC regulation 10 CFR Part 50.55a, Codes and Standards, established additional standards for some primary system mechanical components because of their importance to nuclear safety including requirements for design, construction, and testing of the reactor coolant pressure boundary in accordance with the ASME Code. NRC regulation 10 CFR Part 50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, established quality assurance and documentation standards for DCPP’s structures, systems and components which are documented in the plant’s Final Safety Analysis Report (FSAR).

Mr. Sharp observed NRC regulatory guidance was not completely developed before
DCPP construction was completed. Common industry classification guidance, established after DCPP design and construction, includes:


In response to Dr. Budnitz observation Mr. Sharp confirmed that later versions of these guidance documents have been issued and he stated that while the plant was under construction the NRC published the 1971 GDC and when PG&E submitted its application for operation based on the 1967 GDC and Safety Guides 26 and 29 there were gaps and accordingly DCPP committed to additional quality and performance standards in its FSAR and he stated DCPP generally meets the intent of both safety guides and ANSI N18.2 although its license basis predates all of those documents.

Mr. Sharp reported that in order to meet licensing requirements, DCPP utilizes two primary classification categories that are similar to ANSI N18.1, SG26 and SG29. These are:

- PG&E Design Class
- PG&E Quality Assurance Class

Sub classification categories are also established for Fluid-Mechanical, Electrical, and Instrument and Controls SSCs which he described as follows:

- PG&E Quality/Code Class for Fluid Systems and Fluid System Components (I, II and III)
- IEEE-308-1971 (Class 1E and Non-Class 1E) for electrical systems
- PG&E Instrument Class (IA, IB, IC, ID, and II)

In response to Dr. Peterson’s inquiry Mr. Sharp confirmed that safety classifications for civil structures are provided under mechanical systems-structural which also have seismic and quality assurance classifications that define their criteria. Mr. Sharp confirmed Dr. Peterson’s observation that every structure inside the power block has a performance and quality criterion associated with the structure and this complicates making any changes, even seemingly minor alterations, to or within these structures. Mr. Sharp confirmed Dr. Budnitz observation that there is a plethora of other codes to which plant SSCs are held to including those of the American Concrete Institute for the Containment structures.
and some of the codes have provisions to reconcile provisions of older codes to the new code but some do not and are under the purview of the NRC.

Mr. Sharp provided a description of PG&E design class definitions and examples as follows:

- PG&E Design Class I is applicable to SSCs that are important to safety, including SSCs required to assure the following:
  - The integrity of the reactor core pressure boundary.
  - The capability to shut down the reactor and maintain it in a safe shutdown condition.
  - The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of 10 CFR Part 100.

He stated all plant features designated as PG&E Design Class I are designed to remain functional when subjected to the additional forces associated with the design basis earthquake that they are required to withstand: the Design Earthquake (DE), the Double Design Earthquake (DDE) and/or the Hosgri Earthquake (HE). PG&E Design Class I example SSCs include:

- The reactor coolant pressure boundary, the reactor core, and reactor vessel internals.
- Systems or portions of systems that are required for emergency core cooling, post-accident containment heat removal, or post-accident containment atmosphere cleanup.
- Systems or portions of systems that are required for reactor shutdown and residual heat removal.
- Portions of the main steam, feedwater, and steam generator blow down systems extending from the secondary side of the steam generators up to and including the outermost Containment isolation valves.
- Auxiliary Saltwater, Component Cooling Water, and Auxiliary Feedwater Systems or portions of these systems that are required for emergency core cooling, post-accident containment heat removal, post-accident Containment atmosphere cleanup, and residual heat removal.
- Systems or portions of systems that are required for (a) post-accident monitoring (PAM) of Regulatory Guide 1.97, Revision 3, Category 1 variables and (b) actuation of systems important to safety.
- The Control Room, including its associated vital equipment and life support systems, and any structures or equipment inside or outside of the Control Room whose failure could result in an incapacitating injury to the operators.
- Reactor Containment structure, including penetrations.
Portions of the onsite electric power system, including the onsite electric power sources that provide the emergency electric power needed for functioning of SSCs included in the items above.

Mr. Sharp provided examples of SSCs subject to PG&E Design Class II which include SSCs not essential to safe shutdown or mitigation of accident consequences:

- Those fluid systems and components that contain or may contain radioactive material, but whose failure would not result in calculated potential exposures in excess of 0.5 rem whole body (or its equivalent to parts of the body) at the site boundary.
- Power and auxiliary service piping systems (as defined in ANSI standard B31.1, Paragraph 100.1).

Mr. Sharp stated Design Class II examples include reactor fueling equipment such as fuel handling cranes and portions of the Turbine Building. He remarked that some Design Class II SSCs are seismically qualified to prevent their interaction with seismically qualified SSCs.

Mr. Sharp reported PG&E Design Class III is applicable to SSCs that are not related to reactor operation or safety. Examples include the maintenance shop buildings outside the power block, and domestic water and sanitary lines that do not interact with Design Class I equipment. Seismic qualification of certain PG&E Design Class III SSCs is required for equipment that has the potential to interact with Design Class I equipment.

Mr. Sharp stated the second highest level method used to categorize or classify components is called the PG&E Quality Assurance Class which is defined in the Updated FSAR (UFSAR) and implemented by the Quality Assurance (QA) organization. He reported these are grade quality requirements established in the DCPP Licensing Basis and are implemented by site-specific administrative procedures to include:

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<th>For equipment and structures to which the QA provisions of Appendix B to 10 CFR Part 50 apply for design, procurement, and construction.</th>
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<tr>
<td>“Blank”</td>
<td>For PG&amp;E Design Class II or III equipment that is not subject to nuclear QA requirements.</td>
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<td>R</td>
<td>For those radioactive waste management items that require application of graded QA requirements.</td>
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<td>For those portions of the Fire Protection System and emergency</td>
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lighting and communication equipment that require application of a quality program as described in NFPA-805.

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<th>For equipment within the scope of the seismic configuration control program as defined in Inter-Department Administrative Procedure (IDAP) CF3.ID11.Z This PG&amp;E Design Class II or III equipment requires seismic qualification to satisfy licensing or UFSAR commitments, or to assure the functionality of PG&amp;E Design Class I components.</th>
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<th>For Regulatory Guide 1.97, Revision 3, Category 2 and 3 instrumentation that requires application of the graded QA Program as defined in IDAP CF3.ID12.</th>
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</table>

Mr. Sharp stated GDC 2 establishes performance criteria and DCPP’s licensing basis, and compels the plant to qualify seismically above and beyond what GDC 2 would otherwise require. DCPP has created a system to track the seismic design classification which Mr. Sharp displayed and discussed using a table showing the relationship of design and quality group classifications.

Dr. Budnitz summarized the information provided by Mr. Sharp by stating that everything in the power plant has a classification and, depending upon that classification, there are special procedures, treatments and inspection required. Mr. Sharp agreed and stated that in some instances codes and guidance are sometimes amplified by additional regulatory requirements and Dr. Budnitz observed the industry codes describe the interaction of one system with another. Mr. Sharp agreed with Dr. Budnitz’ observation and noted that not all codes adopted by the industry are mandated by the NRC.

In response to Dr. Budnitz’ inquiry Mr. Sharp confirmed that DCPP has not invoked the provisions of 10 CFR 50.69 which would allow a request to the NRC to change the code classification of a system, structure or component based upon a risk-informed classification of its role in the plant. Dr. Budnitz observed that when nuclear power plants of DCPP’s vintage were designed some components governed by the codes referenced in Mr. Sharp’s presentation really need not have been given the safety importance they were originally assigned and utilities now have an option under 10 CFR 50.69 to demonstrate that a different classification of a SSC is warranted. Mr. Sharp agreed and noted that this could reduce the maintenance or testing burden. Dr. Budnitz remarked that not many plants have invoked 10 CFR 50.69 as to do so requires a great deal of work and expense. Dr. Budnitz used an analogy involving a requirement to replace an automobile’s windshield wipers every six months when the new wipers would function more...
than adequately for at least three years as an example of the type of calculus to be engaged in for invoking relief under 10 CFR 50.69.

Dr. Lam observed and Mr. Sharp agreed that federal regulations and oversight of nuclear power plants are both broad and deep and contribute significantly to safety of plant operations but represent a huge regulatory burden on the NRC’s licensees. Mr. Sharp commented the Nuclear Energy Institute (NEI) is seeking risk-informed relaxation of code requirements to reduce the burden on licensees and allow the licensees to comply with license requirements while focusing their resources on matters that are truly safety significant. He agreed with Dr. Lam’s observation that safety comes with tremendous cost and this makes nuclear technology very expensive.

Ms. Linda Seeley of Mothers for Peace was recognized. Ms. Seeley commented that with the Joint Proposal plan to retire DCPP and terminate generation operations, maintenance and repair activities may be circumvented and she inquired as to how it can be ensured that this does not occur. She stated the mission of the DCISC should be to verify that this does not take place. She used as an example the inspection of the Unit 1 reactor vessel, which she stated has been identified as the fifth most embrittled reactor vessel in the U.S., which has had inspection requirements relaxed related to inspections last conducted in 2014 such that the Unit 1 vessel will not be completely inspected before the plant might close in 2024. Ms. Seeley stated her opinion that PG&E may well have known in 2014 that it would not seek renewal of the operating licenses from the NRC for DCPP and the relief from this inspection requirement poses a serious threat to the safety of the local community. She also inquired whether replacement of the stator might represent the same type of issue. Mr. Harbor responded that the replacement of the Unit 2 stator is planned and is moving forward and the project has not been cancelled and materials have been acquired and funding has been reserved for the replacement project.

Ms. Donna Gilmore of the group San Onofre Safety was recognized. Ms. Gilmore replied that when a seismic rating is issued there is an assumption that the materials involved are in perfect condition but this is false because some defects always exist. Dr. Budnitz replied that this was not a true statement as the assumption made in context of a seismic rating is the materials have typical material characteristics, and not that the materials are in perfect condition. Ms. Gilmore stated that it was her understanding the NRC does not have an answer for how to inspect certain critical areas for reactor safety which cannot at present be inspected and therefore it is not possible to know whether the material remains in the same condition as it was when it was initially rated and she remarked this issue is also applicable to the MPCs. Ms. Gilmore observed that there are many factors which can cause concrete to fail when used in connection with dry storage and this represents yet another issue.

Ms. Judy Jones of San Clemente, California was recognized. Ms. Jones stated her
husband was employed as an ASME vessel engineer and he had often remarked that the ASME code was written to save lives not buildings. Dr. Budnitz stated the ASME codes referenced during Mr. Sharp’s presentation concerned the construction and inspection of metal in the pressure vessel and its piping and these were different from the codes referred to by Mr. Jones. Ms. Jones commented that there are factors such as salt air and soil conditions to be considered and it was her assumption that these factors were included in the classification systems described by Mr. Sharp. Dr. Budnitz confirmed that this was the case.

Mr. Harbor introduced Mr. Bob Oldenkamp, Manager of Nuclear Projects at DCPP, and reported Mr. Oldenkamp has more than 30 years’ experience in the nuclear industry and he holds a leadership role in Maintenance Projects. Mr. Oldenkamp made the final informational presentation for this public meeting.

**Summary of Completing the Transition to NFPA-805 and a Summary of the Advantages, Disadvantages, Lessons Learned and Safety Insights Gained from the Transition.**

Mr. Oldenkamp stated he has a total of 42 years’ experience at DCPP, commencing when the plant was under construction. He described the NFPA-805 Project as a long journey to establish a performance based regulatory scheme allowing the existing Fire Protection Program to be modified in scope and depth of coverage to focus on critical aspects. The transition activity itself is complicated and extensive and includes:

- Engineering Evaluations
- Fire PRA (Probabilistic Risk Assessment)
- Calculations modeling fire growth and spread

Mr. Oldenkamp commented that thousands of documents have required changes in this process and more than 5,000 pages of analysis has been performed in conjunction with the transition to NFPA-805 regulations.

Mr. Oldenkamp discussed and described the NFPA-805 Project milestones as including:

- License Amendment Request (LAR) Preparation and Submittal Phase (completed)
  - Includes identifying modifications to meet RG 1.174 acceptance criteria
  - Submitted to Nuclear Regulatory Commission (NRC) on June 26, 2013
- Post-LAR / Modification Implementation Phase (In progress)
  - Began July 2013, after LAR submittal
NRC performed a DCPP LAR Audit July 14–18, 2014

DCPP implementation to be completed within 365 days, by April 15, 2017, after receipt of a Safety Evaluation (SE) and License Amendment (LA)

Develop a Document Only Design Change Package (DCP) for delivery of the new NFPA-805 program to the Plant Self-Approval When DCPP fully completes the Transition to NFPA-805.

- Unit 1 target date November 16, 2017
- Unit 2 target date June 17, 2018

Mr. Oldenkamp reported DCPP is now on schedule for overall post-license change work and for modification work with four modifications made on each unit. He remarked most U.S. nuclear power plants opting to transition to NFPA-805 have been required to make many more modifications than has DCPP. He reported the target date for self-approval is by November 16, 2017, for Unit 1 and by June of 2018, for Unit 2. Modifications have been made to the hot shutdown panel for both units. The Incipient Fire Detection System is installed and complete for Unit 1 and will be installed as the last modification required for Unit 2 during 2R20 in March 2018.

Mr. Oldenkamp reviewed with the Committee the advantages of a transition to NFPA-805 regulations as including:

- Plant risk from fire reduced by $\sim$40%.
- Use of risk informed-performance based methodology to determine how best to make corrective and preventive modifications.
- Effective implementation of changes to the plant.
- A state-of-the-art PRA that can be used to further improve safety and make other changes to the plant with risk aversion without the need to submit a license amendment request.

Disadvantages of the transition to NFPA-805 include:

- Learning curve for nuclear industry.
- Changing regulatory positions, e.g. NUREG 2180.

In response to Dr. Budnitz’ inquiry, Mr. Oldenkamp and Mr. Harbor reported the NFPA-805 Transition Project cost approximately $100 million to complete and the project required review and approval by the highest corporate level in PG&E. Mr. Oldenkamp stated an important part of any project is to identify lessons learned. He described and discussed those for the NFPA Transition Project as follows:

- First-of-a-kind projects have significant impacts.
- No matter how much time you think you have, it is not enough.
- Be flexible; your plan and schedule will change significantly.
- Two pilot plants does not solidify the path forward.
- Any project driven by new regulations will have significant changes.
- Operations, Maintenance, Engineering and other PG&E organizations must be involved.
- Be prepared for emerging issues.
- Understand the complexity and breadth of a first-of-a-kind project.
- Take advantage of other projects so you don’t perform the same work twice.

Mr. Oldenkamp reported the NFPA-805 Transition Project benefited from an excellent team effort including participation by the Engineering, Operations, and Maintenance organizations during the initial design creation. Work order planning provided the team with operating experience during the planning and scheduling process. He reported turnover of the commissioned system worked well due to inclusion of recipients from the beginning of the design process. Having broad team expertise during field installation greatly contributed to the final site acceptance of the Incipient Fire Detection System.

Mr. Oldenkamp reviewed with the Committee the safety insights gained during the Project as including the need to discuss relevant safety issues with personnel on a daily basis before work is performed to support completion of an injury-free project; spending project oversight time in the field to ensure equipment and components are not harmed; and to have a risk management plan that identifies the necessary oversight during the development, installation, and implementation of the Project. Nuclear safety insights included the careful identification and risk analysis by key personnel to demonstrate significant lowering of core damage frequency (CDF) probability. In response to Dr. Peterson’s request, Mr. Oldenkamp described modification to the hot shutdown panel, including additional valve control and indications, as a modification done in the interest of safety to address a situation such as a fire in the Control Room. Mr. Harbor stated he would characterize the modifications to the hot shutdown panel as contributing to making the panel more robust and easier to operate.

In response to Dr. Budnitz’ observation that the installation of a modern, robust Incipient Fire Protection System represents a great advance Mr. Oldenkamp described the function of the Incipient Fire Protection System as to sense air inside critical component cabinetry and safety-related systems for ionized particles which are present for a considerable period before a flame starts and thereby providing an early alarm. Stainless steel tubing is used for this system and the process of its installation is complex and expensive. Mr. Oldenkamp confirmed, in response to Dr. Peterson’s question, that thermography (infrared photography to detect heat), in conjunction with a software that compares and identifies temperature change, is
used extensively in preventive maintenance at DCPP. Dr. Budnitz observed while incipient fire detection systems are not at the present time required by code to be installed in new nuclear power facilities in his opinion they are likely to be required in the future. Dr. Budnitz remarked that settling on a methodology for doing a fire PRA was a major advance which enabled plants to confidently identify important accident scenarios which without intervention could lead to core damage.

Ms. Simone Malboeuf was recognized. Ms. Malboeuf stated she has raised her concerns about fire safety several times in the past with the DCISC. She provided a copy of what she stated was her most recent correspondence with Mr. David Lochbaum of the Union of Concerned Scientists wherein Mr. Lochbaum stated that 28 U.S. nuclear power plants including DCPP remain out of compliance with the NRC’s fire safety regulations. Ms. Malboeuf read to the DCISC the content of the email she received from Mr. Lochbaum wherein Mr. Lochbaum explained that due to enforcement discretion granted by the NRC to PG&E from enforcement of fire protection regulations under the 1980 regulations or NFPA-805, and the need for the plant to make modifications to meet the requirements of NFPA-805, this provides the basis for his conclusion that the plant, in its existing configuration, does not meet fire protection regulations as all modifications required to do so are not yet complete. Ms. Malboeuf stated that she has also received information that DCPP is out of compliance with NRC regulations due to ground water leaks. She provided a copy of a petition with 366 signatures of local area residents who expressed concern about fire protection regulations. Dr. Budnitz replied that when Ms. Malboeuf previously raised her concerns with the DCISC, the DCISC made inquiry with PG&E and reported on the results of those inquiries at a public meeting and the conclusion at that time was that the statements made by Mr. Lochbaum and the Union of Concerned Scientists were false and that DCPP was in full compliance. Dr. Budnitz observed that despite the fact that Mr. Lochbaum continues to make the same assertion, the DCISC is not aware of anything that would change its previous conclusion concerning DCPP’s compliance with fire safety regulations. Dr. Budnitz stated he strongly believes Mr. Lochbaum’s assertion was false when the DCISC initially looked into the matter and it remains false today and the plant has been in full compliance with NRC fire protection regulations since 1980. Ms. Malboeuf stated she wished to express her appreciation to PG&E for its efforts to keep the community safe.

Ms. Donna Gilmore of San Onofre Safety was recognized. Ms. Gilmore stated, while everyone is entitled to an opinion they are not entitled to their own facts and in her inquiries she has discovered a great deal of misinformation exists and her goal is always to seek the facts.

Ms. Linda Seeley of Mothers for Peace was recognized. Ms. Seeley inquired whether the reactor vessel identified as embrittled was seismically rated. Dr. Peterson replied that the study of the relationship between seismic events and reactor vessel embrittlement has determined for sequences in which embrittlement is important the operating temperature of the vessel makes the reactor vessel
ductile, so that it is flexible and not brittle. It is only when the vessel is allowed to cool that embrittlement occurs and it is the injection of cold water at full pressure which cools the surface of the vessel walls which could cause an embrittled vessel to crack and it was determined that seismic events were quite unlikely to be the initiators for this sequence which is termed pressurized thermal shock. Therefore the incremental frequency of pressurized thermal shock is not changed significantly by seismic events as the earthquake stresses would occur while the vessel was hot and ductile and the seismic event would be followed by normal shutdown and cooling. Dr. Peterson reported that the North Anna Nuclear Power Station in Virginia experienced an earthquake and the Reactor Protection System activated to shut down the reactor and subsequent inspection found the plant to be undamaged. Dr. Budnitz commented that a reactor vessel would remain hot and ductile for many days following an earthquake during operation and metallurgical experiments have determined that earthquake forces are unlikely to cause large pipe breaks due to this ductility.

XXIX Concluding Remarks and Discussion by Committee Members of Future DCISC Activities

Dr. Lam expressed the Committee’s sincere appreciation to the members of the public who attended and participated in this public meeting and also to the senior management of PG&E including Director Cary Harbor and Manager Hector Garcia and their associates. The Chair also expressed appreciation to the technicians of AGP Video who provided audio and visual recording and programming services for this public meeting.

XXX Adjournment of Eighty-Eight Public Meeting

There being no further business, the eighty-eighth public meeting of the Diablo Canyon Independent Safety Committee was then adjourned by its Chair, Dr. Peter Lam, at 2:45 P.M.
Notice of Meeting

A legal notice of the plant tour and public meeting and several display advertisements were published in local newspapers and mailed to the media and those persons on the Committee’s service list. Information on the public tour and a copy of the legal notice and the meeting agenda were also posted on the Committee’s website at www.dcisc.org.

Public Tour of Diablo Canyon Nuclear Power Plant

On the morning of Wednesday, February 7, 2018, the DCISC Members Drs. Budnitz and Lam and the Technical Consultants accompanied by 23 members of the public participated in a tour of Diablo Canyon Power Plant (DCPP or the “plant”). The members of the public responded to the advertisement concerning the public tour placed in a local area newspaper and on the DCISC’s website. The group received security badges at the PG&E Energy Education Center and assembled in the auditorium for a brief introduction of the DCISC and its Members and Technical Consultants and a discussion of the operation of the Committee and to view an informational video on the history, role and responsibility of the Committee. Afterward DCPP Lead Manager, Government Relations, Ms. Suzanne Hosn and Communications Representative Mr. John Lindsay gave informational presentations about the plant and Pacific Gas &Electric Company’s (PG&E’s) current energy generation portfolio and plans for the future. An opportunity was provided for questions. The group then boarded a bus for the plant. During the drive information was presented on the history of the plant and PG&E’s land stewardship responsibilities. The bus entered the plant site through the Avila Gate and the group received a briefing from PG&E tour guide Ms. Diana Turk on the various external features and buildings and was taken on a narrated drive-by of the Independent Spent Fuel Storage Installation (ISFSI), also known as the dry cask spent fuel storage facility.
The bus then arrived at the parking area. The members of the public and the DCISC Members and Technical Consultants viewed the Intake and Outfall Facilities where the plant pulls in and discharges cooling water from and to the Pacific Ocean and then visited the Mechanical Maintenance Facility.

The group then departed DCPP for return to the Energy Education Center and had the opportunity to discuss the tour with individual DCISC members and consultants.

Conclude Public Tour

Agenda

I Call to Order – Roll Call

The February 7 2018, public meeting of the Diablo Canyon Independent Safety Committee (DCISC), the eighty-ninth public meeting of the Committee, was called to order by Committee Chair Dr. Peter Lam at 1:30 P.M. in the Point San Luis Conference Facility at the Avila Lighthouse Suites in Avila Beach, California. Dr. Lam, the appointee of the Chair of the California Energy Commission to the DCISC, welcomed those present to the meeting and he briefly reviewed the appointment and professional background of the other two members of the DCISC, Dr. Robert J. Budnitz, the appointee of the California Attorney General, and Per F. Peterson, the appointee of the Governor of California.

Present:

Committee Member Robert J. Budnitz
Committee Member Peter Lam
Committee Member Per F. Peterson

Absent:

None

II Introductions

Dr. Lam acknowledged and welcomed the members of the public in attendance. Public meetings of the Committee are viewed in real-time over streaming video at www.dcisc.org and www.slospan.org and are videotaped for later broadcast on the local public access television station. The Chair then briefly reviewed the professional backgrounds of the Committee's Technical Consultants, Mr. R. Ferman Wardell, P.E. and Mr. Richard D. McWhorter, Jr., and Assistant Legal Counsel, Robert W. Rathie. Dr. Lam recognized Mr. Hector Garcia, Support Manager to PG&E’s Chief Nuclear Officer, who serves as the DCISC’s principal liaison with the plant.
III Public Comments and Communications

The Chair inquired whether there were any members of the public present who wished to address remarks to the Committee on items not appearing on the agenda for the public meeting and he reviewed the advice from the agenda concerning items or issues which are brought to the attention of the members by the public during public meetings.

Dr. Gene Nelson, a volunteer for Californians for Green Nuclear Power a citizen’s group advocating for continued safe operation of DCPP beyond 2025, was recognized. Dr. Nelson read an article concerning Florida Power and Light Company’s relicensing of its Turkey Point Nuclear Generating Station and Dr. Nelson remarked the article demonstrates that PG&E is making a poor decision to close DCPP after 40 years of operation. He stated his group is pursuing a number of legal alternatives to allow DCPP to continue to operate beyond 2025, as Dr. Nelson stated PG&E’s application to close the plant is not in the public interest, is wasteful and will increase emissions from fossil fuel generation while forcing California ratepayers to pay more for energy. Dr. Lam thanked Dr. Nelson for his comments.

Mr. Joe Ivora was recognized. Mr. Ivora stated he is a member of Californians for Green Nuclear Power. He remarked he did not feel it was fair for the State of California to close DCPP and require the ratepayers to pay more for electricity while emissions are increased. Dr. Lam thanked Mr. Ivora for his comments.

Mrs. Mary Ivora was recognized. Mrs. Ivora, also a member of Californians for Green Nuclear Power, stated it was her hope that PG&E would not close the plant and the plant was constructed to be safe and there have been no deaths due to nuclear power operations in California and only four nationwide. Mrs. Ivora requested that PG&E reconsider its decision to close DCPP as she appreciated enjoying clean air. Dr. Lam thanked Mrs. Ivora for her comments.

IV Consent Agenda

A. Approval of Minutes

A draft of the Minutes of the October 18–19, 2017, public meeting of the DCISC, held in Avila Beach, California, was included in the public agenda packet. The members and consultants discussed and reviewed the Minutes including clarification and revision of substantive items to be included in the final version and follow up actions to be taken. Clarification was provided to legal counsel concerning typographical errors and the accuracy of certain references in the Minutes, including direction, for ease of reference, to include the “ML” number in the future when referring to documents of the Nuclear Regulatory Commission (NRC). The Minutes were included with the agenda packet for this meeting, and editorial comments and substantive changes were received concerning the draft of the October 2017 Minutes.
Minutes of the Committee’s public meetings in their final as approved form become part of its Annual Reports on Safety of Diablo Canyon Nuclear Power Plant Operations (Annual Report). On a motion by Dr. Peterson, seconded by Dr. Budnitz, the Minutes of the Committee’s October 2017 public meeting were approved as amended and subject to inclusion of the changes provided to the Committee’s Assistant Legal Counsel. The October 2017 Minutes will be part of the Committee’s 28th Annual Report.

V Action Items


Upon a motion by Dr. Budnitz, seconded by Dr. Peterson, the Committee unanimously accepted PG&E’s Response to the Committee’s 27th Annual Report and the Recommendation made therein for the period July 1, 2016 to June 30, 2017. In its 27th Annual Report the Committee recommended that PG&E do additional analysis of the tsunami hazard phenomena and the probabilities and risks associated with tsunamis. PG&E responded that it was in agreement and has committed to doing the analysis recommended by the Committee and NRC reports have been provided to the Committee on the results of that analysis. A report on this NRC evaluation will be presented by Mr. McWhorter later during this public meeting.

B. Update on Financial Matters and Committee Activities.

Assistant Legal Counsel Rathie reported that the Committee financial year is the calendar year and it appears the DCISC has finished 2017 in very good financial condition with a surplus remaining from the grant funds which are provided for the Committee’s operation by PG&E’s ratepayers under the California Public Utilities Commission decisions which created and continued the DCISC’s operations. Once accounting is completed all funds remaining unspent from 2017 will be returned to the ratepayers through PG&E. The final remittance will be determined once all invoices have been received and paid for 2017. He closed his remarks by calling the attention of the Members and Technical Consultants to the green-colored pages in the agenda packet which include the topics and dates for past and future fact-finding and public meetings.

C. Discussion of Issues on Open Items List.

Dr. Lam requested Consultant Wardell lead a review of items on the Open Items List, an important tool used by the Committee to track and also follow up on issues, concerns, and information identified for subsequent action during future fact-finding or as agenda topics for public meetings. Mr. Wardell reported that items shown in red italicized text are new items since the last Open Items List was distributed. Items discussed or concerning which action was taken included the
following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Re:</th>
<th>Action Taken</th>
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<tbody>
<tr>
<td>CO-13</td>
<td>Review CAISO load following policy re DCPP transients/grid reliability/stability</td>
<td>Sch. 12/18 FF w/PFP and annually &amp; combine w/SE-48 &amp; revise description</td>
</tr>
<tr>
<td>O-14</td>
<td>Operator Retention</td>
<td>Sch. FF 2Q18 RJB</td>
</tr>
<tr>
<td>CM-14</td>
<td>Wireless Technology in Power Block</td>
<td>Sch. 1Q19 if any changes</td>
</tr>
<tr>
<td>HP-1</td>
<td>Human Performance/Behavior</td>
<td>Combine w/HP-18</td>
</tr>
<tr>
<td>HP-25</td>
<td>Management Observation Program</td>
<td>Sch. 1Q19</td>
</tr>
<tr>
<td>HS-6</td>
<td>Safety Culture/SCWE</td>
<td>Sch. 2Q19</td>
</tr>
<tr>
<td>RA-6</td>
<td>Seismic Fragility</td>
<td>Sch. 3Q18 after submittal to NRC and review w/ A-7 at 6/18 PM</td>
</tr>
<tr>
<td>QP-3</td>
<td>Quality Verification &amp; Outside Audit</td>
<td>Sch. 3Q19</td>
</tr>
<tr>
<td>ER-5</td>
<td>Equipment Reliability</td>
<td>Sch. 1Q19 FF</td>
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<td>OE-1</td>
<td>Operating Plan</td>
<td>Sch. 1Q19</td>
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<tr>
<td>SE-40</td>
<td>Transformers</td>
<td>Sch. 3Q18</td>
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<tr>
<td>SE-48</td>
<td>230kV System Voltage Stability</td>
<td>Close and add to CO-13</td>
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<tr>
<td>OM-4</td>
<td>Outage Safety Plan</td>
<td>Sch. 6/18 PM</td>
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<tr>
<td>SEC-4</td>
<td>Cyber Security</td>
<td>Sch. 2Q18 FF w/PFP add context of review is re plant operations</td>
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<tr>
<td>SC-3</td>
<td>Long Term Seismic Program</td>
<td>Sch. 3Q18 w/ RA-6 And add rev. of Hamilton issue</td>
</tr>
<tr>
<td>SC-4</td>
<td>Tsunami &amp; Local Intense Precipitation</td>
<td>Sch. 6/18 PM &amp; revise/compress description</td>
</tr>
<tr>
<td>CL-4</td>
<td>Closed Loop Cooling</td>
<td>Move to CM re monitor salt deposition on external equip.</td>
</tr>
<tr>
<td>6/16PM-4</td>
<td>Safety System Functional Failure</td>
<td>Close &amp; Combine w/EN-19 for periodic review</td>
</tr>
<tr>
<td>6/17PM-4</td>
<td>Unit-1 Source Term re cobalt-60 in RCS</td>
<td>Close &amp; Combine w/ CO-13 re data retention</td>
</tr>
<tr>
<td>6/17PM-7</td>
<td>Alternate Off Site Power Sources</td>
<td>Close &amp; Continue w/CO-13</td>
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Human Performance Errors Sch. 3/18 FF RJB & Combine review w/6/17PM-11

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<th>6/17PM-13</th>
<th>Human Performance Errors</th>
<th>Sch. 3/18 FF RJB &amp; Combine review w/6/17PM-11</th>
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<tr>
<td>10/17PM-8</td>
<td>Decommissioning Consultant</td>
<td>Hi-lite importance in 2018</td>
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<tr>
<td>10/17PM-10</td>
<td>Counsel Review re Decommissioning Role</td>
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</tr>
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<td>10/17PM-16</td>
<td>“Failed Fuel” Definition Close</td>
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<tr>
<td>MIDAS</td>
<td>System/Program Review (Pgs. 11-12)</td>
<td>Review in 2018</td>
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</tbody>
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1 Key to abbreviations used: California Independent System Operator (CASIO); Fact-finding (FF); Probabilistic Risk Assessment (PRA); Dr. Peter Lam (PL); Public Meeting (PM); Quarter (Q); Dr. Robert J. Budnitz (RJB); Refueling Outage (RO); Schedule (Sch.); Safety Conscious Work Environment (SCWE).

Following review of the Open Items List, Ms. Rochelle Becker, Executive Director of the Alliance for Nuclear Responsibility (A4NR), was recognized. Ms. Becker stated she was confused by the wording of item SE-4 concerning the Plant Protection System upgrade and the Unit-2 generator stator work which Ms. Becker observed was still planned to be performed and should be reviewed by the DCISC. Mr. Wardell confirmed that while the Plant Protection System upgrade has been cancelled the generator stator work is still planned and the word “and” should have separated the references in the red text.

Ms. Becker inquired if the PG&E analysis of the tsunami and locally intense precipitation has been shared with the California Public Utilities Commission’s (CPUC) Independent Peer Review Panel (IPRP) and Dr. Budnitz agreed that it made sense to share data on this topic with the IPRP.

A ten minute break followed the discussion of the Open Items List.

**VI Committee Member Reports and Discussion**

**A. Public Outreach, Site Visits and Other Committee Activities; Agenda Items, Scheduling, and Confirmation of Future Fact-findings and Public Meetings:**

Assistant Legal Counsel Rathie reported that with Dr. Lam he attended a meeting in Sacramento, California on November 13, 2017, with the Chair and senior staff members of the California Energy Commission. He reported that as part of its public outreach efforts the Committee will be publishing the DCISC 27th Annual Report on its website, in two bound volumes, and in compact disk format and the report will be sent to the Governor, the California Attorney General, the
California Energy Commission and to the CPUC as well as to interested parties and made available at several local libraries. Mr. Rathie reported on the volume of visits to the Committee’s website which have averaged 1,707 unique visitors every month, with the most visits coming from the Russian Federation.

Dr. Lam reported during the November 13, 2017, with Mr. Rathie, he met in Sacramento, California with the Chair of the California Energy Commission, Dr. Robert B. Weisenmiller, Dr. Weisenmiller’s Chief of Staff, Mr. Kevin Barker, California Energy Commission Executive Director, Mr. Drew Bohan and Senior Nuclear Policy Advisor Dr. Justin Cochran to discuss the activities of the Committee and items of mutual interest.

The Members turned to the matter of confirming and scheduling public meetings of the DCISC. Future public meetings are scheduled for the Committee for June 13–14 and October 24–25, 2018 and for February 13–14, 2019. The Members then scheduled a public meeting of the DCISC for June 19–20, 2019, with all meetings scheduled to date to be held in Avila Beach, California.

Fact-finding visits were confirmed and scheduled as follows:\(^2\):


\(^2\) Abbreviations used: Robert J. Budnitz (RJB); Peter Lam (PL); Richard D. McWhorter (RDM); Per F. Peterson (PFP); R. Ferman Wardell (RFW)

B. Documents Provided to the Committee:

Dr. Lam directed the Committee's attention to the list of documents received from PG&E on a monthly basis since its last public meeting in October 2017. A copy of the list was included with the public agenda packet for this meeting.

VII Staff Consultant Reports and Receive, Approval and Authorize Transmittal of Fact Finding Reports to PG&E

The Chair requested Consultant Wardell to report on the October 30–31, 2017, fact-finding visit with Dr. Lam to DCPP. Dr. Lam expressed his appreciation to the Chief Nuclear Officer (CNO) Support Manager Mr. Hector Garcia and to Director of Nuclear Business Operations Mr. Cary Harbor for their willingness to accommodate Dr. Lam and Mr. Wardell for this fact-finding visit.

- Meet with NRC Senior Resident Inspector - the DCISC fact-finding team discussed the NRC Section 95001 inspection related to a White finding by the
NRC (related to the Emergency Core Cooling System) which DCPP has discussed with the DCISC on several previous occasions. Corrective actions have been completed and the NRC has closed some items from the initial inspection but some items remained open and are pending reinspection. The DCISC representatives also discussed the NRC’s independent evaluation of DCPP’s tsunami submittal and the inspection which was to take place in November concerning the FLEX³ Program.

- Joint Proposal, Staff Retention, and Decommissioning Status. As this item will be reviewed at this public meeting Mr. Wardell reported discussion would be deferred at this time.

- Plant Performance Indicators, NRC and Industry - Mr. Wardell briefly reviewed DCPP’s performance against a sample of the industry’s performance indicators. The performance indicators⁴ were rated as Green for most areas of assessed performance but the indicator for unit capacity factor were Red and Yellow, likely due to planned outages and forced generation curtailment for maintenance and the indicator for high pressure injection unavailability was Red for a High Pressure Injection System pump which needed maintenance and with that maintenance having now been performed, Mr. Wardell reported the indicator has returned to Green.

- Dry Cask Storage Loading. As this item will be reviewed at this public meeting Mr. Wardell reported discussion would be deferred at this time.

- DCISC Meeting with PG&E Vice President, Power Generation Mr. Jon Franke - to discuss items covered during the fact-finding.

- Joint Proposal Capital Projects Review - this was a review of long-term capital projects. Mr. Wardell reported all capital projects planned for 2017 were approved and implemented but capital projects planned after 2017 are under review by a committee and, as to those projects, final decisions were not available as of the fact-finding. At this time the Unit-2 generator stator replacement is planned to be accomplished but the upgrade to the Eagle 21 Plant Protection System will not take place.

- Employee Concerns Program (ECP) - the DCISC representatives learned that there were 30 concerns raised with the ECP through October 2017 none of which were nuclear safety-related. There were no issues raised in 2017 under the Differing Professional Opinion Program as of the fact-finding.

- NRC Information Notice 2017-4. High Energy Arcing Faults in Electrical Equipment Containing Aluminum Components - Mr. Wardell reported in May 2002, Unit-1 experienced a trip due to a fault in an electrical component containing aluminum which caused an electrical arc and started a small fire. A root cause analysis was performed due to the unit trip and the aluminum components were replaced with copper components and the load was reduced for those components. By 2017, two other nuclear stations experienced similar occurrences and the NRC issued an information notice on the issue.
Dr. Lam remarked that the DCISC team was able to interview two members of the plant staff who were involved in the 2002 fault which was a demonstration of the value of institutional memory.

3 *FLEX is not an acronym but describes a strategy developed by the nuclear industry to address diverse and flexible coping strategies to address the loss of safety-related systems due to beyond design basis events.*

4 *On a scale of Green indicating a healthy performance and White indicating that achievable action plans are in place to return performance to healthy status. A Yellow rating would indicate the indicator shows deficient performance and needs improvement and Red would indicate unsatisfactory performance.*

The Chair requested Consultant Wardell continue with a report on the November 13–14, 2017 Fact-finding Report on a visit to DCPP with Dr. Budnitz. Mr. Wardell reviewed the topics discussed with PG&E during that visit including:

- **Observe Auxiliary Feedwater System (AFS) Pump Valve Periodic Test** - the DCISC team was scheduled to observe testing of two valves of the AFS and to meet with the system engineer to review the test results. However, preventive maintenance was being performed on the valves and this work took longer than expected and precluded the DCISC representatives from observing the test. The DCISC fact-finding team walked down the AFS with the system engineer and found the system and the plant in general to be in very good condition and the AFS to be in Green health status.

- **Observe FLEX Training for Licensed Operators** - Mr. Wardell reported the operators were training on the FLEX Support Guidelines (FSG) and that FLEX does not have procedures per se. The FSG address response to certain conditions and the DCISC team reviewed the FSG response to extended loss of all AC and DC power and the resulting bus load shed management including making the initial assessment through the final staging of equipment to respond to this event. The DCISC team found the instructor to be knowledgeable, the materials to be well prepared and the training to be appropriately interactive. Following training the operators then walked down the various FLEX equipment locations. Dr. Budnitz remarked he found the persons attending to be very knowledgeable about the issues and scenarios they could be called upon to address in context of a FLEX response and supportive of the substantial safety enhancements afforded by FLEX. In response to Dr. Peterson’s comment, Mr. Wardell confirmed the symptom-based approach utilized by FLEX includes opening communication at an early stage with the plant’s Security organization. He reported that DCPP has staged diesel generators and load centers on mobile trailers to be readily available to restore power and function at multiple locations. In response to
Dr. Peterson’s inquiry, Mr. Wardell confirmed that the FSGs are available in paper format as well as by the plant’s computer systems in the event printers might not be available to print copies. Mr. Wardell reported the Control Room has access to “crash carts” which have all normal, abnormal and emergency procedures available. **The DCISC committed to review during its next review of seismic interaction with plant furnishings the ability of these crash carts not to fall over and spill their contents in the event of a seismic event.**

- Meeting with Three Performance Improvement Coordinators - Mr. Wardell reported the coordinators’ job is accomplished by measuring, monitoring, trending and reporting on plant performance through the plant’s Corrective Action Program and the Performance Improvement organization’s programs such as self-assessment, benchmarking and operating experience. The performance improvement process uses trending results, clock resets and human performance tools. Mr. Wardell reported the DCISC found the assignment of what are categorized as sub-functions from different areas of the plant to the Performance Improvement organization to be effective.

- Results of August 2017 Institute for Nuclear Power Operations (INPO) Evaluation - Mr. Wardell stated that while INPO evaluations are confidential, the results of the August 2017 INPO Evaluation were generally positive with some areas for improvement identified on which DCPP has started taking action and will follow up on in time for the next INPO evaluation in two years. Mr. Wardell and Dr. Budnitz reported that none of the areas for improvement identified by INPO came as a surprise to the fact-finding team based on the DCISC’s review.

- Meeting with NRC Senior Resident Inspector.

- Plant Protection System Review with System Engineer - the DCISC team reviewed the Eagle 21 Plant Protection System which has been upgraded since its original installation. Mr. Wardell reported the Plant Protection System monitors Reactor Coolant System (RCS) parameters, pressure, temperature and neutron flux and the system sends a signal to the engineered safeguards system. Mr. Wardell stated the upgrade planned for the Eagle 21 System has been cancelled as PG&E has determined it is a project that will not be necessary due to the plant closing by 2025 as installation and implementation of the planned upgrade would take several years. The Eagle 21 System is a Westinghouse manufactured system and Westinghouse and its third party vendors will continue to support the Eagle 21 System with spare parts and technical assistance if necessary. The Eagle 21 System is in Green health status. Mr. Wardell reported the Plant Protection System is subject to the full DCPP Cyber Security Program to ensure it remains isolated and the system is also protected from unauthorized changes by internal cyber security features.

- Meeting with DCPP Station Director - the DCISC team met with Station Director Paula Gerfen to discuss items reviewed during the fact-finding visit and also the potential for a post-shutdown role for the DCISC. The plant and
the DCISC have concerns about the impact of the CPUC Administrative Law Judge’s proposed changes to the Employee Retention Program on the plant’s ability to retain adequate, experienced personnel to maintain reliable and safe operation.

- **Fire Doors Status** - Mr. Wardell reported the DCISC previously expressed concern with the condition and plans for repairing or replacing nonfunctioning fire doors in 2014 and since that time the plant has devoted more management attention and resources to repairing and replacing fire doors such that there were no impaired fire doors as of the November 2017 fact-finding. The DCISC representatives raised with DCPP certain issues brought to the Committee’s attention by Ms. Rochelle Becker of A4NR including repair versus replacement and the assessment of corporate overhead to the fire door remediation efforts. Mr. Wardell reported that the DCISC team did not find corporate overhead was responsible for a lack of timeliness in the repair or replacement of the fire doors but he remarked that the issue of the cost of the remediation is outside the scope of the Committee’s review. The DCISC representatives found the timeliness of the repairs to be the principal factor, with repair favored over replacement, if possible, as repairing a door can restore it to full functionality sooner than if the door is replaced. Dr. Budnitz and Mr. Wardell reported they were pleased with what they described as a good outcome regarding fire door functionality.

- **NRC 95001 Inspection of White Finding** - the October 2017 fact-finding found the NRC accepted some but not all of DCPP’s analyses and conclusions concerning the White finding (assessed for a deficiency in the Emergency Core Cooling System). A new root cause evaluation has been performed and additional corrective actions were identified and the NRC has conducted a follow up inspection which found DCPP’s actions in response to be acceptable and the White finding has been closed and the plant returned to Column 1 on the NRC’s inspection matrix, which means that the plant will undergo regular rather than enhanced NRC inspection activity in the future. Dr. Budnitz expressed his view that the NRC was technically incorrect in rejecting PG&E’s initial root cause evaluation and this resulted in a more severe sanction by the NRC than was warranted.

- **NRC Inspection Report for 2010 Event** - Mr. Wardell reported that the 2010 event concerned instrumentation found to have been operating out of technical specification requirements due to insulation in the piping where the instruments were installed which caused the instruments to experience higher temperatures than specified. This issue was identified by DCPP and reported to the NRC. The problem has been corrected and the instruments replaced. Mr. Wardell reported that analysis demonstrated the required number of channels remained functional in spite of having exceeded the temperature limits. A Green, Non Cited Violation (NCV) with very low safety significance was issued to DCPP by the NRC for this event.

Upon a motion by Dr. Peterson, seconded by Dr. Budnitz, the October 30–31, 2017
and the November 13–14, 2017 Fact Finding Reports were accepted and their transmittal to PG&E authorized.

The Chair requested Consultant McWhorter report on the December 13–14, 2017, fact-finding visit with Dr. Peterson. Mr. McWhorter reviewed the topics discussed with PG&E during the December 13–14, 2017, visit including:

- Spent Fuel Inspections after Transfer to the Independent Spent Fuel Storage Installation (ISFSI) - Mr. McWhorter remarked this item was discussed at the October 2017 public meeting with reference to a question concerning inspection or repackaging of spent fuel in the event of a crack in a multipurpose canister (MPC) after decommissioning of the spent fuel pools. Mr. McWhorter described the components of the dry cask spent fuel storage system including the MPC, which he described as the core component which contains the fuel and is dried with helium and sealed and welded shut. The MPC is a one-time repository for the fuel but it is not a stand-alone component as it is surrounded by other canisters at differing times. The transfer cask is used to move the MPC from the spent fuel pool (SFP) to the ISFSI. At the ISFSI Cask Transfer Facility the MPC is removed from the transfer cask and placed in the HI-STORM storage cask, manufactured by the Holtec International firm, which is then placed vertically on the storage pad.

In the future, in order to transport spent fuel offsite, the Cask Transfer Facility and the HI-STAR transportation cask would be used to transfer and transport the spent fuel in a horizontal position. Mr. McWhorter observed the Cask Transfer Facility is a key component as it provides options for possible inspection, repair or repackaging of a MPC or installation of an over pack, although he reported that none of these options have been fully vetted or analyzed in detail. Dr. Peterson observed there is also an issue regarding how the transportation cask would be moved to a federal repository, whether by barge, road or rail, and he suggested it would be worthwhile for the Committee to follow up to verify the technical and logistic practicality of these different approaches. Mr. McWhorter reported and Dr. Peterson agreed that the U.S. Department of Energy has considerable successful experience in transporting used nuclear fuel for the military. Mr. McWhorter observed the HI-STAR transportation cask does not rely on the MPC’s integrity and is certified to remain intact under all conditions and designed to contain any leak from a MPC and accordingly MPC integrity is not required for offsite transport using the HI-STAR transportation cask.

Dr. Peterson remarked that stress corrosion cracking that could credibly form on a MPC would be expected to have a very tight aperture which would likely prevent significant leakage. Dr. Peterson remarked there could be a significant benefit if prior to DCPP decommissioning there was a successful effort to establish a consolidated spent fuel storage facility, as priority could be given to fuel from decommissioned reactor sites. In response to Consultant Wardell’s inquiry, Mr. McWhorter stated he did not believe the HI-STAR transportation casks were
designed or intended to be used as final storage casks but that the MPCs would be finally dealt with in some other manner. Dr. Budnitz remarked that the facility proposed for Yucca Mountain, Nevada, was designed to use disposal canisters for final disposition of spent fuel. Dr. Peterson stated for other facilities it is an open question as to what might be used or what other facilities might be required as it is feasible to use either wet or dry transfer techniques to repackage the MPCs.

Mr. McWhorter reported the DCISC team received information on scoping studies being done by the Electric Power Research Institute (EPRI) on the consequences of cracking of a MPC and EPRI has issued inspection and repair documents as guidelines and is presently investigating inspection techniques for MPCs as part of an aging management plan for spent fuel storage installations. In 2024 DCPP will be required to address, in context of its review of renewing the license from the NRC for the ISFSI, the effects of aging of the facility. Mr. McWhorter stated that PG&E is confident that within a relatively short time there will be robotic inspection techniques available to inspect the HI-STORM casks and the weld-affected zones of the MPCs. **In conclusion, Mr. McWhorter stated there are still questions which will need further follow up by the Committee and that DCPP is continuing to work with the industry as part of its license renewal effort for the ISFSI and the DCISC team concluded that the Cask Transfer Facility provides certain options for inspection, repackaging or repair of a MPC if necessary after closure of the spent fuel pools.**

- **Meet with NRC Senior Resident Inspector -** the DCISC representatives reviewed issues concerning: CPUC consideration of the Joint Proposal [approved as modified by CPUC in Decision 18-01-022, issued on January 16, 2018] which will retire both DCPP units by 2025, the status of the NRC’s review of DCPP’s external flooding review, and a recent bearing failure on Charging Pump 2-1.

- **Unit-1 Increased Radiation Levels -** Mr. McWhorter reported a root cause evaluation (RCE) determined the Unit-1 increased radiation levels were due to cobalt 60 produced by the misalignment of a seal on Reactor Coolant Pump 1-3 in 2014 during the eighteenth refueling outage for Unit-1 (1R18). This misalignment released stellite containing cobalt 59 into the Reactor Coolant System (RCS) which when deposited on the fuel became cobalt 60, a highly radioactive and long-lived material, which is now slowly being taken out of the RCS by increased zinc injection and increased filter flow rates and by decreasing the size of the filters. Dr. Peterson remarked that the lack of data retention resulted in a missed opportunity to analyze vibration data for the reactor coolant pumps as the misalignment would have generated a unique acoustic signature which could have been used in the future to monitor for and assess similar issues and to alert operators in the Control Room.

Dr. Peterson remarked the corrective actions identified did not include identification of this missed opportunity. **Dr. Peterson remarked that such data is now very inexpensive to collect and to monitor and suggested a**
potential recommendation for the DCISC’s consideration might be related to data retention periods. Dr. Peterson stated a similar issue occurred with seismic monitoring instrumentation after an earthquake in the vicinity of the North Anna Nuclear Generating Station in Virginia which might have reduced the period of time during which that plant was shut down. Mr. McWhorter reported the data acquisition issue at North Anna was related to the lack of internal battery backup for certain instrumentation.

Mr. McWhorter stated the DCISC team met with the director of the DCPP Radiation Protection organization to review departmental staffing issues. At present Radiation Protection consists of 83 persons which he stated was a decrease from 89 persons employed previously. Mr. McWhorter reported Radiation Protection personnel are often moved into other departments and they will continue to be needed after the plant ceases generation operations and, accordingly, have a longer-term horizon for employment at DCPP than some other employees. He stated the DCISC team concluded the increased radiation level for Unit-1 had been appropriately identified and corrective actions, not including addressing data retention, have been put into place albeit after some passage of time.

- Emergency Diesel Generator System Health - Mr. McWhorter reported the station has six very large emergency diesel generators (EDGs), three for each unit, used to supply power to all critical equipment for at least 72-hours following loss of offsite power. The plant keeps seven days of diesel fuel available onsite for the EDGs. The EDGs for both units are considered in White health status due to what Mr. McWhorter described as small issues concerning valves and switches. There is also an issue with the Unit-1 EDGs’ design basis for impact due to high wind events and a prompt operability assessment (POA) is currently in place to allow continued operation until calculations are revised. A reliability improvement plan for the EDGs is now in place and Mr. McWhorter stated the DCISC team judged this plan is doing a good job in dealing with the issues at an appropriate pace. He reported both units have problems with non safety air-start pressure control valves dedicated to safety-related service, as after the air system is depressurized for maintenance sometimes these valves do not work and must be returned to maintenance status for additional work. The DCISC team toured the EDG area with the system engineer and viewed the air-start valves and the covers installed for the Unit-2 EDGs over their emergency trip buttons. The DCISC representatives reported the EDGs are in White health status, that is, needing improvement, but that issues are being appropriately worked through and the DCISC should be attentive to ensure that DCPP continues with the initiatives to improve EDG reliability and in the future the Committee should review the repair parts evaluation process in more detail as that process is used to dedicate a non safety-related valve for safety-related service.

- Observe Corrective Action Review Board (CARB) Meeting - Mr. McWhorter reported a meeting of the CARB was not held due to lack of a quorum.
Operations Department Performance - the DCISC fact-finding team met with the Operations organization performance shift manager to review performance. The Operations’ Excellence Plan has identified lack of formality in certain shift operations as an area to be addressed including implementation of pre evolution briefings for smaller tasks and the lack of a full operational risk assessment revealed by the recent nitrogen leak in Containment which resulted in an alert and a cooling water tank indication issue with the stator cooling water system. Mr. McWhorter reported the Excellence Plan is also looking to improve station watch fundamentals by incorporating activities based on INPO’s Event Report 17-005 which is entitled “Line of Sight to the Reactor Core.” Dr. Peterson observed that with respect to the nitrogen leak this event represented a missed opportunity as the flaw would have been detected if more modern strategies were available to provide larger data sets for plant health monitoring. Mr. McWhorter reported that in discussions with Operations staff, the proceedings regarding the Joint Proposal to retire DCPP by 2025 was identified as a distraction but there is no indication that this has affected day-to-day Operations performance. He also reported there has been no implementation of load following procedure by the California Independent System Operator (CAISO) discussed previously by the DCISC and monitored by the Committee on its Open Items List. The DCISC team concluded plans are in place to address areas identified for improvement in the Operations Department and the DCISC should continue to review Operations Department performance on a regular basis.

230kV/500kV Switchyards and Offsite Power Lines Health - the DCISC team inquired whether the changes in the availability of renewable energy has affected system stability and found that the transmission system has been stable with only some normal actuation of protective relays which Mr. McWhorter stated is typical for these systems. The solar project located between the Morro Bay and the Midway transmission substations has had very little effect on system reliability. PG&E continues to monitor this issue and has expressed concern about the possible effects of this installation in the future. Mr. McWhorter reported both the 230kV and the 500kV Systems are in Green health status with replacements and upgrades having been completed to switches, insulators and breakers in both switchyards. Future upgrades have been placed on hold due to the Joint Proposal. A project to install static VAR compensators into the 230kV switchyards has been moved to the Mesa substation due to the availability of a larger footprint at that facility. The DCISC team concluded overall grid stability in the local area remains good and PG&E and the Committee should continue to monitor this issue.

Use of Portable Electronic Devices in the Power Block - Mr. McWhorter reviewed the efforts to implement electronic work management and the Smart Procedure Initiative. The Smart Procedure Initiative is now on hold due to the Joint Proposal and a requirement that informational technology (IT)
projects must be vetted through the company as a whole. Dr. Peterson stated this represented another lost opportunity with respect to professional development and it may be possible to accomplish, at least in part, some of the benefits of smart procedures by implementing a date and time stamp electronically when entering and exiting procedural steps. Mr. McWhorter reported that the project to install wireless capability in the power block has been placed on hold, as that effort at present would take several years and would require considerable analysis concerning the significance of the design changes required. Dr. Peterson observed that there is a certain irony in the fact that the wireless capability in the power block could be implemented much faster and much more easily once the plant ceases generating electricity and this traces back to the fact that safety requirements can at times actually degrade safety in certain contexts.

- **Electronic Work Management System** - Mr. McWhorter reported this system was implemented in 2014 to manage work packages and is part of an industry initiative to digitalize work packages in what is referred to as the Electronic Work Management (eWM) process which at DCPP requires interfacing with the SAP-based data collection system. The eWM process began in 2017 and less than 10% of the work packages are now issued electronically, with a goal set to get to 75%. Mr. McWhorter described advantages as including reduction in time for planners to assemble a work package, no need to use paper, and the ease of use of eWM packages in the field. **Mr. McWhorter recommended the DCISC again review the eWM process in one year.**

- **Management of Data in the Performance Improvement Program** - Mr. McWhorter reported on the cognitive trending of data within the Performance Improvement Program by program improvement coordinators to identify trends and enter those trends into the Corrective Action Program. He reported statistical trending is generally not done as this tends to be a delayed indicator. Dr. Peterson remarked that with the ability to gather larger quantities of data, this is an area where other industries are making performance improvement using data analytics. **Mr. McWhorter reported data obtained from specific equipment in the plant is customarily reviewed by the Engineering organization to a greater degree than by the Performance Improvement organization and the Committee may want to follow up on this issue in the future.** In response to a question from the October 2017 public meeting, Mr. McWhorter reported that out of 1,038 industry events reviewed by the Performance Improvement organization, 135 of those events were found to have potential for applicability to DCPP. **The DCISC team concluded that the Performance Improvement Program is effective in reviewing the Corrective Action Program for trends but there is an opportunity presented to review plant policies on data retention for instrument data related to equipment performance programs.**
In response to Consultant Wardell’s inquiry as to whether the issue related to a systematic approach to periodic review of data retention and data management by DCPP was a one-time situation or a recurring issue warranting a recommendation from the DCISC, Dr. Peterson and Mr. McWhorter agreed that further inquiry with the Engineering organization during future fact-finding might be warranted before adopting a recommendation.

- DCISC Member meeting with DCPP Officer - Dr. Peterson met with PG&E Vice President Nuclear Generation and Chief Nuclear Officer Mr. James Welsch.

On a motion by Dr. Budnitz, seconded by Dr. Peterson, the December 12-13, 2017 Fact Finding Report was unanimously approved and its transmittal to PG&E was authorized.

Following the approval of the December 2017 Fact Finding Report, the Committee discussed and determined, by a vote with Drs. Lam and Peterson in favor and Dr. Budnitz opposed, that a public tour should be conducted in conjunction with the June 13–14, 2018, public meeting. The Members and Consultants also discussed and agreed that an invitation from the Committee will be extended to Dr. David Victor, the Chair of the San Onofre Nuclear Generating Station (SONGS) Community Engagement Panel, to attend the June 2018 DCISC public meeting and in conjunction with that invitation to offer to reimburse Dr. Victor for his expenses. Dr. David Weisman of the A4NR suggested that Dr. Victor’s appearance before the DCISC should be, if possible, scheduled for the DCISC’s evening session on June 13, 2018, to allow as many members of the public to attend as possible.

VIII Adjourn Afternoon Meeting

The Chair adjourned the afternoon meeting of the DCISC at 5:00 P.M.

IX Reconvene for Evening Meeting

Dr. Lam convened the evening meeting of the DCISC at 6:00 P.M.

X Committee Member Comments

There were no comments by the Members at this time.

XI Public Comments and Communications

Dr. Lam invited any members of the public to address remarks on any item not of the Committee’s agenda.

Ms. Linda Seeley of San Luis Obispo, California, was recognized. Ms. Seeley remarked that Ms. Donna Gilmore [of the group San Onofre Safety] had intended
to attend this public meeting of the DCISC but was prevented from doing so for health reasons. Ms. Seeley requested a copy, on Ms. Gilmore’s behalf, of the fact finding report presented earlier at this meeting by Mr. McWhorter concerning the December 2017 fact-finding visit. Ms. Seeley also stated that she has received information on a Green status safety violation received by DCPP from the NRC for an inoperability issue related to the nitrogen supply system for Unit-2 which resulting in a degraded safety function. Mr. Wardell reported that information on the issue cited by Ms. Seeley was also reported previously at a public meeting and again mentioned by Mr. McWhorter during his report.

Ms. Simone Malboeuf of Los Osos, California, was recognized. Ms. Malboeuf provided copies to the Committee and read from a letter, dated January 4, 2018, from Mr. David Lochbaum of the Union of Concerned Scientists. In his letter Mr. Lochbaum cited requests made between December 2005 and January 2018 by PG&E for extensions and modifications related to meeting the National Fire Protection Association Standard 805 regulations (NFPA 805) for fire protection. Ms. Malboeuf read from various portions of Mr. Lochbaum’s letter citing: (1) a non concurrence report by the NRC’s Chief of Plant Licensing Branch 4-1 regarding DCPP’s NFPA 805 submittal not meeting NRC safety standards and undue pressure having been brought by an NRC executive on employees to allow risk credit for unproven Westinghouse Generation III seals; (2) a requirement that DCPP complete five NFPA 805-related modifications to Unit-1 by January 28, 2018 and for Unit-2 by March 2018; (3) claiming the effort and cost undertaken to transition to NFPA 805 and DCPP’s requests for enforcement discretion constituted prima facie evidence that DCPP was not in compliance with the 1980 [Appendix R] or NFPA 805 regulations; (4) that transition to NFPA 805 required modifications which will reduce risk of core damage frequency and is more than a mere paperwork review; (5) that noncompliance with NFPA 805 elevates the risk of reactor core damage; that compensatory measures for noncompliance are outside the law; and (6) that when the NRC adopts a regulation, the regulation embodies the NRC’s definition of what is required to protect public health and safety and when a reactor operates in a manner not in compliance with NRC regulations it is clearly not safe enough. Ms. Malboeuf inquired and Dr. Budnitz confirmed that DCPP completed the cited five NFPA805-related modifications to Unit-1, and Unit-2 will have that worked performed during its upcoming refueling outage.

Dr. Budnitz responded to Ms. Malboeuf’s comments and Mr. Lochbaum’s letter and he observed that the statements in Mr. Lochbaum’s letter were simply not accurate. Dr. Budnitz reviewed the history of the Appendix R fire protection regulations and the option offered some years ago for plants to transition to the NFPA 805 regulations. He reported DCPP opted to make this transition and it has taken longer than expected and been a more complex evolution than was initially anticipated and, accordingly, extensions of time were required but, following the upcoming 2R20 refueling outage, DCPP will be fully in accord with NFPA 805. Dr. Budnitz stated it is simply not the case, and he opined the NRC would agree, that because a plant opted to transition to NFPA 805 it is prima facie evidence of
noncompliance with earlier regulations. He stated Mr. Lochbaum has been wrong in making this assertion. Dr. Budnitz remarked the reason plants made the transition to NFPA 805 was because, over time, the transition will save money and make the plant safer. Dr. Budnitz confirmed that DCPP has always met the NRC’s fire protection regulations, as plants are allowed by those regulations to request exemptions or compensatory measures that, if granted, meet the definition of regulatory compliance. Dr. Budnitz observed that it would be a true statement to say that DCPP did not meet Appendix R regulations as written but that is not what Mr. Lochbaum is asserting and it is important to understand this distinction. Dr. Lam and Dr. Peterson stated the Committee will accept Mr. Lochbaum’s letter into its records and review his information. Dr. Peterson observed that simply meeting regulations does not necessarily mean a plant is safe, as regulatory compliance provides only partial assurance but Dr. Peterson remarked the DCISC is not charged with assessing regulatory compliance but rather advising as to whether the plant is safe from an operational standpoint and he used the example of the DCISC’s efforts and focus upon workplace seismic safety as an important area which is not addressed in regulations. Dr. Peterson further observed there are areas of regulatory compliance that may actually operate in a manner that is adverse to safety and he gave the example of the cost to replace fire doors as an example. Dr. Peterson observed the United States has successfully established a regulatory framework across a wide range of differing technologies and has achieved remarkable levels of safety by doing so. Dr. Budnitz commented that while it is absolutely the case that DCPP has not met all of the NRC’s 1980 [Appendix R] regulations as written, there have been a number of exemptions and compensatory measures put in place with the NRC’s approval and judgment so as to ensure the plant was in regulatory compliance. The Committee has reviewed all of those exemptions and compensatory measures and agreed they were adequate to keep the plant safe which is different than asserting that the plant met the regulations as written.

David Weisman of the A4NR was recognized. Mr. Weisman remarked that this date marks the one year anniversary of the failure of California’s Oroville Dam main spillway and the results of an independent external review of the Department of Water Resources and the federal regulators involved with dam safety found that the failure was the result of long-term systemic deficiencies which continued despite repeated evaluations by reputable outside consultants in a State with the nation’s leading dam safety regulatory program. Mr. Weisman characterized this as a wake-up call for everyone involved in dam safety, as no single root cause was identified but rather the failure was related to a complex interaction of relatively common human, organizational, and industrial factors. A 2014 statement by the Federal Energy Regulatory Commission found failure of the flood control spillway was so unlikely that there was no need to plan for such emergencies. Mr. Weisman stated the same statement has been made more than once in the history of DCPP and the events at the Oroville Dam should serve as a reminder of the fallacy of this notion. The Oroville Dam review panel also identified the Department of Water Resources as a somewhat insular organization that had not accessed industry
knowledge sufficiently and, like many large dam owners, had accordingly become overconfident and complacent regarding the integrity of civil infrastructure. Mr. Weisman remarked that while he appreciated Dr. Peterson’s comments on U.S. regulatory structure, perhaps the allowance of exceptions to regulations, while an accepted practice, might lead to other catastrophic failures as there is no such thing as infallibility and the concept that probabilistic risk assessment can reduce risk to a level that does not merit greater concern can be undone.

Assistant Legal Counsel Rathie recognized and welcomed Ms. Shelly Abajian, District Director for the Central Coast in the Office of U.S. Senator Diane Feinstein who was attending this public meeting at the invitation of the DCISC.

XII Information Items Before the Committee

Dr. Lam introduced and requested Mr. Cary Harbor, Director of Nuclear Business Operations, to introduce the first presentation and presenter to the Committee. Mr. Harbor thanked Dr. Lam and introduced Ms. Paula Gerfen, DCPP Station Director, and asked Ms. Gerfen to make the first of the informational presentations requested by the Committee of PG&E for this public meeting. Mr. Harbor reported Ms. Gerfen has more than 25 years of nuclear experience, holds a Bachelor of Science Degree in Computer Science and has held leadership positions in the Digital Engineering, Maintenance, and Operations organizations and has held a Senior Reactor Operator’s license at DCPP.

State of the Plant Update including Key Events, Highlights, Organizational Changes, Institute of Nuclear Power Operations Evaluation Results, and Station Activities since the DCISC’s October 2017 Public Meeting.

Ms. Gerfen reported her presentation would be brief as, with a few exceptions, both units have remained at 100% power since the last public meeting of the DCISC in October 2017. Unit-2 is now at 85% power as it is being ramped down in preparation for the planned 2R20 refueling outage while Unit-1 is operating at 100% power. Ms. Gerfen reported all NRC performance indicators are in Green status. She reviewed with the Committee graphic depictions of plant operation for the past four months and over the past twelve months and noted the refueling outage for Unit-1 and other changes in generation due to scheduled curtailments. Ms. Gerfen reported the only unplanned curtailment was due to a problem with a steam generator flow control valve experienced while Unit-1 was coming out of its latest refueling outage which required Unit-1 to come down to 28% power for replacement of the positioner, with solid performance by Unit-1 thereafter.

Ms. Gerfen reviewed upcoming activities and reported Unit-2 will enter 2R20 on Saturday, February 10, 2018, and the refueling outage is scheduled for 35 days with a 40-day schedule accounting for five contingency days. During the outage the NRC will conduct a Radiation Safety Inspection and following the outage the NRC will conduct a Problem Identification and Resolution Inspection.
Ms. Gerfen reported that with conclusion of the NRC’s 95001 issue, DCPP has exited Column 2 and returned to Column 1 on the NRC’s Reactor Oversight Process Action Matrix. Ms. Gerfen confirmed Dr. Lam’s observation that the transition from Column 2 back to Column 1 took more time than anticipated and she remarked that during the second 95001 inspection DCPP experienced challenges with one of the NRC reviewers who provided better direction on how to attack the issue by asking a sufficient number of “why” questions and when the plant adopted this perspective, DCPP was able to come to a successful conclusion of the issue. In response to Dr. Lam’s inquiry, Ms. Gerfen stated that she did not believe the Joint Proposal was responsible for any lack of focus by the Operations organization as the Joint Proposal is discussed openly and transparently at the plant and the DCPP leadership team ensures that employees remain focused on safe, reliable performance. She observed the difference of opinion with the NRC inspector during the 95001 reinspection did not indicate the plant had not appropriately focused on the inspection and Ms. Gerfen stated it was her belief that the correct amount of resources were employed in preparing for the 95001 inspections.

Mr. Harbor then introduced Director of Government Relations, Mr. Tom Jones, and asked Mr. Jones to make the next presentation to the Committee.

**Update on the Status of the Joint Proposal and Employee Retention Plan Including Efforts to Retain Qualified Staff including Licensed Operators.**

Mr. Jones stated in his presentation he would be discussing the Joint Proposal as ruled upon by the CPUC on January 11, 2018, and the key regulatory milestones for decommissioning DCPP. Mr. Jones reported the CPUC Decision on the Joint Proposal, while supporting the retirement of DCPP, did not include all funding requested by PG&E for retention and retraining of DCPP employees, although the funding level was increased from $160.5 million recommended in the Proposed Decision, nor did the final decision approve the Community Impact Mitigation Program which would have provided $85 million for the local communities to offset the impact of DCPP closure. PG&E had proposed a 25% bonus retention “across the board” for DCPP employees, however, the final decision approved funding for the retention program in the amount of $210 million which he reported was equivalent to a 15% retention bonus. The CPUC did not accept that it possessed the legal authority to fund the Community Impact Program and Mr. Jones stated PG&E is presently working on these issues in a meet and confer process with the Joint Proposal settling parties. Mr. Jones stated that the Community Impact Program could be addressed through legislation or through a request for a rehearing of the Decision or by acceptance of the Decision as issued, or by some combination thereof. Dr. Budnitz observed the issue of the Community Impact Program was outside the DCISC’s remit from the CPUC. Dr. Peterson observed the Employee Retention Program related directly to issues under the DCISC’s mandate from the CPUC.

Mr. Jones reported PG&E designed the Employee Retention Program as a prorated
program because of expected attrition both by those employees who opted to participate and those who did not opt into the program and he reported that DCPP is, at present, experiencing normal levels of attrition. The participation rate in the Employee Retention Program was greater than 92% at the end of 2017, with attrition and participation rates for those employees with long terms of service less than the average which Mr. Jones stated was as expected. He reported PG&E is presently working with employees, including represented groups, to recast the Employee Retention Program and he stated he would provide an update to the DCISC on progress made in recasting the Employee Retention Program at its next public meeting. Mr. Jones confirmed Dr. Budnitz’ observation that DCPP will need to once again solicit participation in the program by its employees and Dr. Budnitz observed that, together with PG&E and the NRC, the Committee is concerned about DCPP’s ability to retain sufficient highly qualified personnel to continue to operate the plant. Mr. Jones observed the interests of PG&E, the other parties to the Joint Proposal and DCPP’s employees are relatively well-aligned in this process toward providing some certainty and finality to the issues he described.

Mr. Jones reviewed with the Committee a graph showing key regulatory milestones including formation of the Diablo Community Engagement Panel, emergency planning issues in the decommissioning period, and the established cycle for the Nuclear Decommissioning Trust Triennial Proceedings (NDCTP). He confirmed Dr. Budnitz’ observation that some of these milestones are fixed while some depend upon events which have yet to occur. **Dr. Peterson observed the Committee will have significant interest in how the Diablo Community Engagement Panel is to be constituted as well as what recommendation the Committee may make for a post-shutdown role as in some respects the Community Engagement Panel may provide some of the same functionality now provided by the DCISC.** Mr. Jones reported PG&E has benchmarked its efforts regarding the Diablo Community Engagement Panel against the experiences of the SONGS Community Engagement Panel and with six other panels across the country including PG&E’s Community Engagement Panel for its now closed Humboldt Bay Power Plant. He reported for the Diablo Community Engagement Panel PG&E now plans to seek a broad section of participants with diverse opinions and to utilize a professional facilitator and to employ a consensus decision making model. Mr. Jones stated the Committee’s input would be welcome and he would be providing future updates to the DCISC concerning the Diablo Community Engagement Panel. In response to Dr. Budnitz’ inquiry, Mr. Jones stated the funding sought for the Employee Retention Program and for the Community Impact Program are separate elements of the request to recover funding through rates.

In response to Dr. Peterson’s inquiry as to contingency plans should employee morale and retention be impacted negatively, Mr. Jones cited the Culture Monitoring Safety Program and the tools that program provides as being positioned to identify and address those issues. The Chair thanked Mr. Jones for an informative presentation.
Ms. Linda Seeley of the group San Luis Obispo Mothers for Peace was recognized. Ms. Seeley inquired as to who makes the decision as to what constitutes an adequate staff to run a power plant of a certain megawatt generation capacity and whether there is a specific numerical requirement for a certain number of qualified persons in key positions set forth in regulations. Dr. Budnitz responded that it is unlikely DCPP would fall below a minimum number of persons required to continue operations but the Committee’s concern runs to ensuring there are a sufficient number of highly qualified people to operate the plant safely. Dr. Budnitz reported about ten years ago DCPP recognized that a significant portion of its workforce and management staff would soon be eligible to retire and a major effort was made at that time to hire to replace those persons and the DCISC, the NRC and PG&E were all pleased with the results and the success of that effort. As to who makes the decision as to the adequacy of plant staff, Dr. Budnitz reported that PG&E plant management and the NRC would have the final say. Dr. Peterson confirmed there are regulatory requirements on numerical staffing for some functions such as Control Room operations and emergency planning and the DCISC will be closely watching to assure that staffing, capabilities, and skill remain sufficient. Dr. Budnitz remarked that for some positions licenses are required from the NRC but for other positions there are requirements for industry certification to carry out those functions. Mr. Harbor reported regulations require DCPP to have a qualifications process and program for all persons, including management personnel, who perform key functions at the plant and there are accredited training programs that must be taken and passed before someone is allowed to work at DCPP. Mr. Harbor reported a nuclear power plant must have the capability to meet its license requirements to maintain equipment and keep within technical specifications. Dr. Peterson remarked this was an area on which the DCISC should follow up including actions required should certain staffing requirements not continue to be met. Dr. Budnitz remarked that one does not simply stop a nuclear power plant as it remains necessary to run it safely after it is shut down. Mr. Wardell observed, with reference to Control Room operations there are persons working in areas in the plant other than Operations who continue to hold active reactor operator licenses and, subject to NRC rules, overtime is available as well. Mr. Wardell and Mr. Harbor reported that in order to keep an active reactor operator’s license, training and qualification are required including periodically standing watches in the Control Room, and a biennial examination by the NRC continues to be required. Those with inactive reactor operator licenses have lesser continuing requirements but can requalify to hold a current license on an expedited basis.

Mr. David Weisman of the A4NR was recognized. Mr. Weisman stated that the Community Impact Program for which the CPUC declined to provide funding has impacts on the Office of Emergency Services and on San Luis Obispo County and he provided the example of necessary seismic improvements, identified as costing approximately $900,000, to the bridge over Avila Bay Drive out to State Highway 101 as one of those impacts which the County, per Federal Emergency Management Agency regulations on infrastructure and the NRC regulations
governing evacuation routing, is required to maintain to certain standards. Mr. Weisman stated this was representative of the nexus between financial commitments and living in a community that has an operating a nuclear power plant in the vicinity. **Dr. Peterson stated the DCISC should schedule a future fact-finding with the County Office of Emergency Services (OES) manager to review the impact of a future significant reduction in resources on OES planning.**

Dr. Gene Nelson of the group Californians for Green Nuclear Power was recognized. Dr. Nelson commented that the issue raised by Mr. Weisman illustrated another good reason not to close DCPP as the County would not need to be concerned about loss of funding.

Ms. Simone Malboeuf was recognized. Ms. Malboeuf inquired as to the mission and application process for the Diablo Community Engagement Panel. Mr. Jones replied that the mission of the panel is to provide PG&E with advice on many issues including preparations for the next phase of decommissioning which include the upcoming NDCTP application, proposed transportation routes for waste and shipping times, emergency planning, and the possible re-purposing of existing facilities. Mr. Jones reported PG&E will soon launch the application process for the Diablo Community Engagement Panel and a recruitment panel has been formed from community leaders, including Ms. Rochelle Becker of A4NR and retired State Assemblyman Katcho Achadjian, to assist in screening applicants. Mr. Jones stated PG&E is seeking individuals with a broad cross-section of interests and divergent viewpoints. Solicitations will appear soon in social media and print and electronic advertising.

Dr. Gene Nelson of Californians for Green Nuclear Power was again recognized. Dr. Nelson stated the CPUC Decision on the Joint Proposal should not be considered final as the group he represents has filed an application with the CPUC for a rehearing.

Dr. Budnitz reported that the February 8, 2018, morning session of this public meeting would commence with a report by Consultant McWhorter on the NRC’s assessment of the tsunami hazard at the plant site. Dr. Budnitz observed that a tsunami represents a real hazard to the local area and although the information to be presented by Mr. McWhorter was developed for the plant site it also applies more broadly to the local area.

**XIII Adjourn Evening Meeting**

The Chair adjourned the evening meeting of the Committee at 7:30 P.M.

**XIV Reconvene for Morning Meeting**

The February 8, 2018, morning public meeting of the Diablo Canyon Independent Safety Committee was called to order by its Chair, Dr. Lam at 8:00 A.M. Dr. Lam welcomed those persons present in the audience. Dr. Lam invited
any of the members who wished to make remarks to do so at this time.

**XV Committee Member Comments**

There were no comments from Members at this time.

**XVI Public Comments and Communications**

The Chair reviewed the invitation to address the Committee on matters not on the agenda for this public meeting and invited any comments from members of the public who wished to address the Committee to do so now. There was no response to his invitation.

**XVII Technical Consultant Report and Committee Discussion**

The Chair requested Consultant McWhorter to make the next presentation to the Committee.

Mr. McWhorter stated in his presentation he would cover the purpose and summarize the tsunami section of NRC Staff Assessment of DCPP’s Response to 10 CFR 50.54(f) Information Request - Flood Causing Mechanism Reevaluation (ADAMS Document Number ML17024A207) (the NRC Staff Assessment) issued on December 18, 2017, concerning various matters related to flooding. He reported he would not be making an evaluation regarding the merits or validity of the NRC Staff Assessment or any representations regarding PG&E’s assessments or positions on the topic.

By way of background Mr. McWhorter stated in March 2012 the NRC issued an information request requiring (in part) operating reactor licensees to reevaluate flood-causing mechanisms using present-day methodologies and guidance, this is known as Fukushima Recommendation 2.1. In March 2015, as revised in February 2016, DCPP submitted its Flood Hazard Reevaluation Report (FHRR) which found only one potential flooding hazard which might exceed the current licensing basis, that being locally intense precipitation. However, this flood hazard was subsequently found to fall within the plant’s current licensing basis. Nuclear power plants were required by the NRC to reanalyze not only locally intense precipitation but also tsunamis, flooding from streams or rivers, and dam failure among other possible natural hazards.

The NRC Staff Assessment of the tsunami hazard, Section 3.7, addressed the flooding hazard from tsunamis. In summary, Mr. McWhorter reported the DCPP FHRR for tsunamis reported a 32' 8" tsunami hazard at the plant site. DCPP’s current licensing basis accounts for a 34' 9" tsunami at the Auxiliary Saltwater System (ASW) Intake structure with the ASW snorkels located at 48' 5" and the plant itself at 87' 9". Mr. McWhorter reported that all elevation numbers used and to which he referred in his report use North American Vertical Datum of 1988 references. He stated the DCPP FHRR included review of historical records of nearby and distant tsunamis. The submarine mass landslide which occurred off of
Goleta, California, was used as a proxy and represented the Controlling Submarine Mass Failure in this analysis which produced the postulated tsunami of 32' 8".

Mr. McWhorter stated in conjunction with its review the NRC obtained the services of the Taylor Engineering firm to develop a completely independent analysis. The Taylor Engineering analysis, entitled Technical Evaluation Report DCPP Tsunami Hazard Reevaluation Review, Taylor Engineering (ADAMS Document Number ML17341A065), used different computer modeling and evaluated different tsunami-generating sources for earthquake generation from both distant and local sources, as well as for distant and local submarine landslides including a Goleta-type near-site slide. The Taylor Engineering analysis used slightly different sea level assumptions regarding tidal effects and long-term sea level rise. The NRC reviewed the Taylor Engineering analysis results which also concluded that the Goleta proxy submarine local landslide was the controlling failure but Taylor Engineering found a Goleta-type postulated failure produced a 47' 7" tsunami at ASW Intake Structure. Mr. McWhorter displayed a graph which compares the PG&E FHRR, the independent NRC Staff Assessment and the Taylor Engineering analysis with the NRC and PG&E analyses showing the hazard falling within the current licensing basis for the plant. However, the graph also showed the differences between PG&E’s analysis for a 32' 8" tsunami at the ASW Intake Structure and the Taylor analysis for a 47' 7" tsunami at the same location. Mr. McWhorter reported the NRC took care to address those differences.

The NRC review addressed the difference between the Taylor Engineering analysis results (47' 7") against the DCPP analysis results (32' 8") which were both based upon an abstraction of Goleta slide complex data and used computer modeling techniques to move the slide to different locations near the plant for numerical modeling purposes. Mr. McWhorter reported the Taylor Engineering study assumed a very conservative, thicker, slide taking place over a smaller area thereby producing a more focused tsunami. Taylor Engineering performed a parametric study evaluating 50 different source locations which DCPP was not required to perform. Mr. McWhorter reported the Taylor Engineering analysis determined that a Goleta-type event has a recurrence interval of once every 100,000 years (or 10^{-5} per year).

Mr. McWhorter reported the NRC concluded DCPP’s analysis relied on peer reviewed information and methods and that the analysis used by DCPP employed relevant regulatory criteria based on present-day methodologies and guidance. The NRC further concluded the DCPP analysis was conservative in its use of the Goleta slide complex at proxy locations. Further, the NRC found that the independent analysis by Taylor Engineering provided additional context to assure that the site could withstand an even more conservative scenario. In summary, the NRC concluded DCPP’s analyses met the requirements established by the NRC and the NRC’s effort to reevaluate the hazards from external flooding at DCPP is now closed.

Dr. Peterson remarked that there has been a great deal of effort by the
Committee concerning the question of the potential effect of a submarine landslide-induced tsunami on DCPP and, as it has now been determined that such an event is not a safety issue at the plant site as the risk is bounded by other elements, the DCISC can close its inquiry relevant to the danger to DCPP. However, Dr. Peterson observed that a tsunami would have a significant effect on the local area including on plant egress and ingress, as well as on the entire California coast and the lessons learned in this inquiry should be taken very seriously as should such an event occur there may be very little warning and almost no opportunity to stage an evacuation. Dr. Peterson observed that the conclusions of the reports discussed by Mr. McWhorter should be taken very seriously by California officials and should be integrated into their broader set of responsibilities. Dr. Budnitz stated he agreed with Dr. Peterson and he observed that while the reports discussed by Mr. McWhorter conclude that a 32' 8" to a 47' 7" tsunami may have a recurrence interval of once every 100,000 years, the frequency interval of smaller tsunamis is likely much less and these could be devastating to the local area and represent a huge hazard. Dr. Budnitz reported DCPP is separately now conducting an analysis of the consequence to the plant by a postulated compromise of the ASW System in order to work out the likelihood of a core damage accident and Dr. Budnitz stated this will be important information when it is available for review by the Committee. Dr. Lam reported the potential for tsunami hazards was brought to the Committee’s attention by Mr. David Weisman in context of a report prepared by Dr. Robert Sewell which was at that time entirely redacted by the NRC. Dr. Lam reported that through Dr. Budnitz’ effort in filing a Freedom of Information Act request, the unredacted report was released. Mr. McWhorter reported that the PG&E analysis he discussed will be part of the plant’s seismic probabilistic risk assessment submittal to the NRC and will be made publicly available.

Dr. Gene Nelson, representing Californians for Green Nuclear Power, was recognized. Dr. Nelson stated, and Dr. Peterson agreed, the issue of tsunamis in other locales such as off the Oregon coast differed from that for California’s central coast, as the Oregon mechanism is due to the presence of the Cascadia Subduction Zone and not to the strike-slip seismic features identified offshore from Central California. Dr. Nelson stated there are no subduction zones of any consequence in the vicinity of DCPP and he observed this is an important fact for the public to understand as a strike-slip seismic event is basically a lateral motion and is not a tsunami-generating event. He reported that with a dipolar, quadrupole seismic event involving a submarine landslide one part of the event would actually diminish the height of a resulting tsunami while the other part would enhance it, but the tsunami would attenuate very sharply with distance. Dr. Nelson commented that Dr. Sewell’s report was not peer reviewed and was found by the NRC to be beyond the state of the art.

Dr. Justin Cochran, Senior Nuclear Policy Advisor and Emergency Coordinator for the California Energy Commission, was recognized. Dr. Cochran reported that Dr. Robert B. Weisenmiller, the Chair of the California Energy Commission, was the state-appointed liaison for California to the NRC. Dr. Cochran thanked the
Committee and its associated staff for excellent and essential work performed each year and thanked Dr. Lam for his service on the DCISC as the appointee of the California Energy Commission. Dr. Cochran stated the California Energy Commission greatly appreciates the DCISC’s work and its perspective and insight on the issues pertaining to nuclear energy and the work and staff of PG&E for their dedication, efforts and critical contributions to this effort. Dr. Cochran recognized Dr. Peterson’s recent reappointment by the Governor to another term on the DCISC. In concluding his remarks Dr. Cochran stated that in his role as California Energy Commission Emergency Coordinator he works regularly with the Office of Emergency Services and he will forward the information in the reports discussed by Mr. McWhorter to the hazard mitigation and planning representatives of the Office of Emergency Services. Dr. Peterson expressed the thanks of the Committee to Dr. Cochran for his remarks and efforts.

Dr. Lam recognized the presence in the audience of U.S. Senator Diane Feinstein’s Central Coast District Director, Ms. Shelly Abajian, and of the NRC Senior Resident Inspector for Diablo Canyon, Mr. Christopher Newport, who were attending this meeting upon invitation of the Committee.

Dr. Lam recognized and welcomed Ms. Annie Aguiniga, Assistant District Director for State Senator William Monning. Ms. Aguiniga stated that Senator Monning was disappointed that the CPUC in adopting the Administrative Law Judge’s Proposed Decision concerning the Joint Proposal determined that it lacked authority to provide the local community with certain mitigation measures for the economic impact of closing DCPP. She stated Senator Monning is committed to introduce legislation to address issues in the CPUC’s Decision including the community impact mitigation proposal, the DCPP Employee Retention Program and to encourage renewable replacement energy. Ms. Aguiniga reported concerning SB 968, introduced by Senator Monning in 2015 that the CPUC is in the final stages of contracting with a third party evaluator to conduct an economic assessment of the effects of the closure of DCPP. She stated the Senator encourages the DCISC in continuing to provide public interaction and dialogue regarding decommissioning matters and the Senator hopes the Committee will continue to ensure safety and preparedness during decommissioning. Ms. Aguiniga thanked the DCISC on behalf of Senator Monning for its continued oversight and efforts to maintain the safety of the San Luis Obispo area. The Chair thanked Ms. Aguiniga for her remarks.

**XVIII Information Items Before the Committee**

Dr. Lam requested Mr. Harbor to introduce the next presentation and presenter to the Committee. Mr. Harbor introduced the next PG&E speaker, Mr. Hossein Hamzehee, Manager of Regulatory Services at DCPP and reported Mr. Hamzehee has more than thirty years of nuclear experience including serving at the level of a Branch Chief in the NRC and Mr. Hamzehee holds a Master of Science Degree in Mechanical Engineering.

**Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC**
Notices of Violation and Issues Raised by NRC Resident Inspectors.

Mr. Hamzehee reported DCPP is rigorously inspected by the NRC and the plant is committed to the highest standards of safety and to continually reevaluating its operations and emergency plans. He stated his report to the Committee would cover the period from October 2017 through January 2018 which represents approximately 1,600 hours of NRC inspections and during this period DCPP met all Green performance standards as measured by the NRC Performance Indicators. During this period DCPP received one violation from the NRC which was categorized as of very low safety significance. Mr. Hamzehee briefly discussed some of the Performance Indicators and provided a summary of the indicators, which are also available to members of the public on the NRC’s website, including:

- Unplanned Scrams per 7000 Critical Hrs
- Unplanned Power Changes per 7000 Critical Hrs
- Unplanned Scrams with Complications
- Safety System Functional Failures
- Mitigating Systems Performance Index, Emergency AC Power System
- Mitigating Systems Performance Index, High Pressure Injection System
- Mitigating Systems Performance Index, Heat Removal System
- Mitigating Systems Performance Index, Residual Heat Removal System
- Mitigating Systems Performance Index, Cooling Water Systems
- Reactor Coolant System Activity
- Reactor Coolant System Leakage
- Drill/Exercise Performance
- ERO Drill Participation
- Alert & Notification System
- Occupational Exposure Control Effectiveness
- Radiological Effluent Occurrence

Dr. Budnitz observed the DCISC receives monthly reports on the NRC Performance Indicators.

Mr. Hamzehee reported one Licensee Event Report (LER) was issued during October 2017, this was associated with relief valve leakage and an inoperable pressurizer power-operated relief valve. He reported safety significance of licensee violations is characterized by the NRC as Green (very low), White (low to moderate), Yellow (substantial), or Red (high) safety significance with respect to core damage frequency.

Mr. Hamzehee reviewed the violation received during the period of his report, a
non cited violation (NCV) identified by one of the NRC Resident Inspectors for failure to properly identify and correct a relief valve leakage in a timely manner. This occurred when a relief valve on the Unit-2 nitrogen accumulator for the pressurizer, which maintains and adjust pressure in the Reactor Coolant System (RCS), was found to be leaking nitrogen which is used as backup for the instrument air supply to the three pressurizer relief valves. DCPP replaced the valve and performed a cause evaluation which identified inadequate guidelines in procedures for installing the nitrogen bottles. In response to Dr. Lam and Dr. Peterson’s inquiries, Mr. Hamzehee reported the leakage was initially identified due to a self-revealing reduction in oxygen in Unit-2 Containment which resulted in an alert being declared associated with low levels of oxygen in Containment. Mr. Harbor characterized this as a missed opportunity to have more aggressively pursued the issue and DCPP is now performing more extensive monitoring of the atmospheric conditions inside containment.

Dr. Peterson observed the alert provided an opportunity for the Emergency Response Organization to focus on a real scenario which did not involve the release of radioactive material which, although a focus of many emergency exercises, is not statistically likely to occur. He observed training on scenarios which often involve making recommendations to evacuate in response to a postulated event can reinforce an incorrect response to an actual event. Dr. Peterson remarked that precautionary evacuations always involve some risk and should not be part of an automatic response. Dr. Peterson observed it is good that the threshold for activating alerts is set low enough that alerts happen from time to time but he stated, and Mr. Hamzehee confirmed, that one of the responses to this event was for DCPP to seek and obtain NRC approval to change the criteria for alerts. Dr. Peterson remarked that the experience during the evacuation due to the recent fires in Sonoma and Napa Counties was disastrous when 40 persons died. He remarked that the San Luis Obispo County Office of Emergency Services is a highly competent organization and the experience of evacuations in the southeastern area of the United States demonstrates that evacuations can be done effectively. Dr. Budnitz remarked he was not convinced that triggering action based upon low safety significant events was desirable though he agreed that identifying them is.

Mr. Hamzehee reported three NRC inspection reports were issued since the last DCISC public meeting:

- NRC Inspection of Implementing Strategies and Emergency Preparedness Plans to Address Fukushima Event (2017-007, 01/24/18).

In response to Dr. Budnitz’ inquiry Mr. Hamzehee reported the NRC is continuing
to develop requirements for ongoing inspections related to FLEX and DCPP has benchmarked with other nuclear power plants regarding lessons learned concerning the implementation of FLEX strategies. Dr. Budnitz reported that another nuclear power plant completed a probabilistic risk assessment (PRA) pilot study of the integration of FLEX equipment into emergency planning and the reports of which Dr. Budnitz is aware show, as might be expected, a substantial positive effect in decreasing the probability of some of the more important accident scenarios. Mr. Hamzehee reported that DCPP has not taken credit for FLEX in its risk models because the NRC has not endorsed the methodology and FLEX equipment is not included within the NRC’s Maintenance Rule. Dr. Budnitz stated it is his understanding the Nuclear Energy Institute (NEI) will produce a report on recommended methodology that may be embedded with input and a broad-based consensus from the industry, the NRC, universities, and national laboratories as well as from representatives from around the world, within an American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) standard which would be used by all the sites and done under auspices of a Standards Committee which Dr. Budnitz co-chairs.

Dr. Gene Nelson, representing Californians for Green Nuclear Power, was recognized. Mr. Hamzehee reported, in response to Dr. Nelson’s inquiry, that although FLEX equipment is not within the NRC Maintenance Rule it is properly and regularly maintained and programs are in place to do so. Dr. Budnitz reported when the PRA analyses are completed much will be learned about maintenance frequencies. Dr. Peterson remarked that FLEX equipment should not be subject to the same requirements as safety-related equipment because its purpose is to be available to address residual risk from accidents that are outside a plant’s design basis and when FLEX strategies are called for, plant staff should have the training and authority, and not be under any constraint in the use of all available resources. Dr. Peterson observed this issue represented a major failure during the accident to the Fukushima Daiichi Nuclear Power Plant in Japan when lack of authority to enter accident management guidelines, which plant personnel believed to be necessary, prevented effective mitigation and it was the actions taken in spite of these constraints by the plant staff who, although they had not been given training in the necessary procedures or any resources, acted to save the plant in spite of abysmal leadership. Dr. Peterson stated it would be a huge mistake to have FLEX equipment be treated as safety-related equipment but instead it should be given special treatment related to maintenance and testing to ensure a high level of reliability and plant staff would have the authority, training and responsibility to enable them to take actions they judge to be necessary to maintain plant safety.

Dr. Nelson closed his comments by observing that a system that triggers alerts too frequently can both desensitize and unnecessarily alarm the public.

Mr. Harbor introduced the next PG&E speaker, Mr. Hector Garcia, the Chief Nuclear Officer Support Manager, and stated Mr. Garcia has more than seventeen years of
nuclear experience.

Results of the 2017 Operating Plan and Key Elements of the 2018 Operating Plan.

Mr. Garcia stated that the DCPP Operating Plan is designed to formulate strategy on how the plant will operate in the future and to obtain alignment from the employees who are all considered team members. He stated that safety is at the forefront and the strategies embodied in these concepts and described in the “OUR TEAM” motto, are intended to pursue and achieve operational excellence. He described the OUR TEAM concepts as follows:

The three nuclear tactical focus areas include:

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<th>Outage and online reliability improvements;</th>
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<td>U</td>
<td>Use of human performance tools and performance improvement processes; and</td>
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<td>R</td>
<td>Reinvigorating employee engagement.</td>
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The Operating Plan also consists of four nuclear strategic focus areas:

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<th>Transfer and retain critical knowledge;</th>
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<td>E</td>
<td>Enhance Facilities;</td>
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<td>A</td>
<td>Achieve a better work-life balance; and</td>
</tr>
<tr>
<td>M</td>
<td>Maintain safe, reliable and affordable operations.</td>
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Regarding outage and online reliability improvements, including preparation for the 1R20 and 2R20 refueling outages, Mr. Garcia stated preparations were thorough and included use of human performance tools and performance improvement processes by supervisors in the field to leverage leadership. The 1R20 outage was of a longer duration due to planned replacement of baffle former bolts and installation of a permanent reactor cavity seal. Outage 2R20 will commence during the next weekend and has required many hours of preparation. He stated the Corrective Action Program (CAP) continues to provide a venue for the timely identification and resolution of issues and bridging strategies are put in place until issues involving safety are resolved. Mr. Garcia commented the use of human performance tools has resulted in 2017 being a very safe year with no recordable injuries and both units operating reliably. He reported reinvigoration of employee engagement is addressed through the DCPP Excellence Plan, the Premier Survey, which provides feedback from employees, and implementation of an action plan to address and communicate resolution of concerns raised by employees. In response to Consultant McWhorter’s inquiry, Mr. Garcia stated the Premier Survey is usually conducted biennially. Mr. Garcia stated DCPP has continued its Crucial Conversations Program with training that reinforces behaviors which improve the safety culture.
Mr. Garcia stated tactical considerations for the Operating Plan involve transfer and retention of critical knowledge through workforce retention planning and succession planning for critical positions. Mr. Garcia reported plant facilities have been enhanced including completion of Building 113 to house the plant’s Fitness for Duty and Fire Departments, remodeling Building 102 for Mechanical Maintenance, and relocating the Fix It Now Team to Building 104.

Mr. Garcia reported efforts to achieve a work-life balance through continuous improvement and prevention of operational challenges is continuing and this also involves risk awareness and mitigation. Dr. Budnitz remarked that the term “work-life balance” is closely related to the use of overtime. In response to Dr. Budnitz’ request, Mr. Garcia described the initiative called “Delivering the Nuclear Promise” as intended to help simplify processes and to continue improved performance and he used the CAP as an example of one component, as well as the prioritization of Notifications which provide initial input into the CAP. **Dr. Peterson remarked that, as this initiative has the potential to provide significant opportunities to improve performance in Operations, Engineering and Maintenance organization, this is an important and interesting initiative for the DCISC to review in fact-finding as it may provide a mechanism to enhance safety and mitigate potential future retention problems.**

Mr. Garcia reviewed the efforts to maintain a disciplined approach to safe, reliable and affordable operations and he observed the Investment Review Process is an important component as was the replacement of the Spent Fuel Pool Bridge Crane.

Mr. Garcia reviewed safety and human performance data and results achieved as compared with the goals set for 2017 and reported there were no industrial safety accidents and no human performance station clock resets during 2017. He reported the industrial safety accident rate is measured against the number of accidents resulting in lost work for every 200,000 worker hours while the station clock reset rate reflects the incidence of human performance events that meet clock reset criteria. Plant reliability and outage performance data shows a goal for the Equipment Reliability Index, which is used to gauge the health of equipment to ensure safe and reliable operations, of \( \geq 90 \) with 99.0 achieved; an Online Reliability Loss Factor goal of \( \leq 0.52\% \) with 0.22\% achieved; and a refueling outage duration goal of \( \leq 75 \) days with the 1R20 outage completing in 61 days. The plant performance index and NRC metrics reflected a goal of \( \geq 89.1 \) for the Reliability and Safety Indicator Index, made up of 11 sub-components, with performance achieved of 93.5 and both DCPP units have now been returned to Column 1 on the NRC Action Matrix with no cross-cutting issues identified. Mr. Harbor remarked that in terms of goal setting, DCPP aligns its goals around industry performance and sets them according to the top quartile or top decile industry performance measures.

Dr. Budnitz observed that having had no injuries for the many hours of labor performed at DCPP during 2017 represents a remarkable achievement and is indicative of DCPP’s efforts to protect the health and safety of its employees. Dr.
Peterson remarked this performance greatly exceeds, by a factor of more than ten, the rate of injuries for business or financial industry workers or for workers employed at fossil fuel plants and is indicative of DCPP and the nuclear industry having set the bar very low for these metrics. Dr. Peterson stated this commitment required support on the part of the NRC as the industry regulator, as many thousands of Notifications are created in the CAP each year, some concerning very minor issues, and rather than being indicative of an industry beset with problems they are part of a strategy to improve safety and therefore should not incite skepticism by the public as to do otherwise would risk creating a chilled environment for reporting problems and be detrimental to safety. The NRC has contributed to supporting improved safety by not punishing the plant or the employee for reporting minor issues and the important metric is ensuring the CAP is functioning effectively so as to preclude recurrence of the same problem and thereby to build a strong safety culture. In response to Consultant McWhorter’s inquiry as to the plant’s exceptional performance concerning the industrial accident rate, Mr. Garcia stated the results are due to total engagement and ownership by employees and the use of effective human performance tools. Mr. Harbor commented that DCPP employs a significant number of contractors and leadership works hard to communicate DCPP’s values and to make very clear the expectation that if something is not going as planned or there is the potential for a safety issue the expectation is that work will stop until it is resolved and before anyone is injured.

Mr. Garcia summarized his presentation by stating that 2017 was an outstanding year with a capacity factor achievement of 91.5% and a lost workday case count of 0. These results were achieved safely and affordably and the plant continued to conduct injury free outages with a strong focus on employee engagement to continuously improve teamwork and safety culture. Strong personnel, safety, plant reliability and outage performance continue to support DCPP’s employees and customers and the focus will continue during 2018 to engage Our Team principles and to further enhance performance. Mr. Garcia reported the 2018 Operating Plan Update is under development and key elements will include safety, reliability, and affordability over the next three years, compliance and risk, people, and regulatory and external strategies. Mr. Garcia confirmed Mr. Wardell’s request that the DCISC be afforded an opportunity during its March 2018 fact-finding to review the 2018 Operating Plan.

Following Mr. Garcia’s presentation, Ms. Jane Swanson of the group San Luis Obispo Mothers for Peace was recognized. Ms. Swanson observed there is a certain tension between the terms “safe” and “reliable” and Mothers for Peace is concerned that PG&E might be willing to sacrifice safety and reliability in order to cut costs. She remarked that PG&E’s plans, set forth in a document entitled “Cancelled Orders” which she offered to provide to the Committee, to conduct work arounds to avoid replacing 81 aging components and systems at DCPP which have been demonstrated to be already failing or aging and might be indicative of breakage or failure that could lead to safety problems. She challenged the logic of
dividing systems into safety-related and non safety-related as all plant systems interact. Dr. Budnitz remarked there is always tension between safe and reliable operations and affordability and this has been exacerbated at DCPP due to the current environment where the plant has only a short time to continue to operate. He noted that the DCISC is charged with making its own evaluation of the extent to which any compromises affect safety. Dr. Peterson remarked and Dr. Budnitz agreed there is a natural set of business incentives for the plant operator to try to achieve high reliability as the frequency of forced outages must remain low and the generation availability high. Dr. Peterson observed there are some systems such as fire protection which do not directly affect plant reliability and the Committee spends considerable time assessing the adequacy of investment in those areas but for large segments of the plant there is a strong alignment between reliability and affordability. Dr. Budnitz observed that it is not necessarily the case that old equipment is inadequate as given proper maintenance older equipment can perform as well as newer equipment and this too is an area important for the DCISC to review. Dr. Lam remarked that DCPP is keenly aware of the issues discussed by Drs. Peterson and Budnitz concerning capital allocation and has demonstrated that a decision to keep using older equipment must be based upon several deliberate, systematic and well-developed criteria including the availability of spare parts, the reliability record of the equipment in question, and its ability to continue to meet all functional requirements, Consultant Wardell directed Ms. Swanson’s attention to the presentation to the Committee at its October 2017 meeting on Classification of Systems Structures and Components and the requirement that every piece of equipment at DCPP must be categorized, classified, designed and maintained, from the most highly safety-related to the non safety-related equipment. Mr. Garcia responded to Ms. Swanson’s comments by observing that the terms safe, reliable and affordable are used at DCPP in the conjunctive not the singular, that is, safe and reliable and affordable, and safety never has nor will be compromised.

A short break followed.

**XIX Consultant Report and Receive, Approve and Authorize Transmittal of Fact Finding Report to PG&E (Cont’d)**

The Chair requested Consultant Wardell to report on the January 18–19, 2018, fact-finding visit with Dr. Lam to DCPP.

- **Observe Operator Rounds in the Plant** - Mr. Wardell reported the DCISC accompanied a nuclear operator on an inspection of Emergency Diesel Generator (EDG) 1-3 including observing the pre job briefing, procedure review, safety advisement and the use of personal protection measures. The DCISC representatives then accompanied the operator on a general walkdown of EDG 1-3 to inspect for leaks and to record data using a preprogrammed, hand-held electronic device to verify acceptance criteria for various parameters which data was later downloaded into the plant’s computer system. Mr. Wardell reported the plant was clean, the operator followed
procedures and used appropriate human performance tools and good safety practices.

- Meet with NRC Senior Resident Inspector - the DCISC fact-finding team discussed with the Senior Resident Inspector a leak in the suction piping for Main Feedwater Pump No.2 on Unit-2 which created a steam spray and the efforts to repair the leak temporarily and then permanently during 2R20; the NRC’s evaluation of the hazard from flooding caused by locally intense precipitation and tsunamis; NRC Generic Safety Issue (GSI) 191 concerning containment debris; the status of the fire doors; and the NRC’s inspection of post-Fukushima beyond design basis FLEX equipment.

- Radiation Monitoring System - Mr. Wardell reported this system consists in part of original equipment, both analog and digital, installed during the 1980s and 1990s. He reported DCPP had considered upgrading the entire system but as the plant is not seeking to be relicensed, the capital project review process determination was the upgrade was not necessary as the system is functioning satisfactorily and is under the NRC Maintenance Rule Program with sufficient vendor and spare parts availability. The DCISC team agreed with this determination.

- Quality Verification (QV) Assessment of Outage 1R20 Seismically Induced System Interactions (SISI) - Mr. Wardell stated the SISI Program protects seismically important equipment from other equipment which is temporarily stored in the vicinity of the seismically sensitive equipment or is temporarily installed during outage activity. Such equipment is required to be assessed to assure that it will not affect seismically important equipment. Mr. Wardell stated DCPP has experienced some challenges related to scaffolding during 1R20 and a QV audit determined the issues related to a lack of procedural clarity in obtaining proper approvals during the initial stages of the SISI Program requirements. These procedures have been clarified and the DCISC team found the changes to be reasonable.

- Quality Assurance (QA) 2017 Audits and 2018 Audits Plans - QV reviewed with the DCISC representatives the audits conducted by QA during 2017 and the audits planned for 2018. Mr. Wardell described these as very high level, resource intensive activities which occur on average twelve times each year. The DCISC fact-finding team found the QV audits for 2017 and the plans for 2018 to be satisfactory as regards breadth, depth and the plant programs selected for audit and concluded the QA audit program remains effective.

- NRC Evaluation Report of DCPP Flood Hazard Reevaluation - the DCISC team reviewed the NRC Staff Assessment for both tsunamis and locally intense precipitation. Dr. Budnitz commented with reference to locally intense precipitation, that is, heavy rainfall, as this could cause Diablo Creek to overflow its banks and flood structures at the plant it was determined, although sandbags were pre deployed as a precautionary measure they were not needed as the analysis concluded that even in the event of locally intense precipitation the plant’s design basis relative to a large pipe break event was
adequate to protect systems and equipment within structures and therefore the plant was already adequately protected and this conclusion was accepted by the NRC.

- NRC Regulatory Issues Status - Mr. Wardell reported the DCISC representatives met with NRC regulatory staff to discuss the GSI-191 issue on containment debris; the EDG system health, the 230kV emergency power system; plant modifications to address the open phase power issue; Control Room habitability, the NRC re inspection concerning the White finding regarding the Residual Heat Removal System valve; cyber security; and the reevaluation of the spent fuel pools which the NRC is now reviewing and the DCISC will review during future fact-finding.

- Meet with Vice President, Nuclear Generation and Chief Nuclear Officer - Dr. Lam reported that at the time of the fact-finding visit Mr. James Welsch had only recently assumed the position of Chief Nuclear Officer and he and his senior management staff were concentrating on the CPUC Decision on the Joint Proposal issued on January 16, 2018.

- Capital Projects Review Status - Mr. Wardell reported the Project Review Working Group has reviewed hundreds of capital projects to assess their importance in order for the plant to operate successfully through 2025. Their recommendation was provided to the Executive Oversight Board and as a result 45 projects were cancelled. Mr. Wardell reported the generator stator project for Unit-2 was not cancelled and will be performed but the upgrade to the Eagle 21 Plant Protection System has been cancelled. The fact-finding team reviewed the 45 cancelled projects and concluded their cancellation would not have a negative impact on nuclear safety or plant reliability.

- Equipment Reliability Process Status - Mr. Wardell reported that in July 2015, equipment reliability was showing less than positive results associated principally with capacity factor capability. At that time the Equipment Reliability Process was reassigned away from the Engineering organization to director-level management which resulted in the Engineering organization being joined by the Operations and Maintenance organizations to focus jointly on equipment reliability issues. This effort was successful and as of January 2018, Mr. Wardell reported performance was improved such that Equipment Reliability Process oversight has been returned to the manager level in the Engineering organization. Mr. Wardell displayed and briefly discussed the Equipment Reliability Index and reported that the Index is expected to return to all Green status by the middle of 2018.

Upon a motion by Dr. Peterson, seconded by Dr. Lam, the January 18-19, 2018 Fact Finding Report was accepted and its transmittal to PG&E authorized.

**XX Legal Counsel Report and Committee Discussion**

Dr. Lam requested Mr. Rathie to make the next presentation.
Administrative, Regulatory and Legal Matters Including Discussion of a Potential Role for the Committee after Expiration of the Operating Licenses.

Mr. Rathie reported on January 11, 2018, the CPUC Commissioners approved by a unanimous vote the Decision which would result in the retirement of DCPP by 2025, and that the Decision was issued officially on January 16, 2018, and is available for review on the Committee’s website at www.dcisc.org.

Mr. Rathie remarked the matter of whether the DCISC will have a role after the plant ceases generating electricity was raised by several members of the public during the Committee’s public meeting in October 2017 and at that time the Members directed information be provided at this meeting. Mr. Rathie reported the Restated Charter for the DCISC is very broad and grants the Committee the mandate to review and make recommendations for the safe operation of the plant. He presented and discussed with the Members and Technical Consultants a list of the reasons why a continuing role for the Committee following the cessation of generation operations might be appropriate and reasons why the Committee might cease its activities at that time as follows:

Reasons for the Committee to Continue:

- To provide a means for continued receipt of independent, informed, expert assessments on a regular basis concerning the safety issues related to decommissioning and the handling and storage of spent nuclear fuel.
- To enhance transparency concerning safety issues related to decommissioning activities and the handling and storage of spent nuclear fuel as opportunities for the State of California and the public to interact with the NRC concerning these issues are limited.
- To maintain the ability to receive and disseminate information from PG&E on an important matter of local and statewide concern.
- To continue to review activities with the potential for radiological dose consequences.
- To review the discharge of the final operational cores and their placement in the spent fuel pools and to continue to review the safety issues related to the movement of spent fuel from the spent fuel pools to the Independent Spent Fuel Storage Installation (ISFSI) and ISFSI operations.
- To continue to review the safety issues related to the storage of spent fuel, some of which will remain in the spent fuel pools for approximately nine years following shutdown and will require active components and backup systems for heat removal.
- To continue to review, assess and provide recommendations concerning operations which support achieving adequate safety during decommissioning, including but not limited to plant staffing, the spent fuel pools and the
Auxiliary Saltwater System.

- To continue to provide information regarding the safety issues related to the onsite storage of other highly radioactive materials and preparations for transport of any of those materials to an offsite repository.
- To continue to work with PG&E to ensure the highest priority is given to the safety of decommissioning operations and to the safety of the handling and storage of spent nuclear fuel at DCPP.

Mr. Rathie then reviewed reasons why the Committee might not continue its activities following the cessation of generation operations as follows:

- California might be better served by a statewide oversight committee that would have a comprehensive mandate to review safety issues related to the storage of spent fuel and highly radioactive materials associated with all decommissioned nuclear power plants in California.
- The decommissioning process itself poses low safety risk to both workers and the public.
- The risk to public health and safety when all fuel is removed from the reactor core and is in wet and dry storage is significantly less.
- Once all fuel is in dry storage only passive heat removal is required and the risk to public health and safety is significantly less than during the period when any fuel remains in the wet storage.
- The NRC regulates and provides oversight of radiological aspects of the decommissioning process.
- Some issues arising during the decommissioning period will be of great interest and importance to the local community and State regulators but will not involve nuclear safety and therefore, should remain outside the DCISC’s purview, e.g., future land use and the impact of plant closure on the local economy. This may lead to misunderstanding and frustration for the community concerning the role and the need for continuing the DCISC.
- A Community Engagement Panel will be formed to provide the local community and the State with all the access needed to information concerning decommissioning.

Mr. Rathie observed that the Committee has not identified any particular urgency in addressing the issue of a post-shutdown role and it is not disputed that the Committee will continue to have an operational review role for so long as the plant generates electricity and as that role continues the Committee will of necessity become better informed about decommissioning issues and this will serve to better inform any recommendation the Committee might eventually decide to offer regarding a post-shutdown role.

Dr. Peterson remarked that as the members of the DCISC serve staggered, three-year, appointment terms it will be important to have clarity and guidance on the
Restated Charter no later than three years before the cessation of generation operations to enable an orderly transition to whatever continuing role the DCISC might have. Dr. Peterson observed the Open Items List would change significantly and any decision the Committee may take should therefore be under consideration by 2022 so that subsequent appointment of members would be in accord with any continuing long term role. Dr. Peterson stated that in his opinion the Committee’s actions in the near term will better inform it as to a future role and the time is not ripe yet for a final decision.

Dr. Lam stated he fully concurred with Dr. Peterson and he observed the three State of California authorities charged with appointing the members of the DCISC, the Governor, California Energy Commission and the California Attorney General will each have a duty and an obligation as to how to prescribe duties and expectations for a member of this Committee.

Dr. Budnitz stated he disagreed with Drs. Peterson and Lam in that Dr. Budnitz believes the time is now ripe to clarify the work the Committee should be doing even if the time is not ripe for an assessment of a post-2025 role. Dr. Budnitz stated there is presently a group within PG&E that is planning for decommissioning with regard to both managerial and business-related aspects as well as technical issues. Dr. Budnitz stated in his view it is essential that the Committee’s present scope include review to assure that decommissioning planning and activities do not have an adverse effect on operational safety. Dr. Budnitz commented that it is not clear yet to him whether the present scope of DCISC’s review should extend to the evaluation or review of the planning activities for decommissioning but it was his opinion that the Committee should not divert much of its attention to reviewing those plans and it is, at present, an open question as to whether the Committee should exist at all after cessation of generation. If, by the last two or three years of operation, a post-shutdown role for the DCISC is identified then the Committee can review the planning for decommissioning in much more depth.

San Luis Obispo County Supervisor Bruce Gibson was recognized to address the Committee. Supervisor Gibson stated the residents of San Luis Obispo County (County) have a very keen interest in the safety of the plant and appreciate the efforts of the DCISC. He remarked that an important aspect of a continuing review role for the DCISC will be to assess the ability of PG&E to retain properly qualified and experienced staff and in its recent Decision to close the plant the CPUC declined to approve all of funding requested by PG&E to provide the employee retention financial incentive portion of the Joint Proposal. Supervisor Gibson stated the County is pursuing legislation to address this funding shortfall and well as the $85 million to address the economic impact on the local area from the closure of DCPP which was not approved in the Decision. Supervisor Gibson remarked the County is grateful to know that PG&E has agreed to maintain funding for emergency operations at the level of approximately $1 million per year and the County maintains a very robust Office of Emergency Services (OES).

Supervisor Gibson stated a principal concern of the County is the storage of spent
fuel both in the spent fuel pools and in dry cask storage and he commented that he continues to have questions regarding racking design in the spent fuel pools which has increased their capacity to almost double the original design. He remarked he understood there were issues of heat transfer involved but there remain questions about the changes from their original configuration. However, he remarked ensuring the spent fuel pools are able to be kept cool in the event of a natural disaster is essential as well as the need to continually assess the safety of the dry cask storage systems. Supervisor Gibson stated he was hopeful that perhaps the Committee might also take on a review role in the future concerning the transportation of spent nuclear fuel to locations outside the County. Supervisor Gibson stated, on behalf of the County, that he looks forward to continuing interaction with the DCISC.

Dr. Peterson stated that Supervisor Gibson’s comments align closely with the Committee’s discussion today and the issue of the technical means to transport spent nuclear fuel by barge or rail or by road to a consolidated storage facility is important but there is some level of confidence that this could pose a very low risk of having to repackage the spent fuel prior to transport. Dr. Peterson observed that once the spent fuel pools are decommissioned the ability to repackage is not completely lost but it becomes much more difficult. Dr. Peterson remarked some confidence is gained in that the transportation canisters are designed not to rely on the leak integrity of the multipurpose canisters. Supervisor Gibson, who holds a Doctoral Degree in Geophysics, stated the more assurance the Committee can provide as to the safety and security of the transport of spent nuclear fuel would be of great benefit to the local community. Dr. Peterson observed that an encouraging development, when the federal government develops the capability and provides the approval to ship spent fuel, is that the fuel from decommissioned reactor sites will almost certainly be given some level of priority so there will be a question as to which of California’s decommissioned nuclear facilities would be the first to ship its spent fuel offsite. Dr. Gibson observed that risk assessment will be important in this context.

Dr. Budnitz stated that Dr. Gibson would be pleased to know one of their fellow colleagues, Dr. Norman Abrahamson, PG&E’s Geosciences organization Chief Scientist, has recently been elected to the National Academy of Engineering.

Dr. Budnitz observed there is some ambiguity in the interplay between the State and the County’s authority with reference to the movement of spent nuclear fuel and the DCISC could play a useful role, along with the OES, to assure the activities do not produce radiological consequences. Dr. Budnitz stated that it is presently understood that after the plant shuts down there will be a period of up to nine years during which fuel will remain in the spent fuel pools and during that period there is a certain probability of an accident which could produce a radioactive release and the DCISC wants to make sure that is averted and remains at an acceptably low risk and this is a separate issue from a review of decommissioning activities. Supervisor Gibson, who also serves on the CPUC’s Independent Peer Review Panel (IPRP) which is charged with reviewing seismic studies for DCP,
suggested and Dr. Budnitz agreed that the IPRP would have a role in review of these issues. Dr. Peterson commented that while freshly discharged fuel has very high heat rates, with the heat rate for the spent fuel more than doubling upon discharge of a full core offload, the heat rate falls off rapidly over the subsequent several months and after 18 months the fuel inventory in a spent fuel pool is cooled sufficiently such that its heat generation is actually lower than the heat generation of the freshly offloaded fuel. Dr. Peterson stated it is necessary to identify the point in time where a threshold is reached where water is needed in a pool to prevent reaching the temperature at which damage to the fuel and potential oxidation of zirconium might occur because there is a point, even with tightly packed racking, where qualitatively the safety of the pool and the requirements for water and backup capability will change and once in dry cask storage, the safety with respect to accidents that could mobilize significant amounts of radioactive material is very high.

Supervisor Gibson commented his concern is not only the cooling of the most recent fuel but also that the continued and accelerated discharge of fuel from the spent fuel pools to dry cask storage is accomplished in such a manner so as to empty the pools as quickly as possible consistent with technical requirements. Dr. Peterson remarked the plant cannot proceed to full decommissioning until the spent fuel pools are decommissioned and no longer available and it is necessary to make sure there is an acceptable level of risk in not having an available pool.

Supervisor Gibson observed there are other components of a nuclear power plant that will need to be handled very carefully during decommissioning and these components may not get the same level of attention as spent fuel.

In response to Dr. Lam’s inquiry, Supervisor Gibson stated the County is seeking the cooperation of California Senate Majority Leader Monning and Assemblyman Cunningham to carry legislation to implement components of the Joint Proposal that were not approved in the Decision and there is some precedent for such legislation based on the 1997 deregulation of electricity in California and the resulting PG&E bankruptcy filing. While funding for those aspects of the Joint Proposal which were not approved in the Decision has not been determined, Supervisor Gibson stated his information is that the cost could be approximately twelve cents per month to the average PG&E ratepayer.

Ms. Jane Swanson of San Luis Obispo Mothers for Peace was recognized. Ms. Swanson stated she did not believe it to be premature for the DCISC to endeavor now to define a role for the Committee after the plant ceases generating electricity. She stated the CPUC Decision did not preclude an earlier closing date than 2024 for Unit-1 and 2025 for Unit-2 for economic or other reasons and the Decision requires PG&E to prepare for that contingency in the Integrated Resource Planning proceedings. Ms. Swanson stated she appreciated the list of reasons supporting a future role for the Committee and that Mothers for Peace was in agreement with them and has highly valued the DCISC and its role of providing insight into DCPP operations that are not otherwise available and for its
Ms. Simone Malboeuf was recognized. Ms. Malboeuf encouraged the Committee to include in its decommissioning review efforts to detect and mitigate any detectable residual radiation in the area. Dr. Budnitz responded and stated the technical plans for decommissioning a nuclear power plant must include addressing concerns over radioactivity in the environment to assure it is below acceptable levels and part of a potential role for the DCISC would be to review those plans.

Ms. Malboeuf stated the issue of transportation of spent fuel involves both expensive and difficult problems. Dr. Peterson replied that the experience in Europe in transporting spent nuclear fuel for reprocessing provides a solid basis on which to view the issue and in the United States the experience with moving spent fuel for the U.S. Navy will serve to inform the procedures. There have been no accidents which have caused harm with respect to radioactive releases in either Europe or the U.S. In response to Ms. Malboeuf’s observation, Dr. Peterson stated PG&E retains legal title to the spent fuel and retains the responsibility for its safe management but as the U.S. Department of Energy is in breach of certain contractual agreements requiring the Department of Energy to remove spent fuel, all costs associated with the storage of spent nuclear fuel are recovered by the utilities from the U.S. Government. He remarked as the money comes from the Government’s judgment fund and does not count against budget rules, there is no incentive for Congress to take action to address the problem. If Congress were to appropriate funds under the Nuclear Waste Policy Act those funds would count against the budget so the system at present is set up to create incentives not to solve the problem of the lack of a centralized repository for spent nuclear fuel. Dr. Peterson stated the technical viability of transporting and providing geologic disposal of spent fuel is robust and there is an operational geologic repository operated for transuranic waste. Dr. Budnitz stated the effort to create a geologic repository at Yucca Mountain, Nevada, resulted in the Department of Energy developing a license application which was reviewed and included a technically analyzed plan for transportation from the plant sites to Yucca Mountain which is available for review by the public. Dr. Budnitz remarked the NRC continues to regulate transportation of nuclear waste and if there are specifics developed for transportation of spent nuclear fuel from DCPP the Committee, if it is still functioning, will review them.

Dr. Gene Nelson identified himself as a radiation biophysicist and stated the earth is a very radioactive planet and there are inhabited locations which have levels of radioactivity greater than in the area of the Chernobyl nuclear plant which have thriving wildlife and no increased incidents of sickness.

Dr. Justin Cochran, the California Energy Commission’s Senior Nuclear Policy Advisor, was recognized. Dr. Cochran reported California Energy Commission Chair, Dr. Robert B. Weisenmiller, serves as the State’s liaison officer to the NRC and is responsible for Dr. Lam’s appointment to the DCISC. Dr. Cochran stated Dr. Weisenmiller has been consistently engaged with federal agencies on issues.
pertinent to California nuclear facilities including the NRC’s recent power reactor decommissioning rule making and that DCPP will be the first California nuclear facility to fall under the new decommissioning rules. Dr. Cochran remarked DCPP’s location on California’s seismically active coastline, in a populated area, requires a high level of safety and independent review by experts and the host communities and other stakeholders seek a decommissioning process that is public, open, safe and timely. He remarked the DCISC provides a public and open approach, specific plant experience, and independent technical judgment to provide a forum that the State, the local communities and the public can utilize in navigating through critical stages of the decommissioning process. Dr. Cochran reported that Dr. Weisenmiller will review the information presented today and provide his thoughts and recommendations within thirty days in the form of a letter to the Committee. In closing, Dr. Cochran thanked the Committee and its staff for the excellent work performed in support of the DCISC Charter.

Dr. Peterson directed that the Committee Technical Consultants and Assistant Legal Counsel review the Open Items List and determine which types of activities would be expected to continue after cessation of generation and which would continue but in a changed format. Dr. Peterson remarked that it was his opinion that it would be useful to review the planning process for decommissioning as it is central to a determination of the question of what role the DCISC might play during the decommissioning process and for the long term. He observed this could assist the Committee in proving a more specific description of what a future role and scope of DCISC activities might include. Consultant Wardell commented that Mr. Rathie’s presentation includes a preliminary conclusion. Mr. Rathie observed that a slide preliminary to that conclusion stated that once all spent fuel is moved to the ISFSI there should be no active operations at that point and the use of natural convection to remove heat from the spent fuel and the robust design of the facility itself makes the risk to public health and safety significantly reduced and the Committee is presently assessing if an independent review role may no longer be necessary including review of cask corrosion, ISFSI security, emergency preparedness and transportation. On that basis, the preliminary, interim conclusion developed by the Consultants and Mr. Rathie was set forth as follows:

“With the information available to it at this time, the DCISC preliminarily concludes that while electricity generation operations continue it is reasonable to continue an assessment of a review role for the DCISC after electricity generation ceases, but with a reduced scope during the period when spent fuel is in storage in the spent fuel pools and movement of spent fuel is occurring on the site, and for the DCISC to then cease its activities entirely when the last fuel has been removed from the spent fuel pools and stored in the ISFSI.”

Consultant Wardell observed that this preliminary conclusion may form a basis for creating a revised Open Items List of activities the Committee might review.
Mr. Rathie reported that at some point in the future the Committee might want to consider taking action to inform the CPUC about any role that the Membership envisions for the DCISC following cessation of generation activities and to seek timely direction from the CPUC as to whether the Restated Charter should again be restated to include both review of safe operation during generation and safety of decommissioning activities after generation ceases, whether the Restated Charter as provided is adequate to that role, or whether the DCISC should terminate its role at that point or at some point in the future. He reported that regulatory counsel consulted in this inquiry has opined that the best method of seeking a determination by the CPUC would be for the Committee to file an application and the time for a decision could be anywhere from six months to one year. Dr. Lam observed he is in agreement with Dr. Peterson that the time is not yet ripe to take these steps. Dr. Budnitz stated he was not in accord with Drs. Lam and Peterson as he does not believe it is too soon to ask for an opinion on the Restated Charter from the CPUC, Governor, the Attorney General and the Chair of the California Energy Commission as this would assist in clearing the air on the matter. Dr. Budnitz discussed the issue with Dr. Lam and Dr. Peterson and commented that in his opinion it would not be useful to review PG&E’s initial plans for decommissioning DCPP as they are too preliminary but rather the Committee should review current decommissioning activities as input into the revised, post-shutdown, draft Open Items List.

Dr. Peterson remarked that at the October 2017 public meeting the Committee discussed engaging a consultant on an ad hoc basis to review decommissioning issues and the consultant could assist in developing the revised Open Items List. In that effort, Dr. Budnitz reported that he identified several persons who might be qualified and available to serve as a consultant. Consultant McWhorter suggested a matrix format for the revised, post-shutdown role which would list various activities against the pre-cessation, post-cessation while fuel remains in the pools, and post-spent fuel pool operations timeline. He commented this effort could also assist in identifying gaps to the Committee’s present knowledge. Dr. Budnitz stated that he believed a consultant would be helpful in that context and it was agreed that the subject of engaging a consultant to assist in developing a review of decommissioning activities would be deferred to the June 13–14, 2018 public meeting but in the interim, before the June 2018 public meeting, the Technical Consultants and Assistant Legal Counsel should develop the decommissioning matrix described by Consultant McWhorter and a fact-finding should be conducted to review PG&E’s plans for decommissioning.

Dr. Peterson remarked it will be important for the Committee to avoid duplicating ratepayer funded activities which PG&E is planning to undertake relative to decommissioning. The Members also discussed confirming their intention to invite Dr. David Victor, the Chair of the San Onofre Community Engagement Panel, to
the DCISC’s June 2018 public meeting. Dr. Budnitz stated he did not agree with Drs. Lam and Peterson that the Committee defer a decision on the engagement of a consultant to review decommissioning until June 2018. Dr. Peterson commented that prior to the June public meeting it would be useful for the Members and the Technical Consultants to identify additional potential consultants, in addition to those previously identified by Dr. Budnitz. In response to Dr. Budnitz’ inquiry, Mr. Rathie confirmed that the engagement of a consultant for an ad hoc assignment to review decommissioning issues would need to take place during a noticed public meeting. In response to Dr. Budnitz follow up inquiry, Mr. Rathie stated that for such a meeting a quorum must be present in the jurisdiction, i.e., the State of California and there must be at least one member physically present at the principal location given for the public meeting.

XXI Adjourn Afternoon Meeting

Mr. Rathie summarized the direction provided during discussion of the previous item on the agenda and the Chair then adjourned the morning session at 12:00 Noon.

XXII Reconvene for Evening Meeting

The afternoon meeting of the DCISC was called to order by Committee Chair, Dr. Lam, at 1:00 P.M. Dr. Lam welcomed members of the public to the afternoon session of this, the eighty-ninth public meeting of the DCISC.

XXIII Committee Member Comments

There were no comments by the Members at this time.

XXIV Public Comments and Communications

M. Simone Malboeuf a resident of Los Osos, California, was recognized. Ms. Malboeuf stated she wished to share some recent information with the DCISC concerning wildfire activity in California and PG&E’s record in recent wildfires. She displayed a map she stated was released by CalFire which designated levels of risk in those areas subject to threat from wildfires including the recently devastated areas of Napa, Sonoma, Santa Barbara, Ventura and Los Angeles Counties. Ms. Malboeuf read excerpts from several news articles concerning PG&E’s safety record and history of violations, and responsibility for inadequate maintenance of power and gas transmission lines, negligence, or failing to identify or mitigate potential hazards concerning wildfires. Ms. Malboeuf commented that it was her belief that DCPP was located in an area designed as relatively high risk for wildfire. She reported the CPUC has also released a map showing the threat to utilities from wildfire and she observed wind can be a significant factor in such fires. Ms. Malboeuf reported that each investor-owned electric utility will now be required to file an annual report concerning the utility’s fire protection plan. Ms. Malboeuf stated the risk of fire at DCPP is not confined to within the plant itself but extends to the surrounding areas and includes the risk of potentially being exposed to
lethal amounts of radiation. She remarked that she joined other people in making a decision to leave the local area during the recent wildfire event in Santa Barbara County and she remarked on the limitations of the evacuation routes from the area of Los Osos which she stated makes her nervous for the future. Ms. Malboeuf questioned whether DCPP employees would report to work in the event of a local wildfire situation endangering the plant as well as their families. Ms. Malboeuf also inquired regarding the annual report which she believes PG&E is now required to file concerning its fire protection plan.

Ms. Malboeuf read a letter from Mr. David Lochbaum of the Union of Concerned Scientists which discussed the process of conducting surveys of hazardous materials within and outside facilities as part of the decommissioning of a nuclear power plant including the potential for release of radiation contained in the vegetation in the area of a nuclear power plant during a wildfire and wind event which Mr. Lochbaum stated could create challenging safety conditions.

Dr. Peterson stated that the topics raised by Ms. Malboeuf have been reviewed by the Committee in the past and the Committee has met on several occasions with the CalFire Chief for San Luis Obispo. Dr. Peterson commented that the DCISC investigation determined there is insufficient vegetation in the area around DCPP for it to constitute a significant contributor to the risk from wildfire. The Committee has also reviewed the risk from wildfire to transmission lines serving the plant and found the 230kV and 500kV transmission lines to be in satisfactory condition. Dr. Peterson directed that material from the DCISC last investigation during fact-finding of these issues be provided to Ms. Malboeuf. Dr. Budnitz remarked that the recent evacuation experience in the vicinity of Houston, Texas, during Hurricane Harvey provided a positive example of the plant staff at the South Texas Nuclear Generating Station, which lost access to the plant for some time, retaining sufficient numbers of plant staff onsite to safely operate the plant although many of them likely had families or family members who were required to evacuate. Mr. Harbor responded to Ms. Malboeuf’s inquiry by stating, from his perspective as having served as a licensed operator in the Control Room, that the operators do not look at the situation as “either-or” but rather as a situation wherein by adhering to one’s responsibilities and doing one’s duty in the Control Room the operators are also protecting, albeit in a different way, their families at the same time.

Mr. David Weisman was recognized. Ms. Weisman requested the Office of DCISC Legal Counsel to provide him with a copy of the power points presentations on post-shutdown decommissioning scenarios in context of the continuation of the DCISC which were discussed earlier in this meeting. Mr. Weisman inquired with reference to the Committee’s earlier consideration of this matter and Dr. Peterson confirmed that the Committee has made no decision concerning a future role once the plant ceases generating electricity and that any decision would necessarily be within the purview of the CPUC and the Committee’s input and role in the CPUC’s consideration would be to
provide guidance and information only. Dr. Peterson remarked the Committee has provided direction on developing information on what a systematic review of plant operations might entail and what resources might be required in a decommissioning scenario in order to assist the CPUC and the DCISC’s appointing entities. Dr. Peterson observed the Committee intends to use the time available to conduct this review and to provide information as necessary with reference to the Committee’s present Restated Charter. Dr. Budnitz remarked that the Charter is somewhat ambiguous in context of review of operations once electricity generation at DCPP ceases. Mr. Weisman encouraged the Committee not to put off its investigation on this subject for too long and he pointed out that the San Onofre Nuclear Generating Station was closed rather precipitously and there is no guarantee that this would not be the case in the future for DCPP and there is no guarantee that the plant would run to 2025.

XXV Information Items Before the Committee (Cont’d)

Mr. Harbor introduced Mr. Mark Mayer, Manager of Nuclear Fuel at DCPP and reported Mr. Mayer has more than 30 years’ experience in nuclear and holds a Bachelor’s Degree in Nuclear Engineering with extensive experience in the Engineering, Reactor Engineering and Nuclear Fuels organizations at DCPP.

Handling and Disposal of Damaged Spent Fuel.

Mr. Mayer reported both units are currently operating with no indication of fuel damage. Unit-1 has operated since Cycle 4 without indications of fuel damage in the Reactor Coolant System (RCS). Unit-2 has operated since Cycle 16 without indications in the RCS.

Mr. Mayer stated damaged fuel can take two basic forms: damage to the fuel cladding which results in the release of radionuclides to the RCS; or damage to the fuel assembly that requires the use of special handling tools. He reported fuel which has greater than a “pinhole” leak is required to be stored in a special container. Mr. Mayer stated damaged fuel as experienced at DCPP poses no impact to nuclear safety, no spent fuel pool criticality issues or thermal hydraulic concerns. Storage and handling of damaged fuel is conducted in accordance with NRC requirements.

Mr. Mayer described and discussed the typical mechanisms which cause fuel cladding damage as follows:

- Debris Fretting - wear due to contact with foreign material (debris). Mitigation measures to address debris fretting are effected through specific fuel assembly design features including use of an oxide coating, debris filter bottom nozzles, and a P-grid filter. Mr. Mayer reported DCPP has an aggressive foreign material management system to keep debris out of the RCS.
- Grid-to-Rod Fretting - normally caused by fuel rod vibration caused by flow within the reactor which can induce vibration of the fuel rods or cause baffle jetting due to crossflow in corner locations due to the opening of baffle joints. Mr. Mayer reported Unit-2 has experienced bafflejetting in the past and the baffle corners were repaired and the RCS flow through the reactor vessel was improved to eliminate this. Fuel assembly self-excitation can also occur with Westinghouse manufactured fuel to cause fretting, however, to date DCPP has not experienced this.

- Corrosion – due to hydriding occasioned by the presence of hydrogen inside the fuel rods which Mr. Mayer stated may have occurred three times at DCPP, and through spent fuel pool chemistry effects. He reported in 2001 the North Anna Nuclear Generating Station in Virginia had a fuel assembly separate due to the presence of high chlorides, fluorides and sulfides in the pool chemistry. Mr. Mayer stated that four regions on Unit-1 from its first core and the first core reload and from the first core for Unit-2 were found to be susceptible to corrosion from pool chemistry effects and all but one of the assemblies has been repaired and those assemblies are able to be stored in dry cask. Mr. Mayer also commented there was an industry issue which was identified as applicable to DCPP related to the use of 304 stainless steel for the top nozzle of the fuel assemblies which could have resulted in intergranular stress corrosion cracking (SCC). He reported the susceptible components are now fabricated using 304L stainless steel which due to a lower carbon content is less susceptible to SCC.

- Other Mechanisms - include fabrication issues caused by a bad weld or involving the presence of hydrogen or fuel handling issues due to crane operation or otherwise.

Mr. Mayer reviewed the history of fuel at DCPP with both units currently operating with no indication of fuel damage and Unit-1 currently operating in Cycle 21 without any indication of fuel damage since Cycle 4 and Unit-2 currently operating in Cycle 20 with no indication of fuel damage since Cycle 16. In response to Dr. Peterson’s query, Mr. Mayer described the defect which can result in a radionuclide leak to the RCS as a tiny hole which in many cases will not be detected until power levels are changed with resulting temperature and chemistry changes which defect is then evidenced by changes in iodine, xenon, cesium or cobalt silver concentration in the RCS. Mr. Mayer reported vacuum can sipping inspection of Unit-1 fuel from the first core revealed tiny defects in two fuel assemblies and in preparation for dry cask storage the presence of xenon, krypton or radon revealed six additional assemblies with pinhole leaks. Presently for Unit-1 there are eight assemblies for which work has not been performed to address these defects and Mr. Mayer confirmed, in response to Consultant McWhorter’s observation, that these assemblies can be placed into multipurpose canisters and go into dry cask storage. In response to Dr. Peterson’s question, Mr. Mayer confirmed that no fuel pins have been removed from any Unit-1 assemblies while Unit-2 has had approximately fourteen assemblies where identified leakers were found due to
bafflejetting damage and one assembly from Cycle 1, with all but four of the bafflejetting damaged assembly and that from Cycle 1 being reconstituted by replacement of the damaged pins with steel rods. Mr. Mayer confirmed that DCPP presently has a fuel rod storage container for the reconstituted fuel rods in wet storage in the spent fuel pool.

Mr. Mayer reviewed the disposition of damaged spent fuel which may include: reconstituted fuel assemblies with the leaking pins removed and placed into a special container for damaged spent fuel, with the reconstituted assembly then able to be treated the same as an undamaged fuel assembly. The damaged rods can be identified using ultrasonic testing. Once placed into a fuel container the fuel can be handled using normal methods and processes for disposal of damaged fuel. Fuel damage can be mitigated with the use of special containers and once in a special container, the damaged fuel can be stored in dry fuel storage. Mr. Mayer confirmed in response to Dr. Peterson’s inquiry that if the fuel were determined to have only a pinhole leak and no gross damage to the fuel rod it could be placed into normal storage as it would meet the requirements for use of the multipurpose canister. He confirmed that to date no such assemblies have been loaded for dry cask storage and all remain within the spent fuel pools. Mr. Mayer reported that once repaired or reconstituted the fuel assembly is considered intact and can be treated as normal fuel assembly and moved with normal tools and processes and stored in a licensed multipurpose 24-assembly capacity canister and he confirmed that it is his expectation that DCPP would be applying to the NRC for permission to use multipurpose canisters with a capacity for 32 assemblies for damaged fuel. In response to Dr. Budnitz’ observation Mr. Mayer concurred that loading the damaged fuel assemblies for dry storage will likely occur in later years when a rod by rod determination would be made because it is possible there could be some change or degradation in intervening years, but it is likely that all damaged assemblies could be stored in a single or at most two multipurpose canisters. Dr. Lam observed that over the expected lifetime of the plant there will have been approximately one million fuel rods used for generation and the number of these which have been found to have had leaks is therefore a very small percentage.

Mr. Harbor introduced the final informational presentation for this public meeting to be made by the Training Manager at DCPP Mr. Bobby Simpson. Mr. Harbor reported Mr. Simpson has experience at DCPP in the Operations and Training organizations.

**Overview of Training in the Use of FLEX5 Equipment Including a Representative Training Video.**

Mr. Simpson stated that classroom training now includes the Flex Support Guidelines (FSGs) and training has been provided to Operations personnel since March 2012, upon issuance of NRC Order EA 12049. Simulator training for licensed operators includes beyond design basis events which would result in an extended loss of offsite and AC power. Equipment demonstrations have been conducted in
conjunction with FLEX field training including setting up and running the FLEX equipment. Mr. Simpson reported that walkdowns were conducted within the plant and also at the FLEX storage facilities, the staging areas where equipment would be placed for use and at the system connection points where systems and equipment associated with FLEX would be tied-in to plant systems. Virtual reality training software has also been developed and used for what Mr. Simpson described as scenario-based applications.

Mr. Simpson reported web-based training for all station personnel has been conducted which has a generic approach to FLEX related topics. The Emergency Response Organization (ERO) has held a number of FLEX training sessions and specific web-based applications are available for ERO training purposes. FLEX drills have been held with the entire ERO including involving Fire Department personnel who are qualified on heavy equipment operation. Mr. Simpson stated that FLEX oriented training has been provided for a few hundred persons in the Maintenance and technical organizations and consists principally of classroom training. In response to Dr. Budnitz’ inquiry Mr. Simpson replied that approximately 200 persons assigned to the four ERO response teams have received FLEX training.

Mr. Simpson displayed a video which he described as showing a compilation of FLEX training activities depicting the evolution of an event involving an extended loss of AC power including activities in the FLEX equipment storage warehouse, in the field, the use by personnel of communications equipment and of heavy equipment. In response to Dr. Peterson’s inquiry, Mr. Simpson confirmed personal protective equipment and dosimetry monitoring applications are provided for FLEX responders which includes personnel from the Radiation Protection organization. Mr. Simpson, in response to a query from Consultant Wardell, stated the Simulator Facility has had all the FSGs added to the Simulator’s database in order to be capable of simulating the types of failure associated with loss of AC power. Mr. Wardell reported and Mr. Simpson confirmed that during Mr. Wardell and Dr. Budnitz’ observation of FLEX training during fact-finding there was a significant security component and Security organization response is an integral part of the FSGs. In response to Dr. Budnitz’ question concerning important lessons learned from the initial training Mr. Simpson identified the use of laminated cards with procedural steps which are now attached to FLEX equipment as having come from feedback provided by participants during early FLEX training sessions. Mr. Simpson observed, due to procedural requirements and the need to train five separate operating crews, a considerable amount of time and coordination were required in the FLEX training efforts. In response to Mr. Wardell’s inquiry, Mr. Simpson confirmed that FLEX equipment includes internal battery powered lighting and he stated that some scenarios for loss of AC power continue to rely on DC power which is wired throughout the plant. He confirmed that FLEX training includes coping with what might be a considerable amount of debris created by a beyond design basis accident and this is incorporated within the FSGs in terms of meeting the challenge to get equipment from the storage facilities to the staging locations and the Fire Department is also well equipped to provide ready access through
downed fencing, etc. In response to Dr. Budnitz’ inquiry, Mr. Simpson reported FLEX refresher training will be conducted every four years as a minimum requirement but training will also be conducted as conditions and other evolutions afford opportunities.

Mr. David Weisman of the Alliance for Nuclear Responsibility was recognized. Mr. Weisman inquired whether FLEX training follows the model of training used by the aviation industry wherein unexpected evolutions are programmed to test the efficacy of the training as it appeared to Mr. Weisman that in the video provided by Mr. Simpson there was very little in the way of off-normal conditions that the plant staff members were not expecting to encounter in their FLEX response. Mr. Simpson confirmed the use of the Simulator Facility allows the types of training scenarios described by Mr. Weisman and is used to test and improve the ability of the operators to diagnose conditions and to use the tools available to them. In response to Mr. Weisman’s inquiry, Mr. Simpson confirmed that training in the field does include operating the equipment but that at this point in DCPP’s initial FLEX training efforts there has not been an attempt to introduce failure mechanisms as Mr. Simpson observed that to do so at this point could induce a negative response as to how the equipment might operate but the concepts described by Mr. Weisman are intended to be introduced as part of future refresher training. Mr. Wardell commented the concepts described by Mr. Weisman were employed during the emergency exercises observed by the DCISC during previous fact-finding. Mr. Simpson, in response to Dr. Budnitz’ query, confirmed that he has visited the Palo Verde Nuclear Generating Station in Arizona to participate in a self-assessment of that station’s FLEX training activities and DCPP has benchmarked with its partners in the Strategic Teaming and Resource Sharing (STARS) alliance and with other industry peers concerning FLEX training. Dr. Budnitz reported that FLEX is a topic which the Committee will be following on a regular basis for some time to come.

This concluded the informational presentations requested by the Committee from PG&E for this public meeting.

5 FLEX is not an acronym but describes a strategy developed by the nuclear industry to address diverse and flexible coping strategies to address the loss of safety-related systems due to beyond design basis events.

XXVI Concluding Remarks and Discussion by Committee of Future DCISC Activities

Mr. Garcia confirmed, in response to Dr. Budnitz’ request, that the process for the DCISC’s receipt of the monthly document package has changed to permit the DCISC Members and Technical Consultants the use of an online document library which can now be updated on a more frequent basis and an index of documents made available to the Committee will still be provided.
The Chair expressed the thanks of the Committee to the members of the public who participated in this public meeting and to DCPP senior management including in particular to Mr. Cary Harbor and Mr. Hector Garcia and to the able technicians of AGP Video who provided audio and visual recording services and internet livestreaming for this public meeting.

XXVII Adjournment of Eighty-Ninth Public Meeting

There being no further business, the eighty-ninth public meeting of the Diablo Canyon Independent Safety Committee was then adjourned by its Chair, Dr. Peter Lam, at 2:45 P.M.
Notice of Meeting

A legal notice of the public meeting and several display advertisements were published in local newspapers and mailed to the media and those persons on the Committee’s service list. Information on the public tour and a copy of the meeting agenda were also posted on the Committee’s website at www.dcisc.org.

Agenda

I Call to Order – Roll Call

The May 22, 2018, public meeting of the Diablo Canyon Independent Safety Committee (DCISC) was called to order by Committee Vice-Chair Dr. Robert J. Budnitz at 10:00 A.M. in the Boardroom Conference Room at the Graduate in Berkeley, California. A dial-in, toll-free, telephone number providing conference call capability for members of the public was published in the notice of meeting and the agenda and on the Committee’s website. Dr. Budnitz observed the meeting was also being recorded and livestreamed on the internet and video would subsequently be available on the DCISC’s website www.dcisc.org and at www.slo-span.org.

Present:

Committee Member Robert J. Budnitz
Committee Member Per F. Peterson

Absent:

Committee Member Peter Lam

II Establishment of a Quorum
Dr. Budnitz reported that with two members in attendance a quorum was established for this meeting. Dr. Peterson reported Dr. Lam was unable to attend or to join by conference call as he is traveling in Canada. In attendance also was Mr. Robert Rathie of the office of the DCISC Legal Counsel. Dr. Budnitz stated the agenda for this meeting includes a single item concerning approval of a letter with the Committee’s comments on California Senate Bill 1090 introduced by Senator Monning.

### III Action Item

**Consideration of approval of a letter commenting on California State Senate Bill 1090 (Monning) with reference to funding for the Diablo Canyon Nuclear Power Plant Employee Retention Program.**

Dr. Budnitz asked whether the persons who were available to participate in the meeting on the conference call-in telephone line wished to identify themselves for the record. Dr. Budnitz reported that persons participating by telephone were not required to identify themselves. The following persons acknowledged his invitation:

<table>
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<tr>
<th>Name</th>
<th>Organization</th>
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<tr>
<td>Ms. Rochelle Becker</td>
<td>Alliance for Nuclear Responsibility</td>
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<tr>
<td>Mr. David Weisman</td>
<td>Alliance for Nuclear Responsibility.</td>
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<tr>
<td>Mr. Carl Wurtz</td>
<td>Vice President, Californians for Green Nuclear Power.</td>
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<tr>
<td>Dr. Gene Nelson</td>
<td>Government Liaison &amp; Legal Assistant, Californians for Green Nuclear Power (joined later).</td>
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<tr>
<td>Mr. Hector Garcia</td>
<td>Chief Nuclear Officer Support Manager, Diablo Canyon Power Plant.</td>
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Also participating by teleconference were Committee Technical Consultants Mr. R. Ferman Wardell and Mr. Richard D. McWhorter, Jr. and Regulatory Counsel Martin Mattes, Esq. of the Nossaman law firm.

Dr. Budnitz reported the sole purpose of this public meeting was for the Committee to consider a letter to the office of State Senator Bill Monning with the DCISC’s comments on Senate Bill 1090 (SB 1090), introduced by Senator Monning in the California State Senate. Dr. Budnitz stated SB 1090 would, if approved, require that the California Public Utilities Commission approve full funding by Pacific Gas & Electric Company’s (PG&E) ratepayers of the Diablo Canyon Power Plant (DCPP) Employee Retention Program.

Dr. Budnitz described the background of the introduction of SB 1090 which concerns elements of the Joint Proposal between PG&E and six other parties (Joint
Proposal) for which an Application was filed with the CPUC to retire DCPP at the end of its current operating licenses from the NRC [that is, by 2024 for Unit-1 and 2025 for Unit-2]. In response to PG&E’s Application to retire DCPP and approve the Joint Proposal, on January 16, 2018, the CPUC issued a Decision (D.18-01-022 or Decision) in which each element of the Joint Proposal was addressed. Dr. Budnitz reported the Employee Retention Program, a part of the Joint Proposal, provides a financial incentive to all DCPP’s employees if they remain in their employment for certain periods of time, those periods being from September 2016 to August 2020 for Tranche 1 and from September 2020 to August 2023 for Tranche 2.

Dr. Budnitz stated in D.18-01-022 the CPUC approved a substantial decrease in funding for the Employee Retention Program from that proposed in the Joint Proposal and in PG&E’s Application. While the Joint Proposal and the Application sought an annual retention incentive of 25% of a participating employee’s salary the Decision approved a 15% incentive.

Dr. Budnitz stated that since approval of D.18-01-022, DCISC representatives have visited the plant and have held discussions with plant staff and various groups and have come to the recognition that a very significant level of disappointment exists amongst the employees about the change to the retention incentive and, accordingly, there has been a decrease in their morale. Dr. Budnitz stated this could result in a significant decrease in the number of employees whom he described as key contributors to the plant’s operational safety remaining at DCPP. Dr. Budnitz observed the DCISC’s remit from the CPUC is to assess the safety of operations at DCPP and while the Committee cannot recommend how the Employee Retention Program should be designed, it is responsible for assessing its impact on safety if these key employees were to leave employment at DCPP earlier than they would have otherwise done but for the reduction in the incentive. Dr. Budnitz reported that SB 1090, if approved, would restore the Employee Retention Program’s financial incentive to that proposed by the Joint Proposal and accordingly, the DCISC is considering taking a position on SB 1090 only as to those provisions affecting employee retention.

In response to Dr. Peterson’s request, Mr. Rathie described the process by which a draft letter was developed for the Committee’s review. Mr. Rathie stated the draft letter that has been presented for consideration was prepared by Consultant Wardell and was shared with the Members in a blind review process wherein comments are received from, but not shared between, Members and until this public meeting there has been no collective concurrence of the membership concerning the letter. Comments were received by Mr. Wardell and incorporated into drafts without attribution until a point was reached where no further comments were received. Mr. Rathie stated that it was this final draft which was then posted on the Committee’s website, provided to those persons requesting a copy and presented at this public meeting for consideration. Mr. Rathie remarked that due to advice received from Senator Monning’s office concerning the California Senate’s schedule for consideration of SB 1090, it was recognized that the matter
should not wait for consideration until the DCISC’s next scheduled meeting on June 13–14, 2018, in Avila Beach, California.

Dr. Peterson remarked that in his judgment the retention of employees would be substantially enhanced if the full retention incentive of 25% were restored, as a drop to 15% represents a significant decrease. Dr. Peterson commented he believes the Employee Retention Program could be successful through Tranche 1 at the reduced level but absent an increase there could be significant attrition during Tranche 2 among key members of the plant staff essential to operational safety, as those persons have sought-after abilities and therefore have significant incentive to take positions elsewhere. Dr. Peterson reported the Employee Retention Program is structured so as to require an employee who does not stay for the full period of the incentive to pay back to PG&E the amount received under the program and therefore the cost to an employee to leave before 2020 could be substantial while after 2020 the cost to leave could be significantly less. Dr. Peterson reported the DCISC is also investigating other ways by which key employees might be retained and will be discussing this matter at its June 2018 public meeting. He remarked implementation of new technologies, a reduction in the frequency of preventive maintenance activities and opportunities offered for professional development might be important in this context. Dr. Peterson observed it was apparent from the CPUC’s Decision that the only way to restore full funding for the Employee Retention Program was through legislative action. However, he stated SB 1090 also contains additional provisions including with regard to mitigation of the economic impact to the local community of the retirement of DCPP as well as obligating the replacement of DCPP generation to come only from non greenhouse gas emitting sources but as those provisions do not relate to the safety of plant operations, the Committee should take no position on them and it would be important, in Dr. Peterson’s view, for the Committee to be clear that by advocating for specific elements of SB 1090 it is not advocating for other parts of the bill.

Dr. Budnitz stated he was concerned in his review with the issue raised by Dr. Peterson that the Committee should only support those aspects of SB 1090 which address restoring the Employee Retention Program funding level and he added that it is important that the Committee not take a position on the issue of whether or not the plant should close. Dr. Budnitz reviewed certain changes he suggested be made to the draft letter. He further observed there are numerous persons employed at DCPP whose positions do not affect the safety of operations and it is important that the Committee’s letter focus upon the need to retain those key employees whose positions affect safety.

Dr. Peterson stated from observations during his recent visits to DCPP it is clear PG&E is monitoring employee retention issues and understands the importance of retaining key personnel but the Systems Engineering organizations has experienced significant attrition for which the reduction of the Employee Retention Program incentive may have played a role. Dr. Peterson reiterated there is an even
greater concern related to the three-year period under Tranche 2 with reference to retaining key employees and, accordingly, full funding for the retention incentive would have a substantive, positive impact on employee retention. Dr. Budnitz stated other key areas of potential impact include the Operations, Maintenance and Security organizations at DCPP, as well as the Radiation Protection organization’s safety function. He remarked those are key areas, vital to maintaining the plant safety at the level expected by the DCISC and presently achieved by PG&E. Dr. Budnitz remarked experience cannot be acquired in a short time and even experienced personnel from other nuclear power plants may not have the ability to step in quickly to replace DCPP personnel.

Consultant Wardell reported the 25% incentive in the Joint Proposal was payable for each year over the seven-year period covered by Tranches 1 and 2. Mr. Wardell reported he agreed with the comments of Drs. Budnitz and Peterson. In response to Mr. Wardell’s observation concerning the administrative process for consideration of D.18-01-022 Mr. Rathie and Mr. Mattes commented that this may represent another aspect, together with the present status of SB 1090 in the State Senate, on which the DCISC in its letter should consider taking no position.

Dr. Gene Nelson of the group Californians for Green Nuclear Power was recognized. Dr. Nelson stated he appreciated the DCISC’s consideration of sending a letter regarding SB 1090 but he stated his opinion that for the Committee to do so would be premature, as it is not certain SB 1090 will ever be needed. He reported Californians for Green Nuclear Power filed an Application for Rehearing with the CPUC which resulted in a statutory stay of 60 days which has now expired but if the CPUC grants the Application for Rehearing or if the Application is denied and if Californians for Green Nuclear Power prevail on an appeal in the California appellate court, the action of the DCISC would not be necessary. Dr. Nelson remarked the letter represents an indirect endorsement of SB 1090 including of those elements which are not within the DCISC’s purview. Dr. Nelson stated Californians for Green Nuclear Power participated in three hearings concerning SB 1090 to express its strong opposition and he stated his opinion that the DCISC’s action reflects political partisanship and is improper. Dr. Nelson stated his belief that Senator Monning’s office had applied pressure on the DCISC concerning SB 1090 and he commented the DCISC has worked very hard to date to operate independent of politics in California which includes a rich and storied history with reference to DCPP. Dr. Nelson stated that in its comments on PG&E’s Application for approval of the Joint Proposal, Californians for Green Nuclear Power advocated for a more focused employee retention program as not all employees have a safety or security-related function. Dr. Nelson requested that additional language be added to the letter to clarify that the administrative process regarding D.18-01-022 has yet to run its full course.

Mr. Rathie and Mr. Mattes briefly reviewed the effect of the Application for Rehearing and the resulting statutory 60-day stay of any order in the Decision as a result, which stay has now expired. Therefore D-18-01-022, while not yet final, is
presently in full force and effect pending action by the CPUC on the Application for Rehearing or action on an appeal of the Decision in the California appellate court.

Ms. Rochelle Becker of the Alliance for Nuclear Responsibility was recognized. Ms. Becker remarked that there are more safety issues involved in closing DCPP than just retention incentives to be paid to workers. Ms. Becker stated the ability of the local communities to maintain their roads and transportation facilities is one such issue that is addressed by SB 1090. Ms. Becker also expressed her opinion that worker morale at DCPP could be negatively impacted by administering the retention bonus in a manner which did not include all workers.

Mr. Carl Wurtz of Californians for Green Nuclear Power was recognized. Mr. Wurtz commented he was not surprised by the disappointment amongst the plant staff reported by the DCISC as the plant staff are proud of their accomplishments and regret the decision to shut the plant down prematurely. He reported Californians for Green Nuclear Power fully support an employee retention incentive if the plant is to close but with the outcome of the group’s Application for a Rehearing pending, both SB 1090 and any endorsement of it by the DCISC are premature. Mr. Wurtz stated he approved of Drs. Budnitz and Peterson’s comments concerning the DCISC declining to address issues outside of the context of safe operations but Californians for Green Nuclear Power is concerned that senators may misconstrue the Committee’s endorsement to include other elements of SB 1090. He remarked SB 1090 gives PG&E permission to walk away from its commitment in the Joint Proposal to replace DCPP generation with greenhouse gas-free energy and this failure to hold PG&E accountable is not in the interest of California or of a healthy environment.

Dr. Budnitz, in response to Dr. Nelson’s comments, stated that Senator Monning’s office did not formally request the Committee to comment on SB 1090 and the DCISC’s interest in the bill, and the need for this public meeting to consider a letter to Senator Monning’s office stemmed entirely from the DCISC’s own review of the proposed legislation. Dr. Budnitz stated, in response to Ms. Becker’s comments, the DCISC received assurance from the Nuclear Regulatory Commission’s resident inspectors that funding from PG&E will continue to be required and remain in place to support emergency response capabilities which have a direct relationship to operational safety through decommissioning and the DCISC, while it remains in operation, will continue to review to ensure this is so. He stated his opinion that the Employee Retention Program has a direct and substantive link to plant safety and he agreed with Ms. Becker’s observation that providing equal treatment under the incentive to all employees may be the better approach although he reiterated the DCISC’s focus needs to remain on those positions key to safety. Dr. Budnitz remarked that if one were to calculate the cost of the employee retention incentive as a percentage of the revenue from the approximately 120,000,000 megawatt hours of energy DCPP would be expected to produce in seven years, the incentive cost represents a very small number. The Committee Members agreed to add to the letter as follows: “In fact, the DCISC
also recognizes that the overall morale of the entire staff is another important consideration.”

Dr. Nelson was again recognized and he reiterated his position that the letter if approved by the DCISC should include recognition that the administrative process has yet to run its course as to do so would have no effect on safety and would demonstrate the neutrality of the DCISC.

Mr. Mattes was recognized and stated that the California legislature was free to enact SB 1090 without regard to the CPUC administrative process for D.18-01-022. Dr. Peterson commented that in his view it would be important for the letter to acknowledge the current administrative status of D.18-01-022, but the key point is, to the best of the DCISC’s knowledge, the only mechanism to restore the full retention incentive lies with the California legislature. The Members and Legal Counsels then discussed and agreed on a statement to be included in the letter as follows: “Although the CPUC decision is in effect, it is not yet final due to the pendency of an Application for Rehearing.” Dr. Budnitz observed concerning Dr. Nelson’s comment regarding a more a focused retention program that it was not for the DCISC to design the elements of any such program. Dr. Nelson was again recognized and stated he endorsed the addition to the DCISC’s letter concerning the CPUC administrative process and he thanked the Committee for its inclusion.

Mr. Rathie reported that Dr. Nelson, on behalf of Californians for Green Nuclear Power, previously submitted comments and written materials to the Committee and those will be a part of the record of the Committee’s consideration of this matter.

Upon a motion made by Dr. Peterson, with a second by Dr. Budnitz, upon a roll-call vote the Committee approved sending the letter as revised to Senator Monning’s office concerning SB 1090 and the DCPP Employee Retention Program.

IV Public Comments and Communications

The Vice-Chair inquired whether there were any persons who wished to address remarks to the DCISC on topics not on the agenda for this meeting. There was no response to his invitation.

V Adjournment of Public Meeting

There being no further business, the Vice-Chair thanked those persons who participated by telephone during the meeting and the technicians from AGP Video who recorded and livestreamed the meeting for broadcast on the internet and subsequently on Government Access Television, Channel 21 in the San Luis Obispo local area. This meeting of the Diablo Canyon Independent Safety Committee was then adjourned by its Vice-Chair at 11:30 A.M.

Attachment – Copy of Letter to Senator Monning’s Office
DCISC
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

Website: www.dcisc.org

Committee Members:

Committee Member Robert J. Budnitz
Committee Member Peter Lam
Committee Member Per F. Peterson

Original by Federal Express
Copy by Fax to (916) 651-4917
Copy by Email to annie.aguiniga@sen.ca.gov

May 22, 2018

Office of Senator Monning
State Capitol, Room 313
Sacramento, CA 95814

Attn: Ms. Bethany Westfall, Legislative Director

Re: DCISC Comments on Senator Monning’s CA Senate Bill No. 1090M

The Diablo Canyon Independent Safety Committee ("DCISC") hereby submits its comments concerning California Senate Bill 1090, introduced by Sen. Bill Monning on February 12, 2018, which, if approved, would require in part that the California Public Utilities Commission (CPUC) approve full funding by PG&E ratepayers for its Diablo Canyon Nuclear Power Plant ("Diablo Canyon") employee retention program as originally proposed in PG&E’s Application 16-08-006 dated August 11, 2016, to retire Diablo Canyon by 2025.

Background about the DCISC

The DCISC was established as one of the terms of a settlement agreement entered
into by the Division of Ratepayer Advocates ("DRA" now known as the Office of Ratepayer Advocates) of the California Public Utilities Commission ("CPUC"), the Attorney General ("AG") for the State of California, and Pacific Gas and Electric Company ("PG&E"). The settlement agreement, dated June 24, 1988, was intended to cover the operation and revenue requirements associated with Diablo Canyon’s two 1,100 megawatt pressurized water reactors located in San Luis Obispo County for the 30-year period following the commercial operation date of each unit. The agreement arose out of rate proceedings that had been pending before the CPUC for four years, and which included numerous hearings and pre-trial depositions. Just prior to the commencement of trial, the DRA, the AG and PG&E prepared and entered into the settlement agreement and submitted it to the CPUC for approval.

Letter to the Office of Senator Bill Monning
Attn: Ms. Bethany Westfall, Legislative Director
May 22, 2018
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The agreement provided that:

"An Independent Safety Committee shall be established consisting of three members, one each appointed by the Governor of the State of California, the Attorney General and the Chairperson of the California Energy Commission ("CEC"), respectively, serving staggered three-year terms. The Committee shall review Diablo Canyon operations for the purpose of assessing the safety of operations [emphasis added] and suggesting any recommendations for safe operations. Neither the Committee nor its members shall have any responsibility or authority for plant operations, and they shall have no authority to direct PG&E personnel. The Committee shall conform in all respects to applicable federal laws, regulations and Nuclear Regulatory Commission ("NRC") policies."

The DCISC is made up of recognized technical experts in the nuclear power field who have visited the plant or held public meetings near the plant almost every month since 1990 and know the value to the safety of operations in retaining an experienced, high-performing plant staff, which now numbers approximately 1,500 persons.

**Discussion of the Issue**

On June 21, 2016, PG&E announced a Joint Proposal with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Works Local 1245, Coalition of California Utility Employees and the Alliance for Nuclear Responsibility to retire Diablo Canyon at the expiration of its current operating licenses from the NRC in 2024 for Unit 1 and
in 2025 for Unit 2. On August 11, 2016, PG&E filed Application 16-08-006 with the 
CPUC for approval of the retirement of Diablo Canyon, implementation of the Joint 
Proposal, and recovery of associated costs, including employee retention 
incentives through proposed ratemaking.

Under the Joint Proposal, PG&E would continue to operate Diablo Canyon at 
current power levels until retirement, with commitments to continuing the safe 
operation of Diablo Canyon and providing resources and assistance to transitioning 
workers. To ensure continued safe operations under the Joint Proposal, PG&E 
stated that it would be critical to retain existing employees, who are well-trained 
and highly qualified, throughout the remaining several-year period of power 
operation. To accomplish this, PG&E proposed to provide employee retention 
incentive payments of 25% per year\(^1\).

\textit{footnote 1:} 
\begin{quote} 
The retention incentive would be paid in accordance with two tranches, 
the first being for the period September 1, 2016 to August 31, 2020 and 
the second from September 1, 2020 to August 31, 2023. 
\end{quote}

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Attn: Ms. Bethany Westfall, Legislative Director  
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**DCISC discussion and recommendation**

In its Decision 18-01-022, issued on January 16, 2018, the CPUC directed that the 
Diablo Canyon ratepayer-supported employee retention incentive payments be 
reduced from PG&E’s proposed 25% per year to 15% per year. Although the 
DCISC did not participate as a party in the CPUC proceeding that led to Decision 
18-01-022, the DCISC has observed, in its subsequent visits to the plant, 
disappointment by employees in the reduction of the incentive payments and 
anticipates significant increases in future employee attrition, especially in nuclear 
plant operations, maintenance, and security. This is a concern to the DCISC as 
increased attrition in these critical areas would in all likelihood adversely affect the 
safety of operations at Diablo Canyon. In fact, the DCISC also recognizes that the 
overall morale of the entire staff is another important consideration. The DCISC 
believes that a well-designed and appropriately funded employee retention 
incentive program is essential to the plant’s safe operation until retirement. While 
the DCISC does not know what precise funding level is appropriate, the 15% 
proposal seems to us to be inadequate, based on our recent interactions with the 
plant staff.

The DCISC strongly believes that continued operation of the power plant through 
the proposed retirement date of Diablo Canyon Units 1 and 2 in 2024 and 2025, 
respectively, in a safe manner requires retaining those existing members of the
trained workforce who are vital to operating the plant safely. For this reason the employee retention program as originally agreed upon in the Joint Proposal in Application 16-08-006 should not be cut as severely as the cuts in CPUC Decision 18-01-022. A retention program needs to be designed and funded that effectively accomplishes the needed staff-retention objectives for those employees who have vital roles in achieving nuclear safety. For these reasons, the DCISC strongly supports those aspects of Senator Monning’s CA Senate Bill 1090 with regards to appropriate funding for the employee retention program. We are, of course, not in a position to advise on how the needed employee-retention program should be designed in detail, provided it includes adequate incentives for those employees who perform vital safety functions.

The DCISC is not commenting in this letter on aspects of Senator Monning’s bill that deal with issues beyond those related to the safe operation of the nuclear plant, because those other aspects are outside the DCISC’s charter. Although the CPUC Decision is in effect, it is not yet final due to the pendency of an Application for Rehearing.

The DCISC is available to answer questions and provide additional information as needed. We appreciate the opportunity to provide input into the legislative process on this important topic concerning the future of California’s power supply in the rapidly changing energy landscape.

Letter to the Office of Senator Bill Monning
Attn: Ms. Bethany Westfall, Legislative Director
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On behalf of myself and the other members of the Diablo Canyon Independent Safety Committee, please convey our thanks to Senator Monning for the opportunity to review and comment on CA Senate Bill 1090. It is our hope that this letter will contribute to the Senate’s assessment of these important issues and their potential to adversely affect the future safety of Diablo Canyon. Should the Senator have any questions or concerns about the DCISC’s comments please do not hesitate to communicate with us.

Very truly yours,

s/Peter Lam, DCISC Chair

PL:rfw
Notice of Meeting

A legal notice of the public meeting and several display advertisements were published in local newspapers and mailed to the media and those persons on the Committee’s service list. Information on the public tour and a copy of the meeting agenda were also posted on the Committee’s website at www.dcisc.org.

Public Tour of Diablo Canyon Power Plant

On the morning of Wednesday, June 13, 2018, the Members of the Diablo Canyon Independent Safety Committee (DCISC), together with Committee Technical Consultant Mr. McWhorter, accompanied by 32 members of the public, participated in a tour of Diablo Canyon Power Plant (DCPP). The members of the public responded to the advertisement concerning the public tour placed in a local area newspaper and on the DCISC’s website. The group assembled in the PG&E Energy Center auditorium for a brief introduction of the DCISC and its Members and Technical Consultants and a discussion of the appointment of its members and the operations of the Committee and to view an informational video on the history, role and responsibilities of the Committee. Afterward, DCPP Lead Manager for Government Relations, Ms. Suzanne Hosn, and Communications Representative, Mr. John Lindsay, gave informational presentations about the plant and Pacific Gas & Electric Company’s (PG&E) current energy generation portfolio and its plans for its future. An opportunity was provided for questions. The group then boarded a bus for the ride to the plant. During the drive information was presented on the history of the plant. The bus entered the plant site through the Avila Gate and the group received security badges and a briefing from PG&E representatives on the various external features and buildings and was taken on a narrated drive-by of the Independent Spent Fuel Storage Installation (ISFSI), also known as the dry cask spent fuel storage facility.
The bus then arrived at the parking area. The members of the public and the DCISC Members and Mr. McWhorter visited, in turn, the DCPP Fire Department and the FLEX\textsuperscript{1} Storage Facility and had the opportunity to view the Intake and Outfall Facilities where the plant pulls in and discharges cooling water from and to the Pacific Ocean.

The group then departed DCPP for return to the Energy Education Center and had the opportunity to discuss the plant with individual DCISC Members and Mr. McWhorter.

\textsuperscript{1} FLEX is not an acronym but describes a strategy developed by the nuclear industry to provide diverse and flexible coping strategies to address the loss of safety-related systems due to beyond design basis events.

Conclude Public Tour

Agenda

I Call to Order – Roll Call

The June 13, 2017, public meeting of the Diablo Canyon Independent Safety Committee, the ninetieth meeting of the DCISC, was called to order by Committee Chair Dr. Peter Lam at 1:35 P.M. at the Point San Luis Conference Room at the Avila Lighthouse Suites in Avila Beach, California.

Present:

Committee Member Robert J. Budnitz
Committee Member Peter Lam
Committee Member Per F. Peterson

Absent:

None

II Introductions

Dr. Lam welcomed those present in the room, introduced himself and reviewed briefly his tenure as Chair of the DCISC and briefly reviewed the appointment to the DCISC by officials of the State of California and the professional backgrounds of those of each of his fellow Members, Dr. Per F. Peterson, the appointee of the Governor, and Dr. Robert J. Budnitz, the appointee of the California Attorney General. Dr. Lam serves on the Committee as the appointee of the California Energy Commission (CEC). The Chair then introduced and briefly described the professional background of each the Committee’s Technical Consultants, Mr. R.
Ferman Wardell, P.E. and Mr. Richard D. McWhorter Jr. and introduced Assistant Legal Counsel Robert W. Rathie. Dr. Lam then introduced and recognized Mr. Hector Garcia, Support Manager in the office of PG&E Vice President and Chief Nuclear Officer Mr. James Welsch. Dr. Lam reported Mr. Garcia also ably serves as the principal liaison and point of contact for the Committee with PG&E and DCPP. Dr. Budnitz reviewed Dr. Lam’s professional background and Dr. Lam’s recent reappointment to a fourth three-year term on the DCISC. Dr. Lam thanked Dr. Budnitz and introduced and welcomed his spouse of 52 years, Mrs. Mabel Lam, who was present in the audience for this public meeting.

III Public Comments and Communications

The Chair reviewed the procedures and advice from the agenda for the meeting concerning receipt of comments from members of the public wishing to address remarks to the Committee and invited anyone who wished to address remarks to the Committee Members concerning matters not on the agenda for this public meeting to do so now.

Dr. Gene Nelson, government liaison and legal assistant for Californians for Green Nuclear Power was recognized. Dr. Nelson expressed his thanks to the Committee for the Committee having accepted Dr. Nelson request that mention be included in the Committee’s letter to the office of State Senator Monning regarding California Senate Bill 1090 (SB 1090) concerning the California Public Utilities Commission’s (CPUC) Decision18-01-022 which provides for and requires the retirement of DCPP by the end of the plant’s current operating licenses from the Nuclear Regulatory Commission (NRC), that is, by 2025. The Committee Members expressed their support for SB 1090 as to its effect on the DCPP Employee Retention Program in a letter approved at a public meeting held in Berkeley, California on May 22, 2018. In the letter the Committee Members agreed to include reference to the Application for Rehearing of D.18-01-022 filed by Californians for Green Nuclear Power and that therefore the Decision, although now in full force and effect, was not yet considered final.

Dr. Lam thanked Dr. Nelson for his comments.

IV Consent Agenda

The first item on the Consent Agenda was approval of the Minutes of the Committee’s February 7–8, 2018 public meeting held in Avila Beach, California. The Members and Technical Consultants reviewed the draft of the February 2018 Minutes provided with the agenda packet for this meeting. Items were discussed and reviewed for follow up or for future action and clarification was provided to the Assistant Legal Counsel concerning certain references in the draft Minutes and regarding typographical or editorial corrections, as well as concerning substantive changes to be made to the final version of the February 2018 Minutes. The Minutes as revised and corrected will be part of the final version of the Committee’s 28th

During review of the Minutes, Dr. Justin Cochran, Senior Nuclear Policy Advisor to the CEC was recognized. Dr. Cochran confirmed that in accordance with a commitment Dr. Cochran made at the February 2018 DCISC public meeting, in his capacity as California Energy Commission (CEC) Emergency Coordinator he provided information in the reports reviewed by the DCISC concerning tsunami hazard and mitigation and planning for a tsunami on the California coastline to representatives of the California Office of Emergency Services, Planning Division.

There were no public comments on February 2018 Minutes and on a motion by Dr. Budnitz, seconded by Dr. Peterson, the Minutes of the Committee’s February 2018 public meeting were accepted as amended subject to inclusion of the revisions discussed and changes provided to its Assistant Legal Counsel.

The second item on the Consent Agenda was approval of the Minutes of the Committee’s May 22, 2018 public meeting held in Berkeley, California. The Members and Consultants reviewed the draft of the May 2018 Minutes provided with the agenda packet for this meeting. Items were discussed and reviewed for follow up or future action and clarification was provided to the Committee’s Assistant Legal Counsel concerning certain references in the draft Minutes and regarding typographical or editorial corrections, as well as concerning substantive revision to be made to the final version of the May 2018 Minutes which will become part of the DCISC’s 28th Annual Report. Dr. Lam remarked the public meeting was held in Berkeley, California and not in the San Luis Obispo area as the issue reviewed during the meeting concerned a matter of importance to the Committee which required prompt and timely action.

Dr. Nelson was recognized and again thanked the Committee Members for their consideration of his comments at the May 2018 public meeting.

Ms. Sherry Lewis, representing San Luis Obispo Mothers for Peace (Mothers for Peace) was recognized. Dr. Lam explained in response to Ms. Lewis’ inquiry that the Committee’s letter to Senator Monning’s office concerning SB 1090 was in support of revising certain elements of Decision 18--01-022 which addressed the funding for the DCPP Employee Retention Program and the issue required that action be taken before this meeting, the next regularly scheduled meeting of the Committee in the San Luis Obispo area.

On a motion by Dr. Peterson, seconded by Dr. Budnitz the Minutes of the Committee’s May 2018 public meeting were accepted as amended, subject to inclusion of the revisions discussed and changes provided to its Assistant Legal Counsel.

V Action Items
A. Update on Financial Matters and Committee Activities.

The Chair requested Assistant Legal Counsel Rathie to provide this report. Mr. Rathie reported that the Committee sent its letter in support of the restoration of full funding for the Employee Retention Program to Senator Monning’s office and a copy of the letter was included in the public agenda packet for this meeting. He reported the Committee completed calendar year 2017 within the amount of funding provided by PG&E’s ratepayers for the Committee’s operation and, following its normal practice, any funds unspent at the end of 2017 should be returned by the Committee for credit to the ratepayers. On a motion made by Dr. Budnitz, seconded by Dr. Peterson, the Committee unanimously approved return of unspent grant funds from its calendar year 2017 operations to PG&E for credit to its ratepayers.

Mr. Rathie reported two payments have been received for calendar year 2018 operations from the funds provided as a grant for Committee operations and based on expenditures made to date, the Committee should also complete its calendar year 2018 operations within the amount provided under CPUC Decision 04-05-055. He observed a list of planned activities for the remainder of 2018 and for 2019 prepared by Mr. Wardell was included in the agenda packet for the meeting. Mr. Rathie reported that the Committee’s accountant has been directed to pay the retainers provided by the DCISC’s Restated Charter from the CPUC to all members as they are all currently serving within appointed terms.

B. Discussion of Issues on Open Items List:

Dr. Lam requested Consultant Wardell lead a review of items on the Open Items List, which Dr. Budnitz described as an important tool used by the Committee to establish priorities and to track and follow issues, concerns, and information identified as requested or to be provided on a periodic basis and for subsequent action during fact-finding or public meetings. Items captured on the Open Items List which represent changes from the prior version of the list were shown in bold red text on the version of the Open Items List provided with the agenda packet for this meeting. Items concerning which action was taken included the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Re:</th>
<th>Action Taken/Next Action</th>
</tr>
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<tbody>
<tr>
<td>CM-14</td>
<td>Use &amp; plans for wireless technology</td>
<td>Move to Equipment Reliability (ER) add performance monitoring and data storage</td>
</tr>
<tr>
<td></td>
<td>within the Power Block</td>
<td>aspects</td>
</tr>
<tr>
<td>EP-2</td>
<td>Emergency drills/exercises</td>
<td>Add NRC-evaluated exercise on 10/24/18; RJB &amp; RDM to observe 10/24 AM; review re public</td>
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</tbody>
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able to access Simulator observation room & DCPP re review videotaping the Simulator activity during exercise

<table>
<thead>
<tr>
<th>RA-6</th>
<th>Seismic Fragility Analysis &amp; Merge items</th>
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<tbody>
<tr>
<td>RA-7</td>
<td>Seismic PRA review</td>
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<tr>
<td>RP-12</td>
<td>Radiological Release Report Make next action 7/18</td>
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<tr>
<td>SEC-3</td>
<td>Security-safety interaction Create item SEC-4 for cybersecurity Make next action SEC-3 2Q20FF Make next action SEC-4 2Q19</td>
</tr>
<tr>
<td>SF-2</td>
<td>Cask &amp; pool fuel storage Create item SF-3 re review seismic adequacy of ISFSI in context of ISFSI license renewal in 2021 Make next action 2018 FF/RJB</td>
</tr>
<tr>
<td>DEC-3</td>
<td>Decommissioning-DCISC role Make next action annually</td>
</tr>
<tr>
<td>6/17 PM-2</td>
<td>Westinghouse Report on GSI-191 Close after 7/18FF</td>
</tr>
<tr>
<td>2/18 PM-2</td>
<td>Share tsunami &amp; LIP analysis Close</td>
</tr>
<tr>
<td>2/18 PM-5</td>
<td>ISFSI cask inspections Close (covered by SF-2)</td>
</tr>
<tr>
<td>2/18 PM-17</td>
<td>Share tsunami/hazard mitigation w/OES Close</td>
</tr>
</tbody>
</table>

2 Key to abbreviations used: Dr. Robert J. Budnitz (RJB), Dr. Peter Lam (PL), Dr. Per F. Peterson (PFP), Mr. Rick D. McWhorter (RDM), and Mr. R. Ferman Wardell (RFW), Fact-finding Meeting (FF), Quarter (Q), Public Meeting (PM), Review (Rev).

During discussion of item EP-2 Ms. Lewis and Dr. Nelson were recognized and both expressed support for the public possibly being permitted to observe the October 24, 2018 NRC-evaluated emergency exercise. Dr. Nelson commended PG&E for its efforts to create defense-in-depth for the DCPP Independent Spent Fuel Storage Installation (ISFSI). During discussion on the Open Items List certain items identified by Mr. Wardell as suitable for closure and deletion from future open items lists were confirmed.
Following the discussion on the Open Items List the Chair called for public comments. There were no comments by members of the public at this time.

C. Nomination and Election of Chair and Vice Chair for the July 1, 2018—June 30, 2019 Term.

On a motion made by Dr. Peterson, seconded by Dr. Lam, the Committee elected Dr. Budnitz to the position of DCISC Chair and, on motion by Dr. Budnitz, seconded by Dr. Lam, Dr. Peterson was elected to the position of DCISC Vice-Chair for respective terms of office from July 1, 2018 through June 30, 2019.

D. Consider Adoption of a Revision to Committee Policy #2 “Accounting Procedures” Regarding Electronic Deposits & Payments.

Assistant Legal Counsel Rathie explained the proposed revision would enable the Committee’s accountant to process direct electronic deposit payments to those individuals who elected in advance to use that method. This procedure would augment and would not replace the present requirement for two-party signature checks and approval by (1) the DCISC Chair or Vice-Chair and (2) the Committee’s accountant would continue to be required for all payments and a system of encrypted data would be used for electronic approval of direct deposit payments.

Mr. Shane Werner, a principal of accounting firm of Martin Ketterling & Associates of Ventura, California, the Committee’s accountant, confirmed that electronic payment would retain the internal controls now in place and would include use of the automated clearing house to process payments.

On a motion made by Dr. Budnitz, seconded by Dr. Peterson, the Committee unanimously approved amending Committee Policy #2 to provide for electronic processing of deposits for payment and delegated implementation of the process to the DCISC Chair and Legal Counsel’s office.

A short break followed.

VI Committee Member Reports and Discussion

A. Public Outreach, Site Visits and Other Committee Activities:

The Members turned to the matter of confirming and scheduling public meetings of the DCISC. Public meetings are now scheduled for October 24–25, 2018, February 13–14 and June 5–6, 2019 (the original date for the June 2019 having been changed at this public meeting from June 19–20) and the Members then scheduled a future public meeting of the Committee for October 23–24, 2019. Based on information received by Consultant McWhorter, the Committee committed to conduct a tour with members of the public in conjunction with its October 2018 public meeting.
Fact-finding visits were confirmed and scheduled as follows

[2018] July 10–11 PFP/RFW; August 22–23 PL/RDM; September 5–6 RJB/RFW; November 7–8 RJB/RDM; December 12–13 PFP/RFW; and

[2019] January 23–24 PL/RDM; March 18–19 RJB/RFW; April 17–18 PL/RDM; May 8–9 PFP/RFW; July 16–17 PFP/RDM; August 21–22 PL/RFW; September 10–11 RJB/RDM.

The Members and Consultants observed that the fact-finding schedule is subject to change based on emergent activities at DCPP.

3 Abbreviations used: Robert J. Budnitz (RJB); Peter Lam (PL); Richard D. McWhorter (RDM); Per F. Peterson (PFP); R. Ferman Wardell (RFW)

B. Documents provided to the Committee:

Dr. Lam remarked that the DCISC conducts its business in a transparent manner and most documents received by the Committee are matters of public record. Mr. Rathie directed the Committee's attention to the list of documents received since its last public meeting in February 2018. A copy of the list was included with the public agenda packet for this meeting.

Ms. Rochelle Becker, Executive Director of the Alliance for Nuclear Responsibility was recognized. Ms. Becker stated that she finds the letter from the Committee to State Senator Monning’s office, wherein the Committee expresses its support for full funding for the DCPP Employee Retention Program, to be unacceptable. Ms. Becker stated that the Joint Proposal entered into by PG&E, together with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Works Local 1245, Coalition of California Utility Employees and the Alliance for Nuclear Responsibility (Joint Proposal) to retire DCPP at the expiration of the current operating licenses required support for all of the Joint Proposal’s components and those components were not fully implemented by CPUC in its Decision 18-01-022 which approved PG&E’s Application for adoption of the Joint Proposal. The components not adopted or fully implemented by the CPUC in Decision 18-01-022 include the Commission not approving full funding for the Employee Retention Program in the amount sought by PG&E in its Application, rejecting funding sought in the Application for the Community Impacts Mitigation Program, and the Decision declining to address the replacement of DCPP’s generation capacity including imposing a binding requirement that DCPP’s generation output be replaced by zero greenhouse gas emitting sources. Ms. Becker stated that all the components rejected by the CPUC in D.18-01-022 are integral to form the basis for the rationale behind the Joint Proposal and for the DCISC to express its support for one (full funding for the Employee Retention Program) but not the others could be detrimental to and
hinder the chances that SB 1090 will receive approval from the California legislature. Ms. Becker opined that all components must receive legislative approval or she fears that none of them will. Ms. Becker asked the Committee to rescind and to withdraw its letter.

Dr. Peterson responded the Committee judged retention of DCPP employees to be relevant to operational safety of the power plant and within the Committee’s mandate from the CPUC to review operational safety and make recommendation and the Committee also considered the impact of the Decision on San Luis Obispo County emergency services but it is the DCISC’s understanding that emergency services are required to be continued under other NRC regulations and will work to confirm that is the case. Accordingly, the Decision’s impact on operational safety was judged to be the need to provide adequate retention bonuses to DCPP’s workforce. Dr. Budnitz stated the other issues discussed by Ms. Becker were outside the DCISC’s scope of review and the position of the parties to the Joint Proposal is not relevant to the Committee’s assessment of the impact on operational safety. Dr. Peterson remarked he did not believe that the Committee’s letter in support of one element would logically hurt the chances of SB 1090 passing. Dr. Lam stated he was sympathetic to Ms. Becker’s argument but it was his belief the letter adequately explained why the Committee was not able to support all elements of SB 1090. Dr. Budnitz observed that withdrawing the letter would be illogical as the Committee considered and found that if the retention bonuses were not increased, significant attrition of key plant staff is likely to occur to a greater degree than would otherwise be the case, particularly during the second tranche of the retention incentive program. Dr. Peterson expressed his view that, given the Committee’s assessment of the importance of the retention bonuses on plant safety, it would be not be ethical for the Committee to withdraw its letter for reasons based upon political expediency. Dr. Lam observed he believed Ms. Becker to be stating that the DCISC’s letter would damage the chances of SB 1090 in the legislative arena. Dr. Peterson stated it would be dishonest for the Committee not to express its opinion on the sole issue within its purview as it is his understanding the legislature is the only body with the authority and capability to address the problem perceived by the DCISC. Dr. Budnitz agreed that the Committee not articulating its opinion on this matter would be irresponsible.

In response to Ms. Becker’s entreaties to rescind the letter, Dr. Budnitz thanked Ms. Becker for bringing her concerns to the Committee but he stated that in its letter the Committee was careful not to endorse the SB 1090 in full but to call attention to the restoration of full funding for the Employee Retention Program, while recognizing the DCISC is not in a position to design that program in detail, and in that regard the Committee recognizes certain employees have roles that are more vital to plant safety than others.

Dr. Lam suggested that the Committee take Ms. Becker’s comments under advisement and enter them in the public record. Dr. Budnitz replied that the
Committee should conduct its debate of the issue at this time. Assistant Legal Counsel Rathie pointed out that as this matter was not on the agenda for this public meeting, accordingly comments must be brief and substantive action is not permitted to be taken on any item not on the agenda. Dr. Budnitz requested that the Members consider calling a meeting to put the matter of rescinding the Committee’s letter in support of SB 1090 on a public agenda. Drs. Lam and Peterson both expressed their opposition to the Committee holding a public meeting for the purpose described by Dr. Budnitz.

Mr. David Weisman of the A4NR was recognized. Ms. Weisman stated, with reference to the discussion at the DCISC public meeting on May 22, 2018, that insufficient consideration was given to a possible nexus between other elements, aside from the Employee Retention Program, and safety such that a reduction in funding for the County due to Decision 18-01-022 having rejected the Community Impacts Mitigation Program and this will likely have an effect on local area infrastructure such that emergency response capabilities will be affected. Mr. Weisman stated a fuller understanding of these and other impacts might have led the DCISC to a different conclusion. Dr. Budnitz reported it is his understanding the NRC will continue to assess and ensure emergency capabilities do not fall below acceptable levels. Mr. Weisman agreed but responded that, to the extent of local roads, that responsibility falls to the Federal Emergency Management Agency (FEMA) and FEMA is then able to delegate the responsibility for road repair to the County and there is a finite pool of resources from which the County may draw to repair roads necessary to ensure the access to DCPP is unimpeded and this means that something else must await funding thereby creating a ripple effect which could ultimately have an impact on the attrition of the DCPP workforce.

Dr. Budnitz requested, with the concurrence of the Chair, that Agenda Item VI-A concerning scheduling of future meetings be reopened for the purpose of considering the scheduling of a public meeting two weeks hence to consider rescinding the Committee’s letter in support of SB 1090. After a brief discussion, the consensus of the Membership of the DCISC was that the next meeting of the Committee should be the regular and previously scheduled meeting now set for October 24–25, 2018.

VII Staff-Consultant Reports and Receive, Approve and Authorize Transmittal of Fact Finding Reports to PG&E

The Chair requested Consultant McWhorter to report on a fact-finding visit to DCPP. Mr. McWhorter reported on the March 7–8, 2018 fact-finding visit to DCPP with Dr. Budnitz. Mr. McWhorter stated activities conducted and topics reviewed with PG&E during that visit included the following:

- Meeting with NRC Senior Resident Inspector - the DCISC fact-finding team (FFT) met with the NRC Senior Resident Inspector to discuss activities during refueling outage 2R20 and the impact of the Joint Proposal on DCPP
Software Quality Assurance (QA) Programs - these programs are managed by the DCPP Digital Systems Group, a part of the Engineering organization, to monitor and oversee software configuration management for individual plant equipment and control systems. Each system’s software is managed by a software QA plan and if a change is required it is governed by a design change package. Verification of changes is accomplished through the use of a development system which is similar to, but operates outside of, the plant’s system to ensure there is no adverse impact on plant systems prior to verification. Business-related software, such as Excel, is managed separately from plant process software and a QA plan is in place for business-related software that is used in a function important to safety or safety-related systems. Mr. McWhorter reported the FFT found the Software Quality Assurance Program was comprehensive and designed to ensure computer software used in the plant is developed and maintained in a controlled fashion.

Non-Containment Outage Work Tour - as the March 2018 fact-finding visit occurred during the 2R20 refueling outage, the FFT toured the Outage Control Center, the Turbine Building, the Control Room, the Auxiliary Building and the Fuel Handling Building. Mr. McWhorter displayed a chart used in the Outage Control Center to assess the critical path and work flow for the outage. At the time of the visit the reactor head was in place on the vessel and the studs were being installed and prepared for tensioning. The FFT reviewed preparations for the 10-year Containment Integrated Leak Rate Test with Mr. Garcia who was the coordinator for that test which uses 16 air compressors to pressurize Containment to 45 pounds per square inch (psi). Mr. McWhorter reported the test was subsequently successfully completed. The FFT concluded the outage work was proceeding in a controlled, professional manner with careful preplanning and management.

Nitrogen Leak in Containment - the DCISC representatives reviewed the nitrogen leak in Unit-2 Containment that, on July 17, 2017, resulted in an Alert being declared by DCPP due to a reduction in oxygen content in Containment resulting in Containment becoming a hazardous environment for personnel entry. The leak resulted from the backup nitrogen system which serves the three power operated relief valves in the pressurizer used to manage pressurizer level and prevent over pressurization or reestablish pressure if necessary. These valves are normally powered by air systems with the nitrogen system serving as a backup but which must be capable of 300 cycles during a potential accident scenario. A small leak on a relief valve on the nitrogen system was allowed to continue for approximately 18 months and over that time released enough nitrogen to cause the Alert. Procedures have been changed and standards put in place to improve the daily review and prioritization of repair work for abnormal plant conditions. Mr. McWhorter opined that this was not the type of event for which an Alert should be
desired to be called, and with regular and more frequent tracking of containment atmosphere this should preclude future activation of the Emergency Plan for this situation. The FFT concluded the corrective actions were appropriate.

- 2018 Operating Plan - at the time of the fact-finding visit, the Operating Plan was being vetted for specific initiatives and to detail key work plans, initiatives and metrics to measure success for the 2018 key focus areas. A station alignment workshop on the Operating Plan was to be scheduled. The FFT concluded the Operating Plan contained the appropriate focus on initiatives and key metrics and the DCISC should continue to monitor the Operating Plan in the future.

- Containment Outage Work Tour - The DCISC FFT toured work in Containment and Mr. McWhorter stated the group was able to move around without impediment and only very limited areas inside Containment were restricted due to radioactivity levels. The team visited all levels of Containment and found the work to be well planned, coordinated, controlled and executed. Dr. Budnitz remarked the team did not observe any interference between the various groups then conducting work in Containment and this included the area around the Containment equipment hatch where equipment was being moved into and out of Containment.

- Decommissioning Process - FFT met with Mr. Jon Franke, PG&E Vice President Power Generation, to review decommissioning planning. At the time of their visit the composition of the Diablo Canyon Decommissioning Engagement Panel was in the selection process. Mr. McWhorter reported the Decommissioning Engagement Panel subsequently held its first meeting in May 2018. Decommissioning funding options were reviewed and Mr. McWhorter reported the funds from the Nuclear Decommissioning Trust are primarily set aside for radiological decontamination but are not intended to provide full funding for returning the site to “green field” status. Accordingly, PG&E will need to seek additional funding from the CPUC. Mr. McWhorter reported the disposition of all waste from nuclear power plants is now required by a California Executive Order to take place outside of California and this could likely involve large volumes of fill and concrete and PG&E may seek to modify the Executive Order in some manner to allow some material to be reused on the site. Dr. Peterson remarked the DCISC should follow up on this Executive Order as it may not necessarily be risk-informed. Dr. Budnitz reported that the plant will be required to classify all items and under the Executive Order the nonradioactive materials will need to be transported outside of California. Dr. Budnitz remarked this is an area outside the NRC’s concern. Dr. Peterson observed it is pertinent to ensure there is a disposition pathway for all materials that is either readily available or for which a storage option exists until a disposition pathway is available. Mr. McWhorter stated the FFT also discussed with Mr. Franke the transition from the plant’s current operation under a 10 CFR Part 50 License for power generation operation and a Part 72 license for storage of
spent fuel to only a Part 72 license. He reported this the transition will occur through a series of license amendments to the Part 50 License. The FFT observed that the decommissioning plans continue to be developed.

- Employee Retention Programs - the DCISC representatives met with Mr. Jim Welsch, PG&E Vice President and Chief Nuclear Officer to discuss the potential impact on the Employee Retention Program from the Proposed Decision on the Joint Proposal which recommended a reduction in funding for the Employee Retention Program. Employees will be offered the opportunity and, in order to participate in the reduced incentive program be required to sign new agreements and while the proposed change is not believed to have a great impact during the first tranche of the retention program, the second tranche which follows may be significantly impacted by a reduction in the retention incentive. **Mr. McWhorter reported the FFT concluded the DCISC should continue to monitor the effectiveness of the Employee Retention Program.**

- Meet with DCPP Officer - Dr. Budnitz met with Mr. Welsch.

- Human Performance Data Inclusion into Probabilistic Risk Assessments (PRA) - Mr. McWhorter reported the FFT found the plant’s PRA Program uses guidance developed from national standards to employ techniques for human error rate prediction methodology. Generally, there is insufficient DCPP-specific data on human performance to inform the PRA, although there are a few points where the PRA has been modified for plant-specific data. The DCISC team found the plant’s use of human reliability analyses in the PRA to be appropriate.

Following Mr. McWhorter’s report, Ms. Rochelle Becker of the Alliance for Nuclear Responsibility was recognized. Mr. Becker suggested that the Committee obtain a copy of the Executive Order governing disposal of materials from nuclear power plants and she remarked there are examples of the movement of nuclear fuel around California.

Upon a motion by Dr. Budnitz, seconded by Dr. Lam, the March 7–8, 2018 Fact Finding Report was approved and its transmittal to PG&E authorized. Once the Committee’s fact finding reports are approved at a public meeting they are no longer considered to be in draft form and are made available in a binder for inspection by members of the public, together with information concerning the professional backgrounds of the Committee’s technical consultants involved with preparation of its fact finding reports. Fact finding reports become part of DCISC’s Annual Reports.

The Chair requested Consultant Wardell to report on a fact-finding visit to DCPP. Mr. Wardell reported on the April 17-18, 2018 fact-finding visit to DCPP with Dr. Peterson. Mr. Wardell stated topics reviewed with PG&E during that visit included the following:
4kV System Review and Walkdown with System Engineer - Mr. Wardell reported the 4kV System is a safety-related system that provides power for both vital and non vital equipment. It is powered from multiple sources, normally from the main generator when the plant is operating but may also be powered by the 230kV and 500kV off site systems as well as by the emergency diesel generators. The 4kV System is presently rated in White status due to a potential energy line break which could introduce steam into one of the equipment rooms. When planned changes are made to the dampers leading into that room, the system will return to Green status. The FFT walked down the system with the system engineer and found it well designed, operating properly and to be in good condition. The system engineer was very knowledgeable and proactive concerning the 4kV System.

4 On a scale of Green indicating a healthy performance and White indicating that achievable action plans are in place to return performance to healthy status. A Yellow rating would indicate the indicator shows deficient performance and needs improvement and Red would indicate unsatisfactory performance.

Refueling Outage 2R20 Results - as there is a presentation scheduled on the 2R20 refueling outage, Mr. Wardell stated he would not further discuss what he described as a very successful refueling outage.

Leadership Engagement in the Performance Improvement Process - the Performance Improvement Process (which was formerly termed a “Program”) includes the Corrective Action Program, benchmarking, self-assessment, and the Operating Experience Program as component parts. The plant is developing expectations for recognition by the management team when performance is less than desired and has characterized this effort as augmented leadership engagement. Mr. Wardell reported the DCISC team found this to be appropriate as it will help improve station performance.

Online Maintenance - Mr. Wardell reported on the FFT review of maintenance performed during generation operations when equipment is taken out of service for maintenance. A risk assessment is performed using the Phoenix Risk Model, an advanced, semi-quantitative, structured and controlled modeling procedure to minimize risk.

Reactivity Management - Mr. Wardell described reactivity as the measure of the changes in the neutron levels to indicate when the reactor is increasing, decreasing or maintaining the same power level. Reactivity control is control of the reactor itself and at DCPP the prime responsibility lies with the Operations shift manager assisted by the Reactor Engineering organization and the Reactivity Management Leadership Team. Mr. Wardell reported the program is in Green status and well designed and implemented with appropriate controls.

Boric Acid Control - Mr. Wardell reported boric acid is used for long-term...
control of reactivity, as boron absorbs neutrons and by adjusting the amount of boric acid in the Reactor Coolant System reactivity in the nuclear core is affected. Occasionally, he reported, there are leaks of boric acid which can damage and corrode carbon steel. These leaks must be monitored and controlled and DCPP tracks each leak whether it is wet or dry. The DCISC representatives found the Boric Acid Control Program to be effective and in good health.

- Meeting with NRC Senior Resident Inspector - the DCISC representatives discussed matters of mutual interest with the NRC Senior Resident Inspector.

- Meeting with Senior Director of Nuclear Technical Services - Dr. Lam met with Mr. Jan Nimick, Senior Director of Nuclear Technical Services, to discuss items reviewed during the fact-finding and of mutual interest.

- Control Room Ventilation System - Mr. Wardell stated this system provides a comfortable environment and protects operators in the Control Room from contaminants such as gas or radioactivity. In 2013 the system was found to experience some in-leakage and short-term fixes were applied and a major reanalysis was undertaken and long-term fixes identified in that reanalysis have now been completed. Mr. Wardell stated the DCISC can remove this topic as a special issue but should retain review of the system as a periodic item on the Open Items List.

- Quality Verification (QV) Assessment of Refueling Outage 2R20 - the FFT reviewed QV’s assessment of activities during 2R20 and found QV’s review of the Operations and Maintenance organizations and all departments reviewed to be complete with some items identified for improvement including: the Confined Space Program not having been rigorously followed; challenges to ensure work instructions are adequate; problems with Operations verifying equipment configurations and plant conditions. Mr. Wardell recommended the DCISC follow-up on these three deficiencies identified for improvement.

Following Mr. Wardell’s presentation, Ms. Sherry Lewis of Mothers for Peace was recognized. In response to Ms. Lewis’ inquiry concerning how many licensed operators have left employment at DCPP, Mr. Wardell responded that while he did not have a precise number the total was not enough to raise a concern on the part of the FFT. He reported DCPP has initiated operator training classes and has compiled a lengthy list of applicants for the training program from which to choose. In response to Ms. Lewis’ further inquiry, Mr. Wardell and Dr. Budnitz reported it takes approximately 30 months to train a new operator to qualify for a license from the NRC.

Upon a motion by Dr. Budnitz, seconded by Dr. Peterson, the April 17–18, 2018 Fact Finding Report was approved and its transmittal to PG&E authorized.

The Chair requested Assistant Legal Counsel Rathie to report on administrative,
regulatory and legal matters. Mr. Rathie reported that upon direction of the Committee Dr. David Victor, the Chair of the San Onofre Decommissioning Community Engagement Panel, was invited to attend this meeting but because of scheduling conflicts Dr. Victor’s appearance has been postponed until the October 2018 public meeting. Mr. Rathie then thanked Mr. David Weisman at whose suggestion the Committee extended its invitation to Dr. Victor. Mr. Rathie reported the Committee has now begun the process of developing its 28th Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations for the period July 1, 2017—June 30, 2018 and that report is expected to be ready for approval at the October 2018 public meeting. He remarked that the informational video produced as a part of the Committee’s public outreach effort has now been shown twice and will be further developed to be available for use with the DCISC public tours and on the Committee’s website. Concerning traffic on the DCISC website, he reported www.dcisc.org has averaged 996 unique visits each month for the first five months of 2018. The countries generating the most visits were the United States, Canada, Japan, Poland and the Russian Federation.

Mr. Rathie congratulated Dr. Lam on his recent reappointment to a three-year term on the DCISC by the California Energy Commission and observed that as all Members are now serving within their respective appointed terms, all Members will receive payment of the retainer provided for by the CPUC during this July.

Mr. Rathie reported the Committee held a public meeting on May 22, 2018 in Berkeley and approved a letter in support of SB 1090. He reported that the legislation has now passed out of the California Senate and is pending consideration in the California Assembly.

VII Adjourn Afternoon Meeting

The Chair adjourned the afternoon meeting of the DCISC at 5:20 P.M.

IX Reconvene for Evening Meeting

Dr. Lam reconvened the evening meeting of the DCISC at 5:35 P.M. and welcomed those present.

X Committee Member Comments

Dr. Peterson recognized and introduced his son, Lucas Peterson, who was present in the audience for this public meeting.

XI Public Comments and Communications

Mr. Ray Lutz was recognized to address the Committee. Mr. Lutz stated he was representing the group Citizens’ Oversight and in his remarks he would address that group’s HELMS Proposal. He commented Citizens’ Oversight has to date been principally involved with the San Onofre Nuclear Generating Station’s (SONGS)
decommissioning and the issue of nuclear waste. He reported that SONGS owner, Southern California Edison, recently agreed to a settlement to study moving the spent fuel from the SONGS to another location. Mr. Lutz reported he has an engineering background and it was the debate over thick versus thin walled spent fuel storage canisters which prompted his concern about how long the canisters might last and whether they are or will be subject to stress corrosion cracking. He remarked that his group did not want to see a transfer of problems with the canisters to another location.

In explaining the meaning of HELMS, an acronym, Mr. Lutz stated the “S” represents surface storage, as it is the Citizens’ Oversight group’s opinion that the canisters must be stored on the surface for approximately 100-200 years. The “H” stands for hardened facilities to make the canisters immune to terrorist actions. The “E” stands for extended life, meaning that the 40-year license term provided by the NRC is inadequate and the goal should be a life of 1,000 years with maintenance and 300 years of passive lifetime. The HELMS Proposal would enclose the existing canisters in an additional outer shell and introduced pressurized helium between the inner canister and outer shell which could then be monitored to detect leaks. “L” stands for local and Mr. Lutz stated the canisters need to be stored near where they were generated, but as some sites are near water this principle might not be appropriate for those plants. The “M” stands for monitoring, which should be undertaken on a 24-7 basis to detect any change in pressure within the outer shell.

M. Lutz stated he has an open mind as to other concepts but it was his belief the dual, outer and inner shell canister would be more acceptable to the nuclear industry than some other concepts as it would allow the industry to continue to use existing canisters. Mr. Lutz stated Citizens’ Oversight submitted an application to the NRC for what he stated were very specific changes in 10 CFR Part 72 regulations and is moving forward with an administrative process concerning its HELMS Proposal. He observed the NRC Waste Confidence Rule provides that spent fuel storage systems can remain in place indefinitely while the NRC only provides a 40-year license for such systems and this disconnect needs to be rectified with the technology now available. He stated he has sent information on the HELMS Proposal to the DCISC and Dr. Budnitz confirmed that the Committee has received the information.

Dr. Budnitz inquired how much the HELMS Proposal might cost to which Mr. Lutz replied he did not have an estimate other than that it would be less expensive that other proposals now under consideration. Mr. Lutz remarked the consolidated interim storage facility planned to be located in New Mexico and partially approved by Congress would only need to make its storage vaults somewhat larger. For independent spent fuel storage installations located outside, in the open, at sites such as DCPP there would only be the need to cover the site with a concrete structure once the outer shells were installed over the existing canisters. He observed there would be no need for repackaging spent fuel as was planned for

the Yucca Mountain repository in Nevada. Dr. Budnitz observed that had the Yucca Mountain repository opened as planned and on the schedule proposed by the U.S. Department of Energy, all waste stored on nuclear power plant sites in the U.S. would have been disposed of over a 50-year period from Yucca Mountain’s opening. Dr. Budnitz reported the cost of Yucca Mountain was estimated as slightly more than 1% of the value of all electricity generated to produce the waste and he stated costs for the HELMS Proposal were likely to be much less. Dr. Budnitz recommended to Mr. Lutz that, to make the HELMS Proposal more realizable, it would benefit the proposal to include an approximate cost estimate. He stated that a proposal such as the HELMS Proposal that could work to make storage safer is of interest to the DCISC. Dr. Peterson observed the capability to use an over pack as an additional barrier has been identified as important from the perspective of mitigation of risk, particularly if a spent fuel pool is to be decommissioned. Mr. Lutz remarked that PG&E's Humboldt Bay Nuclear Power Plant (HBNPP) employs a pressurized, double layer design for its spent fuel storage system and Dr. Peterson stated this was an interesting approach as the casks used at HBNPP are also designed for transportation. Dr. Budnitz remarked that while it is important to think through the criteria, specific details may stifle innovation and there are many innovative approaches possible for meeting these criteria.

XII Information Items Before the Committee

The Chair requested Mr. Cary Harbor, Director of Nuclear Business Operations to introduce the first of the informational presentations requested by the Committee for this public meeting. Mr. Harbor has more than 30 years’ experience in the nuclear industry and holds a Bachelor of Science Degree in Nuclear Engineering from the University of California at Santa Barbara and has completed executive level courses at Stanford University. Mr. Harbor previously held leadership positions in Engineering, Regulatory Services, Operations, Maintenance and Generation Business organizations at DCPP.

Mr. Harbor introduced Ms. Paula Gerfen, DCPP’s Senior Station Director. Mr. Harbor reported Ms. Gerfen has more than 20 years’ experience in the nuclear industry, holds a Bachelor of Science degree in Computer Engineering, and has previously held leadership roles in Operations, Maintenance Engineering and Digital Engineering organizations at DCPP.

Presentation on the State of the Plant including Key Events, Highlights and Station Activities since the DCISC’s February 2018 Public Meeting.

Ms. Gerfen reported both units are operating at 100% power and there are no challenges at this time. She reported two weeks ago Unit-1 experienced a main feedpump low lube oil reservoir alarm and to proactively address the situation Unit-1 was ramped to 50% power to determine if the trip signal would lock in and trip one of the Unit-1 feedpumps. It was determined that a problem existed with one of the main annunciator circuits and Unit-1 immediately ramped back to 100%
power. In April 2017 a cooling water tunnel cleaning was performed for Unit-1 which occupied three to four days with the unit again ramped to 50% power. There were no challenges during the tunnel cleaning. In response to Dr. Peterson’s query, Ms. Gerfen stated that by ramping to 50% power for the feedpump event the plant experienced less stress as depending on the power level, auxiliary feedwater pumps would have otherwise been started which introduces colder water into the secondary system. Ramping to 50% also provides time for the Control Room personnel to review procedures.

Ms. Gerfen displayed and briefly reviewed generation graphs showing operational performance during 2018 for both units and a second graph showing performance since the last public meeting of the DCISC in February 2018.

Ms. Gerfen reviewed the DCPP 2018–2022 Operating Plan and the new mission and culture statements which focus on the concept of generating excellence in areas of safety, people, reliability, affordability, risk compliance and ethics and in regulatory and external strategy.

Ms. Gerfen reviewed upcoming station activities including:

- Station Assignment Workshops - June 26—August 1, 2018.
- NRC Radiation Safety Inspection - Week of July 9, 2018.

In response to Dr. Peterson’s request, Ms. Gerfen described the major goals of the station alignment workshops as creating alignment from the top to the bottom of the DCPP organization and to emphasize the focus for all employees on the Operating Plan and to identify how each employee contributes to the specific areas identified in the Operating Plan in their daily activities. The station alignment workshops are also intended to provide employees with a look ahead to 2019 when the station will have two refueling outages, the World Association of Nuclear Operators (WANO) evaluation, and a Security organization force-on-force drill. In response to Consultant Wardell’s inquiry, Ms. Gerfen confirmed the Triennial Fire Protection Inspection will include the National Fire Protection Association Regulation 805 (NFPA 805) program as well as the rest of the fire protection programs. In response to Dr. Lam’s inquiry on the plant’s focus on flexibility and whether that concept was synonymous with cutting corners, Ms. Gerfen replied that flexibility as used in the Operating Plan and otherwise was in no way intended or allowed to affect safety, reliability or affordable operations and those concepts are integral parts of the organizational culture of DCPP. In response to Dr. Budnitz
inquiry, Ms. Gerfen replied she had no concerns at this point on upcoming NRC Radiation Safety Inspection as the DCPP Radiation Protection organization and plant performance on the “As Low As Reasonably Achievable” (ALARA) concept is within the top decile within the nuclear industry.

Mr. Harbor introduced Senior Director for Nuclear Services Mr. Jan Nimick and reported that Mr. Nimick has more than 20 years’ experience in the nuclear industry and held a Senior Reactor Operator License and a Bachelor of Science Degree in Mechanical Engineering. Mr. Nimick has held leadership roles at DCPP in the Operations and Maintenance organizations.

**Update on Long-term Capital Project Planning under CPUC Decision D.18-01-022 including the Plant Investment Review Process and an Overview of the Project Review Working Group Process and the Results of its Analysis to Date.**

Mr. Nimick reviewed the history of the Joint Proposal under which PG&E agreed to forego pursuing relicensing for DCPP and for the plant to close by 2025. As a result Mr. Nimick reported the Project Review Working Group was assembled in 2016 to perform a technical review and to assist DCPP leadership on assessing each project planned or in progress. The Project Review Working Group consists of a multi-disciplined team made up of representatives from the Engineering, Maintenance, Operations and Work Management organizations. A number of projects were cancelled as a result of Project Review Working Group’s recommendations to the Excellence Plan Executive Oversight Board. Projects required by regulation were retained as well as projects recommended in order to maintain safety and reliability. In response to Consultant McWhorter's inquiry, Mr. Nimick stated he estimated about a third of the projects submitted for review were cancelled and he agreed to provide the final list of cancelled projects to date to the DCISC. Mr. Nimick confirmed Dr. Budnitz’ observation that the Eagle 21 Plant Protection System replacement project was amongst the projects that were cancelled and Westinghouse has committed to support the Eagle 21 System through the end of the plant’s operational lifetime. Mr. Nimick observed that review and assessment by the Project Review Working Group is now a part of future project review and the group meets on a routine basis for that purpose and to advise the Plant Health Prioritization Committee which is involved in making final decisions on capital spending.

Mr. Nimick stated DCPP continues to implement projects and he cited the baffle-former bolt inspection and replacement for Unit-1, the cavity seal replacement for Unit-1, and the control rod guide card inspection and replacement for both units as examples of completed projects. Future projects to be undertaken include the stator re-stack for Unit-2 during 2R21, the main annunciator replacement for both units in 1R22 and 2R22, and replacement of air compressors and plant air dryers. Mr. Nimick confirmed Dr. Lam’s observation that the stator re-stack is the project which entails a greater amount of complex work than the other two projects he
Mr. Nimick reported DCPP is reviewing its preventive maintenance practices using a multi-disciplined, Preventive Maintenance Optimization Team involving the Operations, Maintenance and Engineering organizations performing a structured analysis of more than 12,000 planned maintenance items. The team is assessing maintenance frequencies in order to optimize the effectiveness of preventive maintenance activities. In response to Consultant Wardell’s inquiry, **Mr. Nimick reported the team has reviewed approximately 60% of the 12,000 maintenance tasks and he offered to review the preventive maintenance optimization efforts with the DCISC during the scheduled July fact-finding visit.** Mr. Nimick stated his opinion that this effort would be valuable no matter how long the plant was planning to operate as the effort frees up maintenance resources to work on corrective items.

Dr. Peterson noted that in many industrial contexts there is a movement away from preventive maintenance and toward condition-based maintenance and there are better techniques available now than in the past to monitor degradation and to predict equipment performance and this trend actually increases safety as it avoids creating a “bathtub curve” wherein equipment with newly performed maintenance may be more susceptible to failure during initial operation after maintenance was performed. Dr. Peterson observed any move away from preventive maintenance requires an assessment of the use of resources that are accordingly freed up to ensure they are employed in a manner that mitigates any incremental increase in risk. Mr. Nimick agreed and stated efforts are now underway by the Electric Power Research Institute (EPRI) to develop on line monitoring devices and guidance for particular equipment. In response to Dr. Budnitz’ inquiry as to whether any of the efforts to optimize preventive maintenance have come into conflict with the plant’s technical specifications or the NRC Maintenance Rule, or where the proposed change is in conflict with a probabilistic risk assessment, Mr. Nimick stated that to date he was unaware of any such conflicts.

Mr. Nimick, in response to Dr. Peterson’s request, reviewed some of the efforts now being undertaken at other nuclear power plants to install instrumentation on equipment and then to feed data to a central computer through a wireless network, as this is part of an initiative to move toward condition-based maintenance and he described the challenges these efforts may face in understanding causation with the increased use of artificial intelligence. He remarked that as the plant is only expected to run for a few more years DCPP is not engaged in these types of efforts and preventive maintenance frequencies have not changed based on data from installed monitors or monitors installed on large components as those components are replaced. Dr. Peterson encouraged Mr. Nimick to explore this issue as performing preventive maintenance and creation of the resulting bathtub curve may actually increase risk. In response to Dr. Budnitz’ query, Mr. Nimick confirmed that Operations provides a senior reactor operator/shift manager to serve on the Preventive Maintenance Optimization Team.
in order to bring a detailed knowledge of emergency procedures to the team. In response to Consultant McWhorter’s observation, Mr. Nimick confirmed the emergency diesel generators are being assessed as part of the preventive maintenance optimization efforts.

Following Mr. Nimick’s presentation, Ms. Rochelle Becker of the Alliance for Nuclear responsibility was recognized. Ms. Becker inquired whether work on the Unit-2 stator rewind would result in the stator being subject to the bathtub curve effect; whether the replacement of the main annunciator is expected to be completed for less than $20 million; and were the projects described by Mr. Nimick approved by the CPUC in the last rate case. Ms. Becker also inquired as to the cost of the cancelled projects and she requested a list in electronic format, as well as information concerning the savings realized by their cancellation. Mr. Nimick stated the Unit-1 stator was rewound in operating cycle 12 and it is expected to perform well through the end of operations. The stator for Unit-2 has never been rewound and is now at the end of its expected operational lifetime. He remarked equipment is never out of the bathtub curve effect which is governed by time and failure rate, and that results in a higher failure rate at the beginning of a component’s operational lifetime but the failure rate drops off rather quickly to a period of stable operation with a rising risk of failure toward the end of a component’s expected lifetime. **Mr. Nimick stated he would need to check on the estimated cost of the replacement of the main annunciator and he agreed to provide that information to the DCISC.** Mr. Harbor confirmed that the stator project will be included in the current rate case filing. **Mr. Nimick stated he would provide the DCISC with a full listing of the cancelled projects and Mr. Harbor remarked that the plant would need to consult with PG&E’s Legal Department before providing information on the cost of the cancelled projects.** Dr. Budnitz remarked that the DCISC is not necessarily concerned with the cost of the projects unless operational issues are identified in connection with cancelled projects.

Ms. Sherry Lewis of Mothers for Peace was recognized. In response to Ms. Lewis’ inquiry, Mr. Nimick confirmed that the Unit-2 stator rewind project will include replacing the coils on the armature and the current-carrying portion of the stator but will not involve replacement of the rotor or the frame but will include replacement of the hydrogen cooler and the seals and many other components of the stator.

Mr. David Weisman of the Alliance for Nuclear Responsibility was recognized. Mr. Weisman remarked that as part of the Alliance’s settlement in PG&E’s general rate case, information was to be made available to the Alliance by PG&E on projects that exceeded $20 million in cost. Mr. Weisman noted the presentation made to the DCISC by Mr. Nimick included aspects of affordability and he observed that topic should not be dismissed and be at least of some concern to the DCISC especially in the waning years of the plant’s operation. Mr. Weisman observed the Alliance and the DCISC should be looking for the same information from PG&E as
to project costs although they may view it in differing contexts.

Mr. Ray Lutz of the Citizens’ Oversight group was recognized. Mr. Lutz stated he was surprised that PG&E would be considering a complete rewinding of the Unit-2 stator at this time and he suggested that consideration should be given to shutting down one of the units on an extended basis and only operating a single unit and then using the funds which would have gone to the stator rewind project to install renewable power sources. Mr. Lutz stated that from the perspective of reviewing preventive maintenance efforts in a context other than that of the plant’s technical specifications, Citizens’ Oversight would prefer to have a committee review those issues in public as NRC review may prove inadequate.

Dr. Lam thanked Mr. Nimick for his informative presentation.

Mr. Harbor introduced Director of Strategic Initiatives, Mr. Tom Jones, to make the next informational presentation to the DCISC. Mr. Harbor reported Mr. Jones has more than 20 years’ experience in governmental relations and holds a Bachelors of Arts degree in governmental and political science.

**Update on the DCPP Employee Retention Plan under CPUC Decision D.18-01-022 including Ongoing Efforts to Retain Sufficient Numbers of Qualified Licensed Operations Department Staff.**

Mr. Jones thanked the Committee Members for their recent letter in support of SB 1090. He reported that a legal challenge to the license granted to PG&E by the State Lands Commission to occupy the public right of way on the coastline in order to use ocean water for DCPP cooling was just that afternoon adjudicated in favor of PG&E by the California appellate court.

Mr. Jones reported the Employee Retention Program was a part of the Joint Proposal, however, in Decision 18-01-022 the CPUC reduced funding for the program by 40%, that is, by reducing the financial incentive to remain employed at DCPP from 25% of an employee’s salary to 15%. Mr. Jones remarked the 25% proposal was benchmarked, that is it was found to be comparable with those offered by DCPP’s peers in a decommissioning context within the nuclear industry and therefore judged by PG&E to be appropriate. State Senator Monning, whose district includes the San Luis Obispo area, has introduced SB 1090 which would provide legislative redress of CPUC reduction and SB 1090 has now passed out of the State Senate and is now pending before the Assembly for committee assignment.

Mr. Jones displayed metrics for the Employee Retention Program in light of the reduction imposed by the CPUC which required PG&E to again extend an offer to participate to DCPP employees. The new offer, extended in accordance with the CPUC Decision, resulted in a 1% difference in the number of employees accepting the incentive and Mr. Jones stated the incentive remains an effective tool in the
recruitment process. He reported 277 positions have been filled at DCPP both internally and externally since the Joint Proposal was announced with 94% of those employees in those positions electing to participate and to accept the incentive.

Mr. Jones displayed graphs showing quarterly progress in the percentage of retention agreements signed which showed a reduction of 1% when the program was recast by the CPUC Decision. Mr. Jones observed that the 133 persons who elected not to sign retention agreements represented a number aligned within the annual average of plant turnover in personnel and he reported 58% of the 133 persons who declined to participate are now fully eligible to retire. In response to Dr. Lam’s inquiry as to whether SB 1090 was necessary, as the differences in participation are not great, Mr. Jones responded that when SB 1090 was introduced in February 2018, the offer of 25% was contingent on passage of SB 1090 and was further conditioned upon an employee having agreed to participate at the 15% level. Dr. Peterson remarked the DCISC’s concern over the reduction in the retention incentive was principally focused upon tranche two. In response to Dr. Peterson’s observation, Mr. Jones reported that as payments were not made at the time the retention program was recast by the CPUC, there was no obligation for employees to have to pay back funds received. Mr. Jones reported as to tranche two, in order to be eligible for the severance program, which exceeds the aggregated benefits of tranches one and two, an employee must participate in tranche two. He reported invitations to participate in tranche two will be extended in one year.

In response to Dr. Lam’s observation, Mr. Jones stated that he did not believe the 15% retention incentive would have been sufficient to obtain the current results, although he stated he also did not believe that employees were relying upon the legislation as a principal factor in deciding whether to participate. Mr. Jones stated his belief that support for SB 1090, and its potential effect on tranche two, is an important and effective factor in DCPP’s ability to immediately recruit new hires. Dr. Budnitz expressed his opinion, and Mr. Jones agreed, the plant closure date does not appear to be affecting recruitment in the national labor market and this was a good sign of the Employee Retention Program’s effectiveness.

Mr. Jones stated he would keep the DCISC updated on the Employee Retention Program. In response to a request made earlier by the DCISC, Mr. Jones reported that there has been no challenge to the plant’s ability to retain five licensed, operational shifts fully staffed with licensed personnel. There are also 26 persons with reactor operator licenses who are at present employed at the plant in positions other than Control Room operations and this reserve provides DCPP with the ability to assemble two, and possibly three, additional shifts of licensed operators if necessary. Mr. Harbor, in response to Consultant McWhorter’s question, stated that some personnel with NRC licenses continue to maintain their license while employed in other areas of the plant and some licenses become inactive. There is a program in place that, so long as the license is reactivated
within two years, the employee can return to Operations and stand watch in the Control Room for 56 hours before his or her license is reactivated but the majority of those 26 persons who hold licenses could be available immediately. Mr. Jones reported there are 40 persons currently involved in two licensed operator classes while three non licensed operators have left DCPP’s employ for other opportunities. Mr. Harbor stated this does not represent, in DCPP’s view a negative trend as a number of operators leaving were within retirement age and two of non licensed operators took opportunities elsewhere within PG&E’s generation organization. Dr. Peterson remarked that offering employees opportunities for professional development might result in an operator strengthening his or her position for a subsequent career and it would be worthwhile for the Committee to investigate in a fact-finding setting the program for rotating personnel to obtain experience elsewhere in the organization with the expectation that they could return and contribute to DCPP through the end of its licensed operation. Mr. Jones reported the Joint Proposal provided for $11,300,000 to aid in retraining initiatives which will be implemented as the time for plant closure approaches. In response to Consultant McWhorter’s inquiry, Mr. Jones stated DCPP has not conducted any surveys to assess employee interest in tranche two.

XIII Adjourn Evening Meeting

The Chair adjourned the afternoon meeting of the Committee at 7:02 P.M.

XIV Reconvene for Morning Meeting

The June 14, 2018, morning session of this public meeting of the Diablo Canyon Independent Safety Committee was called to order by its Chair, Dr. Peter Lam, at 9:05 A.M. Dr. Lam welcomed those present and attending remotely by live-streaming video to the meeting. Dr. Lam introduced his colleagues.

XV Committee Member Comments

There were no comments by any Member at this time.

XVI Public Comments and Communications

Dr. Lam inquired whether any member of the public wished to comment or to address the Committee on matters not appearing on its agenda for this meeting. There was no response to his invitation.

XVII Information Items Before the Committee (Cont’d.)

Dr. Lam requested Mr. Harbor to continue with the informational presentations requested of PG&E by the Committee for the public meeting.
Mr. Harbor introduced DCPP Manager of Regulatory Mr. Hossein Hamzehee and reported Mr. Hamzehee has more than 30 years of experience in the nuclear industry and holds Master of Science Degrees in Nuclear and Mechanical Engineering and brings extensive experience with the NRC including at the level of an NRC Branch Chief.

**Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC Notices of Violation, and Issues Raised by NRC Resident Inspectors.**

Mr. Hamzehee reported DCPP is rigorously inspected by the NRC and is committed to the highest standard of safety. In response to Dr. Peterson’s remark that DCPP was also inspected by INPO, as well as by its internal Nuclear Safety Oversight Committee (NSOC), Mr. Hamzehee commented while the NRC principally focuses upon regulatory requirements, the NSOC reviews all aspects of DCPP operations three times each year and identifies strengths and weaknesses which are taken very seriously by senior leadership and the Corrective Action Program is used to address issues raised by the NSOC. He reported the INPO focuses upon operations and provides a rigorous, systematic approach to its audit visits and an independent, formal evaluation every two years of a licensee’s performance concerning operations, maintenance, and training, and as with the NSOC reviews, the Corrective Action Program is used to address issues raised by INPO. In response to Dr. Peterson’s query, Mr. Hamzehee stated all the reviewers provide rigorous oversight but INPO and the NSOC may review areas where there may be no regulatory requirements but which can impact reliability and safety and the respective roles of the NSOC and the INPO enable DCPP to be better prepared for the regulatory compliance reviews by the NRC.

Mr. Hamzehee said that he would provide an overview of DCPP performance based on NRC’s Performance Indicators since the last meeting of the DCISC in February 2018. He remarked his presentation would cover approximately four months of NRC inspections involving ~1,600 hours of inspection time.

During the period February–May 2018 DCPP met all Green performance expectations for all NRC performance indicators. Three violations of very low safety significance were issued by the NRC since the last DCISC meeting in February 2018. Mr. Hamzehee reviewed and briefly discussed some of the 16 performance indicators reviewed by the NRC, and concerning which data is collected daily, as currently being within Green status as follows.

- Unplanned Scrams per 7000 Critical Hrs
- Unplanned Power Changes per 7000 Critical Hrs
- Unplanned Scrams with Complications
- Safety System Functional Failures
- Mitigating Systems Performance Index, Emergency AC Power System
- Mitigating Systems Performance Index, High Pressure Injection System
- Mitigating Systems Performance Index, Heat Removal System
- Mitigating Systems Performance Index, Residual Heat Removal System
- Mitigating Systems Performance Index, Cooling Water Systems
- Reactor Coolant System Activity
- Reactor Coolant System Leakage
- Drill/Exercise Performance
- ERO Drill Participation
- Alert & Notification System
- Occupational Exposure Control Effectiveness
- Radiological Effluent Occurrence

In response to Consultant Wardell’s inquiry, Mr. Hamzehee stated that none of the indicators are close to entering White status. Concerning the indicator for Unplanned Scrams per 7000 Critical Hours, Dr. Budnitz reported that in 1978, prior to the accident at Three Mile Island Nuclear Generating Station in Pennsylvania, the average number of automatic, unplanned scrams was 11 per reactor per year which declined by 2012 to 0.2 per reactor per year, which equates to one unplanned scram at any one plant every five years. Mr. Hamzehee remarked Unit-1 last experienced an unplanned scram more than ten years ago while for Unit-2 the last unplanned scram was about seven or eight years ago. Dr. Peterson observed this is because safety-related reactor protection systems are designed to be highly reliable and most automatic unplanned scrams occurring today are associated with equipment failure and do not relate to factors associated with exceeding safety limits. Dr. Lam remarked that the number of licensee event reports (LERs) has also declined dramatically over the past 35 years from approximately 100 LERs per licensee per year to single digits. Mr. Hamzehee reported there were no LERs issued by DCPP during February through May 2018. However, Mr. Hamzehee remarked, and Dr. Peterson agreed, that issuing a LER is not considered a negative reflection on plant performance but rather an indication that issues are being reported appropriately and not being under reported. He reported the criterion for issuing a LER is found at 10 CFR 50.73 and includes a reactor trip, inadvertent actuation of a safety system, or failure of a component and he observed for a redundant system that failed but did not impact any train or system function that these types of events do not require that a LER be submitted. Mr. Hamzehee observed to require the NRC to review thousands of LERs without safety significance would unnecessarily tax the NRC’s resources but he noted within the guidelines of 10 CFR 50.73 there are a number of criteria without safety significance that require reporting. Mr. Hamzehee and Dr. Peterson discussed the need to assess and determine how to prevent low level safety-significant events by inputting them into the Correction Action Program as in doing so error rates can be driven even lower and additional significant events thereby avoided. Mr. Hamzehee
confirmed that as a part of this effort DCPP monitors events at a much lower level than required by the NRC.

Mr. Hamzehee described the safety significance characterizations used for the performance indicators as either Green (very low), White (low to moderate) Yellow (substantial) or Red (high). Green non cited violations indicate very low safety significance, with no impact to public health and safety. He confirmed Dr. Peterson’s observation that DCPP through its Operating Experience Program monitors the reports of other nuclear power plants to identify any events which may have similarities to DCPP.

Mr. Hamzehee report on NRC Violations February 2018—June 2018 and stated there were three violations, two were non cited violations (NCV) and one was a finding, issued as follows:

- **Non Cited Violation (Green)** - for failure to provide adequate procedural guidance for operating the Nitrogen Supply System. (No cross-cutting aspect.) In July of 2017 DCPP identified an increase in the nitrogen level in Unit-2 Containment and determined the cause was a leaking power operated relief valve (PORV) for the nitrogen supply system due to a damaged o-ring. It was determined maintenance procedures did not provide enough guidance to ensure the PORV was properly installed and as a result there was some pressure excursion in the system which required the PORV to open and close more than usual which resulted in wear on the o-ring. Mr. Hamzehee reported this self-revealing NCV did not represent a design deficiency or loss of a safety system and accordingly was found to be of very low safety significance.

Dr. Peterson observed that General Electric’s digital division has developed technology that is capable of assessing large volumes of data sets and allows use of various tools to identify issues or problems. He remarked at a Westinghouse fuel fabrication facility, for some period of years, uranium was deposited at very slow rates through the ventilation system and finally this accumulation of uranium caused a serious situation and it is this type of situation where one is losing inventory at very low rates that could now be detected with new technologies. Dr. Peterson remarked these technologies and methodologies can now be employed to detect anomalies at much lower levels than possible previously. Dr. Budnitz remarked there is always a tension between how much one can inspect, as performing frequent inspections affects operation and Dr. Peterson noted this is one of the principal reasons for moving toward online monitoring of equipment using wireless technology and ensuring sufficient memory capacity exists to retain data in order for it to be useful to prevent recurrence in the event failure does occur. Mr. Hamzehee agreed and he reported DCPP does have leakage monitoring programs in place for its risk-significant safety systems through the individual system engineers.

Dr. Budnitz used an analogy in the above context to describe the limited
improvement one would achieve for an automobile if cost were no object and tires were for some reason changed every 500 miles as therefore one would be required to accept the unavoidable risk associated with human error in installing a tire thereby creating a greater risk than had the tires been left on the vehicle for the full lifetime of their treads. He remarked there is a certain minimum amount of error that cannot be easily avoided without very difficult, intrusive work no matter how much one is willing to spend. Mr. Hamzehee remarked that in prior years the nuclear industry was engaged in a debate concerning how to optimize the ratio of preventive to corrective maintenance. Dr. Peterson remarked that over the next seven years, as the plant transitions to closure, these issues will become increasingly important.

- Non Cited Violation (Green) - for failure to follow maintenance procedure resulting in temporary loss of source range nuclear instrumentation. (Cross-cutting aspect H.5 Work Management.) This occurred in March 2018 during a Unit-2 refueling outage while the reactor was in Mode 3 (hot standby) and the Maintenance organization was performing informal troubleshooting and failed to follow all the steps in a procedure and thereby created a hot circuit resulting in a blown fuse and loss of power to one of the instrumentation cabinets.

- Finding (Green) for failure to follow procedural requirements regarding review of Operating Experience which had the review been adequate could have prevented a similar event from occurring at DCPP. (No cross-cutting aspect.) This occurred in November 2017 when Centrifugal Charging Pump 2-1 (CCP 2-1) was shut down due to an increase in the temperature of a motor bearing. The cause was found to be failure of an anti-rotation pin and the NRC found that a similar event had occurred previously at the South Texas Project Nuclear Station which if it had been taken cognizance of by DCPP could have prevented the failure of CCP 2-1. Mr. Hamzehee stated the South Texas Project’s report was included in DCPP Operating Experience data but was not identified in the system. Mr. Harbor remarked this event was an example of the value of Dr. Peterson’s observation that in-service wireless monitoring of equipment could play a vital role in avoiding events. Dr. Peterson remarked by employing the use of drone technology, infrared photography, and sophisticated software any change to an area in a power plant can be effectively assessed such that any change is immediately identified and the International Atomic Energy Agency has done considerable work in this area. Dr. Peterson encouraged DCPP to explore the technological options now available in its quest to reassess the need for preventive maintenance and Dr. Peterson remarked this effort may have application for PG&E outside the nuclear area.

**Mr. Hamzehee stated DCPP’s overall performance is Green with respect to NRC Performance Indicators. He reviewed inspection activities since the last meeting of the DCISC in February as follows:**
Following Mr. Hamzehee’s presentation, Ms. Rochelle Becker of the Alliance for Nuclear Responsibility was recognized. Ms. Becker inquired concerning the date for the next NRC end-of-cycle public meeting. Mr. Hamzehee stated it was his understanding the meeting is now tentatively scheduled by the NRC for August 28, 2018, although he stated this was an NRC meeting not a PG&E meeting.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis commented during the period described by Dr. Budnitz when there were 1,100 unplanned automatic reactor scrams per year across the industry, the public was still being told by the industry that everything was going well. Ms. Lewis commented it is therefore hard to trust the nuclear industry. Dr. Budnitz remarked that any such comments made at that time must be seen in comparison with industry and performance of nuclear technology during earlier periods and this has generally been true for every technology, that is, as time passes the technology gets safer. Ms. Lewis remarked her comment may have been prompted by her own distrust of authority.

Dr. Lam thanked Mr. Hamzehee for his presentation and recognized the presence of Dr. Justin Cochran, Senior Nuclear Policy Advisor and Emergency Coordinator for the California Energy Commission. Dr. Cochran stated he was present representing California Energy Commission Chair Dr. Robert B. Weisenmiller who also serves as the Governor’s appointed liaison to the NRC. Dr. Cochran stated Dr. Weisenmiller expresses his thanks to the DCISC and to its support staff for the excellent and essential work they perform. Dr. Cochran also thanked Dr. Lam for his service on the Committee and stated Dr. Weisenmiller appreciates receiving Dr. Lam’s insights and perspective on issues pertaining to nuclear energy. Dr. Cochran closed his remarks by also thanking the members of the public and PG&E and its staff for their dedicated efforts and critical contributions.

Mr. Harbor introduced DCPP Manager of Seismic Engineering Mr. Nozar Jahangir and reported Mr. Jahangir has more than 30 years’ experience in the nuclear industry including in Engineering, piping and seismic type activities.

**Seismic Probabilistic Risk Assessment Project Results including an Update on the Status of PG&E’s Review of the Tsunami Hazard and Risk at DCPP and its Environs.**

Mr. Jahangir began his presentation with background on the hazard reevaluation performed following the catastrophic events of March 2011 at the Fukushima Dai-ichi Nuclear Power Plant in Japan (Fukushima). Following the accident to Fukushima, the NRC ordered all U.S. nuclear plants to perform a seismic hazard
update in accordance with the following directives and responses by DCP:

- March 2012-NRC Request for Information on Seismic Hazard Update, Post Fukushima issued under the 10 CFR 50.54(f) process.
- November 2013: seismic “walkdowns” for both units submitted to NRC.
- March 2014: NRC staff accepts seismic “walkdowns” letter.
- March & December 2015: probabilistic seismic hazard assessment (PHSA) update including screening evaluation (initial & supplemental) submitted to NRC.
- December 2016: NRC staff PHSA letter issued, indicating “proceed with Seismic Probabilistic Risk Assessment (SPRA).” April 2018: updated/upgraded SPRA submitted to the NRC.

Objectives to be determined in this process included: (1) the likelihood of a seismically induced core damaging accident; (2) the likelihood of a seismically induced accident that results in a large, early release of radiation; and (3) the potential risk contribution from structures, systems and components. Mr. Jahangir described key elements in performing the SPRA as developing a seismic hazard, creation of seismic fragility and probabilistic analysis model, each with its own subset of elements that make up the activity, followed by an independent peer review technical adequacy assessment by external subject matter experts. Mr. Jahangir displayed and discussed a flow chart for the SPRA which included two graphic depictions representative of the site hazard showing the response for the probabilistic analysis using the site and the ground motion characterization parameters. Dr. Budnitz explained the use and utility of showing the peak ground motion acceleration at differing frequencies shown on the graph.

Mr. Jahangir then reviewed the fragility reevaluation which he described as bringing the seismic hazard reevaluation PRA model down to its component structural level. He reported the SPRA was subject to extensive external peer review and demonstrates key plant structures, systems and components have significant seismic capacity beyond their seismic design basis, that is, key plant structures, systems and components can withstand a greater level of seismic motion than the plant was designed to withstand. Additional FLEX equipment stored onsite to respond to a beyond design basis event and the procedures to respond should such an unlikely event occur enhance safety. Dr. Peterson commented on the plant tour the Committee conducted the previous day with members of the public during which the group had an opportunity to visit the FLEX Equipment Storage Facility and to observe that every piece of FLEX equipment was tied down in some manner so as not to be damaged in an earthquake, including a large truck. Dr. Peterson observed, however, on a recent fact-finding visit the DCISC representatives found some tall furniture had not been braced and represented a danger to persons in an earthquake. Although a notification was written for this to enter the condition into the Corrective Action Program, Dr.
Peterson stated he found the existence of this condition to be detrimental to safety and disappointing and he emphasized the need to protect both equipment and plant personnel in the event of an earthquake.

Mr. Jahangir reported Seismic Core Damage Frequency (SCDF), used to assess seismic risk is defined as the likelihood of a core damaging accident caused by an earthquake and reported the SCDF was calculated to be equal to 2.78 E-5/yr. The Seismic Large Early Release Frequency (SLERF), that is, the likelihood of an earthquake-induced accident that results in a large, early release of radiation, was calculated as to be equal to 5.37 E-6/yr. Mr. Jahangir stated these values are generally in accord with industry average values for the other 20 nuclear power plants currently performing a SPRA. Only five of the 20 plants have submitted their SPRA to the NRC with DCPP being one of those five plants. Mr. Jahangir identified and reviewed key scenario drivers for these results as including:

- Station Blackout (for SCDF).
- Instrumentation Failure (for SCDF).
- Building Failures, e.g., Auxiliary, Containment (for SCDF).
- Containment Exterior Shell Failure (for SLERF).
- Steam Generators Failure (for SLERF).
- Containment Isolation Failures (for SLERF).

Mr. Jahangir then requested Dr. Albert Kottke, a geotechnical earthquake engineer in the PG&E Geosciences Department, to continue the presentation to the DCISC.

Dr. Kottke stated he would be discussing the seismic hazard reevaluation including: the development of structure-specific foundation inputs, which are termed foundation input response spectra (FIRS); the development of input time series for structural analysis; and the non vibratory hazards including seismic slope stability, tsunamis, and secondary fault rupture.

Dr. Kottke explained FIRS defines ground motion at foundation level of each specific structure and was developed for:

- Containment structures.
- Auxiliary Building.
- Turbine Building.

The horizontal components of the FIRS were computed using a combination of empirical and analytical site amplification. He described this as consistent with the general approach used for calculation of the ground motion response spectra (GMRS). Once the horizontal FIRS are computed, vertical FIRS are developed using a computerized model developed by Drs. Gülerce and Abrahamson in 2011.
Dr. Kottke displayed a graph showing the horizontal and vertical FIRS parameters for the power block structures and he noted the differences are caused by different elevations for the respective structures.

Dr. Kottke reviewed what he described as insights gained from looking at the sources dominating the hazard, including:

- Close seismic sources control the total hazard. Hosgri, Shoreline, Los Osos, and San Luis Bay Faults contribute 90+% of total hazard above 0.3 g.
- Median ground motion models and total uncertainty models dominate the ground motion characterization.
- Significant reduction in the uncertainties associated with seismic source characterization:
  - Slip rates of faults are well constrained:
  - Close distance saturation of large magnitude events.
  - High seismicity rate.
  - Four close sources.

Dr. Kottke explained that as energy moves from a rupturing fault to a location, if that location is very distant from the site of the rupture then the distant location experiences the full energy and magnitude of the rupture, as magnitude is related to length of rupture. At nearer distances, there is not as much energy contribution to the event and the consequences of a rupture depend to a great degree on the location of the rupture.

Dr. Kottke then reviewed with the DCISC the evaluation of the tsunami hazard and explained that the SPRA effort requires consideration of that hazard. To undertake this task two tsunami wave heights were considered:

- 46 ft. (14 meters) – height of the snorkels (impacting the ASW pumps).
- 85 ft. (26 meters) – the elevation of DCPP.

The analysis considered the tsunami sources from nearby slope failure and fault rupture (near and distant). Fault ruptures, near or distant, are not considered as contributors for the large wave heights. Dr. Kottke observed that not all tsunamis are associated with strong shaking at DCPP and gave as examples distant earthquakes and static slope failures. The tsunami hazard evaluation efforts conservatively assumed all tsunamis are associated with strong shaking and considered the probability of both:

1. Ground motion
2. Tsunami wave height
Then the hazards were simplified into scenarios for vector hazard calculation. Vector hazard results include conditional probability computed for integration into SPRA (e.g., wave height given ground motion); very low conditional probabilities (0.001 between 2 and 5 g) which he remarked demonstrate the tsunami hazard to be relatively low. Input from tsunami vector analysis was used for risk assessments for waves < 14 meters and < 26 meters. For tsunami waves < 14 meters, loss of ASW system would occur. Dr. Kottke reported the change in SCDF is insignificant (conservatively estimated to be less than 1E-7/yr.). For tsunami waves < 26 meters, plant equipment inside Turbine Building could be impacted (and core damage was assumed). Change in SCDF is insignificant (conservatively estimated to be less than 5E-08/yr.).

Dr. Kottke reported that the conclusion of the tsunami evaluation determined the seismic risk is dominated by the vibratory ground motion and the potential tsunami hazard has insignificant impact on the SPRA overall.

Drs. Peterson, Budnitz and Lam observed that in its review of the tsunami hazard the DCISC is also concerned with the potential for a stranded plant event and the impact on plant egress and ingress and Dr. Peterson observed that while the tsunami risk may be determined as unlikely to exceed 46 feet (and thereby not to impact the ASW snorkels) there are broader issues as such an event could and very likely would have a devastating effect on the local area and its population and possibly the entire California coastline and this issue has been brought to the attention of the State of California through the efforts of Dr. Justin Cochran, the CEC’s Senior Nuclear Policy Advisor and Emergency Response Coordinator. Dr. Kottke remarked that to undertake an analysis of the issue raised by Dr. Peterson more and different information would be required than that used for the analysis relative to DCPP. Dr. Peterson observed that with the analyses to date, the DCISC is confident that the plant has the capability with its onsite assets to adequately address any hazard from a tsunami but such an event in the local area could very likely impact the families of plant personnel as occurred in Japan in March 2011.

Mr. Jahangir returned to the podium and displayed a fragilities flowchart and remarked the definition of fragility of a system, structure or component is the conditional probability of its failure at a given hazard input level. Mr. Jahangir confirmed, in response to Dr. Peterson’s observation, that both functional and structural fragilities were considered and assessed to determine which is more dominating in the failure analysis and, unlike for a PRA, credit is not given for operator action in fragility analysis. He used a depiction with ground acceleration as a variable and the probability of failure shown graphically and stated that a curve was provided for each component. The objective being to evaluate realistic seismic responses of structures for use in fragility evaluations.

Mr. Jahangir reported that developing ground motion response at each component location required development of key inputs including:
Foundation Input Response Spectra (FIRS).

Time Histories.

Soil profiles.

In response to Dr. Peterson’s query, Mr. Jahangir reported that three-dimensional models of DCPP buildings have been developed and used to assess structural response and he confirmed that the models used by DCPP are accepted by the NRC.

Mr. Jahangir reiterated a ground motion model response for the component has been developed and the evaluation of the model’s components produce the fragility of the system, structure or component. In response to Consultant McWhorter’s inquiry Mr. Jahangir replied the Spent Fuel Pools and the Fuel Handling Building were included within the analysis for the Auxiliary Building as those facilities are a functional part of the Auxiliary Building. Mr. Jahangir confirmed Dr. Peterson’s observation that the Containment structures are separated from the Auxiliary Building by gaps and have separate foundations. Probabilistic soil structure interaction analyses were completed for each of the Containment structures, the Auxiliary Building, and the Turbine Building. Variables affecting seismic response include:

- Ground motion.
- Soil stiffness and damping.
- Structure stiffness and damping.

Mr. Jahangir displayed a three-dimensional depiction of the Auxiliary Building and the Turbine Building produced by the model. He stated, in summary, fragilities were calculated, using site specific data (e.g., shake table testing results) primarily by the separation of variables methods approved by the NRC. The capacities are realistic and represent both units, the lowest capacity is in the model and 30 time-history analyses were run and the average used to evaluate a component so as to capture the variability, and fragility parameters (capacity and uncertainties) were computed and input into the PRA model.

Mr. Jahangir reported two observations were made as a result of the walkdowns, the first concerned fire water sprinkler piping in the Auxiliary Building (seismic risk contributor, operator actions credited to mitigate potential flooding) and the second concerned a 480V ventilation duct which crosses the area between Auxiliary Building and the Turbine Building without a seismic gap. He displayed a photo of the ventilation duct taken from the Turbine Building and reported that a notification for this condition has been entered into the Corrective Action Program. Dr. Peterson observed that prioritization of the list of these types of items as to their seismic risk is an important aspect, as some may fail in an unexpected way and in an actual event operators would need to first address those with the
Mr. Jahangir returned to the SPRA update and upgrade efforts and to important insights identified concerning components and structures. He stated component and structural importance is measured by comparing the relative contribution to risk from different component/structural failure scenarios. Components identified as the most important to seismic risk are:

- Condensate Storage Tank, Firewater Storage Tank, fire water piping – Failure will result in core damage due to a loss of AFW supply for seismically induced station blackout scenarios.
- Main control room vertical boards, Process Control and Protection System (PCPS) – Failure prevents mitigation of most scenarios due to a loss of control.
- Non load-bearing wall failures in EDG rooms, 4kV rooms and DC bus rooms impact important components and could cause a loss of vital power.
- RCP Shutdown Seals (SDS) reduced seismic risk by 50%

In response to Dr. Budnitz’ inquiry as to whether any of these items represent “easy fixes” Mr. Jahangir commented they are all on the order of 1% to 2% contributors to seismic risk and for some of these items there is little that can be physically done but perhaps models could be refined so as to remove some conservatism. Dr. Budnitz remarked that he would request to inspect the non load-bearing walls in the 4 kV and DC bus rooms during a future fact finding visit.

Mr. Jahangir identified structures most important to seismic risk as:

- Auxiliary Building – failure results in core damage.
- Turbine building – failure results in station blackout.
- Containment building – failure results in core damage and release.

Mr. Jahangir reported certain FLEX mitigation strategies are very important to maintaining a low seismic risk level, these include:

- DC load shedding actions taken in response to an extended loss of offsite power. In conjunction with use of fire water storage tank (FWST) for Auxiliary Feedwater (AFW) water supply, allows for continued operation of AFW in a station blackout scenario.
- Manual control of AFW in the event of a complete loss of AC and DC power. Other important actions include isolation of the FWST upon a seismically induced fire water piping failure.

Mr. Jahangir reported on the SCDF perspective, SPRA version and compared the data from the Long Term Seismic Program of 1988 as 3.8E-5 to the Long Term...
Seismic Program/Near Term Task Force (NTTF) 2.1 Response from 2018 which was 2.8E-5. He remarked it was difficult to identify the reasons for the difference as new components have been added to the plant since 1988.

Mr. Jahangir reported an independent peer review assessment was required by the NRC (per NEI 12-13 guidance document) to validate technical adequacy and compliance to the American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) SPRA standard’s requirements. He described the peer review’s component phases as:

- **Phase 1**: peer review assessment was initiated in May 2017. Provided all documents, one month off-site reviews, Q&A. Team of 10 independent subject matter experts, 4 US-NRC observers and 2 Japanese NRRC observers. One week onsite (at San Luis Obispo), face-to-face review in June 2017. Peer review report identified Facts and Observations (F&Os) and issued a report in September 2017.

- **Phase 2**: independent assessment to review and close resolutions to F&Os from the September 2017 peer review report. Onsite (at San Francisco) in November 2017. Final closure report in March 2018. Appropriate documents were revised to incorporate changes and recommendations by the Peer Review Team. All F&Os were addressed and successfully closed and a final closure report was issued in March 2018 concluding that all scenarios were addressed and there were no open issues remaining.

Mr. Jahangir described the next regulatory steps as including:

- NRC Staff technical assessment anticipated to take approximately one year (Based on comparison with Vogtle Nuclear Power Plant’s experience).
- Anticipating interactions with NRC Staff (e.g., requests for additional information) to provide additional clarifications and documents and a potential audit.

He reported the NRC will form an internal panel of experts according to NTTF 2.1 Phase 2 process, to decide if any additional actions are required.

Mr. Jahangir stated PG&E is committed to using insights from the updated hazard and SPRA and will continue to assess future plant additions and modifications and to assess the potential seismic risk impacts by revising affected procedures and documents. Modification to the 480V ventilation duct will be scheduled during 1R21 and 2R21.

Dr. Budnitz remarked that he serves as a consultant to the NRC staff for the purpose of reviewing the SPRAs prepared by other nuclear power plants and that he co-chairs the ASME/ANS SPRA standards committee. In response to Dr. Budnitz question as to whether Mr. Jahangir found anything in the separation of variables
methodology that Mr. Jahangir wished were stronger, Mr. Jahangir replied that in his opinion the methodology cited by Dr. Budnitz worked well in PG&E’s SPRA analyses and he observed the best tool available at this time and in the future to reduce uncertainties may be the three-dimensional models. Dr. Budnitz remarked that when detailed reports are made available he will look very carefully at how the analysis handled the correlations amongst seismic failure of similar equipment as this is an area requiring considerable judgment. Mr. Jahangir agreed that this was an area which might be improved as there are some conservatisms in the model for which any changes would need to go through standards committees. Dr. Budnitz remarked that the committee he co-chairs has recently issued a new methodology and is seeking feedback.

Dr. Peterson stated he was impressed by the work described by Mr. Jahangir and Dr. Kottke and described it as world class and it represents one area where there has been a systematic pushing out of the boundaries in terms of capabilities to identify seismic hazards, quantify risk, and to improve design and to plan out response capabilities and California in particular, and society in general, would benefit from a broad application of these same methods to other infrastructure. In response to Dr. Peterson’s inquiry as to the cost of these efforts, Mr. Jahangir remarked that DCPP already had a base model SPRA from which to commence its update and the work to complete the update was several million dollars. Mr. Jahangir remarked the key to these efforts is in the first-time building of a model, as once the model is built the updated hazard can be input to the existing model to achieve a better insight into the largest risk contributors.

Following Mr. Jahangir’s presentation, Ms. Rochelle Becker of the Alliance for Nuclear Responsibility was recognized. Mrs. Becker stated her belief that this important information concerning seismic safety with the impact on the local population should be communicated to the San Luis Obispo Board of Supervisors.

Dr. Justin Cochran, CEC Senior Nuclear Policy Advisor, was recognized. In response to Dr. Cochran’s question Mr. Jahangir stated the model is not to scale in a meaningful way, nor linear in any event, as to seismic event intensity.

Mr. David Weisman of the Alliance to Nuclear Responsibility was recognized. Mr. Weisman remarked that while Mr. Jahangir’s information was detailed, when one gets into those details it becomes opaque. Mr. Weisman stated the Alliance fundamentally disagrees that the seismic source characterization has been adequately identified for DCPP in that he stated there is no certainty as to the mechanism for the uplift of the Irish Hills which rise up behind the plant site. Mr. Weisman remarked this issues has also been raised by the CPUC’s Independent Peer Review Panel (IPRP) in its Reports Nos. 6 and 10. Mr. Weisman remarked he was disappointed when the IPRP could only muster one if its members to be present in person for its most recent meeting where much of the information presented by Mr. Jahangir was presented to the IPRP and the PowerPoint presentation was only made available in the morning of the day on which the IPRP
Mr. Weisman stated the IPRP was not convinced that the limited number of actual recorded earthquake was sufficient to support PG&E’s evaluation of the ground model and that discrepancies exist between empirical bore hole information and calculated information. Mr. Weisman remarked that IPRP Member Dr. Gibson also has yet to receive an adequate explanation for the uplift of the Irish Hills with the latest theory hinging on a geotechnic plasticity aseismic theory which, Mr. Weisman stated, is at odds with the seismic plotting seen under the mountains to the north of DCPP where the San Simeon earthquake occurred in 2003. He stated his understanding that a paper on this topic is being prepared for presentation to the Geological Society of America. Mr. Weisman observed there were several findings and observations which were closed out but not met such as the supporting requirement to conduct systematic evaluation of other seismic hazards which may exist under DCPP or that could occur during an earthquake. He remarked that while selected evaluations have been carried out there has been no systematic assessment to support the SPRA and it was recommended that other seismic hazards be documented in a single report for ease of access and reference. Mr. Weisman closed his comment with an observation on the difficulty of accessing the references in the PG&E report.

Dr. Budnitz responded to Mr. Weisman’s comments and agreed that until the references are made available it is not possible to form a judgment. Dr. Budnitz stated there are significant large and irreducible, at least at this point in time with the data on hand, uncertainties in the final results of the hazard analysis used by PG&E. This means that while PG&E has a best estimate of the hazard in terms of its recurrence and the frequencies, those estimates are quite uncertain and the rest of the analysis has those uncertainties embedded in it in attempting to capture what might be the highest and what might be the lowest or what might be the broad spectrum of the state of knowledge of those uncertain issues. The NRC and the DCISC will review PG&E’s hazard analysis and if done right in accordance with the existing standards, we will be forced to accept the uncertainties at least until more work is done to improve methods of the analysis or until there are more earthquakes. Dr. Budnitz remarked the DCPP SPRA will receive more review than any other SPRA done in the last twenty years as DCPP is the highest seismic site for a nuclear power plant in the world.

Mr. Weisman thanked Dr. Budnitz for his comments and stated he looked forward to the DCISC and the IPRP review and stated he was surprised Dr. Budnitz also found the results to be, in some respects, opaque. Dr. Budnitz responded by observing that unless one is a civil or structural engineer or a practitioner in the area of seismic analysis the analyses that has led to the finite models discussed by Mr. Jahangir and Dr. Kottke are going to be opaque.

XVIII Technical Consultant Report and Receive, Approve and Authorize Transmittal of Fact Finding Report to PG&E (Cont’d.)

The Chair requested Consultant McWhorter to report on a fact-finding
visit to DCPP on May 2–3, 2018 with Dr. Peterson. Mr. McWhorter stated topics reviewed with PG&E during that visit included the following:

- Meeting with NRC Resident Inspector - Mr. McWhorter reported the DCISC Fact Finding Team (FFT) met with the NRC’s Resident Inspector and reported at the time of the fact-finding visit the Senior Resident Inspector was making an objectivity visit to another nuclear power plant during the fact finding.

- Workplace Seismic Safety - the FFT reviewed this initiative to secure furniture in most of the office areas that are not otherwise controlled by formal seismic programs. For this initiative DCPP has established guidelines entitled “Standards for Bracing Office Furniture, Cabinets and Storage Racks” which was provided to and reviewed by the DCISC representatives. While the standards were judged to be appropriate, the FFT was disappointed to find some existing deficiencies including several cabinets which were not properly braced both in the office areas and in the Instrument & Control Shop. Mr. McWhorter reported a notification for unbraced cabinets was prepared and entered into the Corrective Action Program and the DCISC will follow up on this issue at its July 2018 fact-finding. Dr. Peterson remarked during the public tour held in conjunction with this public meeting, the DCPP Fire Chief informed Dr. Peterson that the Fire Department had identified and secured some cabinets which were not previously braced. Mr. McWhorter stated the FFT found it disappointing that issues still remain with workplace seismic safety.

- Equipment Data Collection, Trending & Retention - Mr. McWhorter reported the FFT review was intended to assess how plant data is collected and stored. He stated most of the data collected from instrumentation are stored by the plant process computer and while these data are archived and available for analysis, most analysis is done on an as-needed basis and requires manual intervention. The FFT was informed that generally at this time there is no automated monitoring of plant computer data although the Nuclear Energy Institute is prompting review of opportunities for automatic data monitoring and there may be some opportunities to employ automatic data monitoring on operating non safety equipment. Mr. McWhorter reported the reactor coolant pump vibration system does not record large amounts of data for long term analysis as it is an older system with limited memory. DCPP plans to replace that system during summer 2018.

- System Engineering Program - of the four system engineering programs reviewed, three were in White health status while one was in Green status. The System Engineering Department experienced some turnover in personnel in 2017 and the mechanical engineering group lost approximately one-third of its engineers to retirement and transfers to other departments which Mr. McWhorter stated was more than usual. DCPP is recruiting for and hiring new engineers and Mr. McWhorter reported the FFT was informed that the Joint Proposal does not appear to have impacted recruiting at this time.

- Observe Corrective Action Review Board Meeting - the purpose of the
Corrective Action Review Board (CARB) is to provide senior plant management with an overview of the Corrective Action Program and its activities include performing root cause evaluations, extension of corrective actions and review of notifications and the results of reviews by the Notification Review Team which is tasked with reviewing notifications on a daily basis. The FFT team found the CARB meeting to be efficient and appropriately focused and it was apparent the members of the CARB were well prepared.

- Commercial Grade Dedication Program - Mr. McWhorter stated this program provides a dedication process whereby commercially purchased items are reviewed, tested and approved for use in safety related systems. The need to employ commercially available components usually arises when obsolescence may have caused a part to no longer be available from a supplier which maintains a safety-related quality assurance program. Mr. McWhorter remarked typically it costs more to obtain and test a commercial part than if the plant were able to purchase the item from a supplier with a quality assurance program. A program engineer is assigned to review the part and its intended safety-related function and to identify the tests that need to be performed to ensure the part can perform a safety-related function. DCPP laboratories perform the required tests including testing for hardness and the plant has the capability to test different types of materials to verify and confirm that the commercial part is accurately fabricated as described. Mr. McWhorter displayed photos of activities in the laboratories and the offsite warehouse facility on Santa Fe Road in San Luis Obispo which serves as the receiving facility for components intended for DCPP and thereby functions to minimize, organize and control the need to process deliveries through plant security.

- Cybersecurity Program - Mr. McWhorter stated the primary purpose of the FFT’s review was to confirm the station completed all NRC requirements by the end of 2017. He reported this effort cost approximately $50 million and employed up to 47 persons at the peak of its implementation. Following implementation, the Cybersecurity Program will be permanently staffed by five persons to maintain the program. Dr. Budnitz reported the nuclear industry is putting together a task force of cybersecurity experts and the DCPP Cybersecurity Department will have that resource available. The Cybersecurity Program provides security for plant equipment and is a separate program from that performed by the DCPP Information Technology Department which maintains the utility’s data network and business systems. Mr. McWhorter reported that of 4,000 digital assets employed by the plant, each was reviewed by the Cybersecurity Program and approximately 900 were identified as requiring modification. Dr. Peterson observed that DCPP employs good architecture for its data diodes which physically separate information from the business data systems and allows information to flow in only one direction, thereby preventing feeding anything back to a safety system. Mr. McWhorter reported DCPP was successful in meeting the NRC
requirements for cybersecurity by the end of 2017 and an inspection will be conducted in 2019. In response to Dr. Budnitz’ inquiry, Mr. McWhorter and Dr. Peterson confirmed they reviewed the Cybersecurity Program from a programmatic perspective and accordingly the FFT did not require access to information otherwise restricted by security concerns. Dr. Peterson commented that many of the efforts made to ensure cybersecurity also increase the reliability of software and hardware systems in general as by protecting from malicious behavior one is also protecting against the unintentional mistakes that all humans make.

- Spent Fuel Pool Systems - the DCISC FFT walked down the system with the system engineer and found the system in generally good condition. The DCISC representatives inspected instrumentation that has been added to the spent fuel pools as part of the post Fukushima NRC orders to allow precise reading of the pool levels from a display that can be accessed during an emergency. Mr. McWhorter stated in the future data on the water level of the pools will also be available in the Control Room. He reported that each spent fuel pool has two of the new level reporting systems installed. The spent fuel pools have also been modified in accordance with the FLEX initiative to provide a new connection, controlled by a valve, to enable the addition of make-up water from the Refueling Water Storage Tank, the Condensate Storage Tank serving the Fire Water System and from the Raw Water Reservoirs located behind and above the plant.

- Meet with DCPP Director - Dr. Peterson met with the Director of Nuclear Services.

- Large Transformers - the FFT reviewed the status of the large main auxiliary and start-up transformers located behind the power block area and found all those transformers to be in good health. Mr. McWhorter stated the initiatives to make repairs to the large transformers have been completed and the transformers are expected to remain healthy through the end of the current operating licenses. Insulators have been changed and regular cleaning of transformer insulators has been initiated and there have been no insulator flashover events since 2013.

Following Mr. McWhorter’s report, Ms. Sherry Lewis was recognized. In response to Ms. Lewis observation concerning the Fire Protection Program, information for which was included within the four systems described by Mr. McWhorter in his report on the System Engineering Program, Mr. McWhorter replied that the White health status for the Fire Protection Program relates to several metrics and while most of a program’s metrics may be in Green status, a few in White or Yellow can change the categorization of the entire program. For the Fire Protection Program, the White status was primarily driven by the back-up system engineer position being unfilled at present and multiple fire protection procedures and engineering evaluations still being revised to support implementation of NFPA 805 regulations. He replied to Ms. Lewis’ observation concerning the Fire Protection Program by stating that this was not a program deficiency and did not mean the NFPA 805
requirements were not met because a large number of engineering evaluations were planned to be made after the NFPA Program was commenced in order to assure its full and effective implementation. In response to Ms. Lewis inquiry about the high rate of turnover for employees discussed during Mr. McWhorter’s review of the System Engineering Program, Mr. McWhorter stated the turnover occurred amongst Operations and Engineering personnel as they have skill sets and training that permit them to move readily to other areas within the DCPP organization and, with reference to the System Engineering Department, personnel once assigned to System Engineering Department generally remain employed in some capacity at DCPP.

Upon a motion by Dr. Budnitz, seconded by Dr. Lam the March 2–3, 2018 Fact Finding Report was accepted and its transmittal to PG&E authorized.

XIX Adjourn Morning Meeting

The Chair adjourned the afternoon meeting of the Committee at 11:58 A.M.

XX Reconvene for Afternoon Meeting

Dr. Lam convened the afternoon meeting of the DCISC at 1:05 P.M. He introduced the other Members and welcomed members of the public present in the audience and those following the meeting by the streaming video available through a link on the Committee’s website at www.dcisc.org or at www.slospan.org.

XXI Committee Member Comments

There were no comments by Members at this time.

XXII Public Comments and Communications

The Chair invited any comments from members of the public.

Mr. Howard Green was recognized. Mr. Green stated he was a retired computer engineer who attended the DCISC’s public tour held the previous day. Mr. Green stated he watched the Committee’s discussion of the letter in support of SB 1090 and he read the letter online on the Committee’s website. Mr. Green stated he believes that the letter might have been more effective had the Committee’s letter better emphasized the fact that, while it remained interested in all aspects of the legislation the Committee believed it to be appropriate and within its scope to only take a position on the aspects of the legislation that relate to the Employee Retention Program.

Dr. Gene Nelson of Californians for Green Nuclear Power was recognized. Dr. Nelson stated his group was the lone adverse party to Decision 18-01-022 which
provides for the retirement of DCPP by 2025 and he stated that Californians for Green Nuclear Power representatives testified against SB 1090 at several State Senate committee hearings. Dr. Nelson stated that while he found the DCISC’s letter in support of SB 1090 to be balanced, he continues to have concern regarding any form of advocacy for or against the closure of DCPP by the DCISC and he stated in any such context the DCISC should adopt a neutral tone.

Ms. Rochelle Becker of the Alliance for Nuclear responsibility was recognized. Ms. Becker stated she had just received information that the next hearing on SB 1090 is scheduled in the State Assembly on June 27, 2018.

**XXIII Information Items Before the Committee (Cont’d.)**

Dr. Lam requested Mr. Harbor to continue with the informational presentations requested of PG&E by the Committee for the public meeting.

Mr. Harbor introduced Director of Nuclear Work Management, Mr. Dennis Petersen, and reported Mr. Petersen has more than 30 years of experience in the nuclear industry and held a Senior Reactor Operator License and has held leadership roles in DCPP’s Operations and Quality organizations.

**Performance during the 20th Refueling Outage for Unit-2 (2R20) including Key Activities, Performance Indicators, Results Achieved, Fuel and Steam Generator Inspection Results and Open Items.**

Mr. Petersen stated in his presentation he would review key activities during the twentieth refueling outage for Unit-2 (2R20) including performance indicators, results of inspection and any open items. He reported 2R20 commended on February 11, 2018 and concluded March 22, 2018, which was an improvement on the goal set by the DCPP Business Plan. He reviewed performance measures during 2R201 as follows:

<table>
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<tr>
<th>Performance Measure</th>
<th>Goal</th>
<th>Actual</th>
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</thead>
<tbody>
<tr>
<td>Serious Near Hit Event</td>
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<td>0</td>
</tr>
<tr>
<td>Nuclear Safety Event</td>
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<tr>
<td>Outage Duration (days)</td>
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<td>39</td>
</tr>
<tr>
<td>Power Ascension (days)</td>
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<td>4.42</td>
</tr>
</tbody>
</table>

In response to Dr. Peterson’s inquiry, Mr. Petersen stated then when a goal is established for outage duration under the Business Plan, the schedule established includes contingency margins which typically include 10%–15% extra time for discovery of emergent work during an outage. For 2R20, all but one day of that margin was used.
Mr. Petersen reviewed key activities during 2R20 as follows:

- Reactor Coolant Pump 2-4 motor overhaul including stator replacement.
- Rod control cluster assembly guide tube swaps (7).
- Thimble tube replacements (13).
- Integrated Leak Rate Test.
- Residual Heat Removal (RHR) suction weld overlay.
- 500kV output breaker 632 replacement.
- 230kV switch 211-2 overhaul.
- 480V vital bus F breaker replacements.
- High pressure rotor blade replacements.
- Feedwater pump 2-2 turbine overhaul.

Mr. Petersen reported during 2R20, a defense-in-depth outage safety strategy was maintained to ensure key safety functions were satisfied and very few changes were required to the outage safety schedule which he described as the mark of a good plan. He described and briefly discussed the high-risk and infrequently performed tests and evolutions performed during 2R20 including:

- Vital bus transfer and engineered safeguards testing.
- Performance of heavy lifts over reactor core.
- Draining to lowered reactor coolant inventory for reactor disassembly and reassembly.
- Draining to reduced reactor coolant inventory for vacuum refill of the reactor coolant with 230kV power unavailable.
- Integrated Leak Rate Test of Containment.
- Initial criticality of the new reactor core

Mr. Petersen reviewed results achieved during 2R20 including:

- Integrated Leak Rate Test.
- Residual Heat Removal System suction structural weld overlay.
- HP turbine blade replacement.
- Line ownership of radiation dose which achieved a result of 24.11 person rem for the outage which was the best performance in DCPP’s history and for which the plant received an award for “As Low As Reasonably Achievable” (ALARA) performance from the North American Technical Center Board.
- Vendor performance.
  (Westinghouse/Siemens being key vendors with excellent performance.)
- Improved Outage Scope Review team to address issues and get better alignment between key managers and the plant leadership team before proceeding with work discovered during the outage.

- Excellent fuel handling equipment reliability.

- Use of Microsoft OneNote for Outage Control Center and maintenance turnovers which allowed a large numbers of persons to use OneNote software to enter information to the same document.

In response to Dr. Peterson’s question, Mr. Petersen stated DCPP’s use of software such as OneNote must confront significant challenges including revision control and development of work packages for use within the plant. During his presentation Mr. Petersen displayed photos of work on the reactor cavity, the high pressure turbine and in the transformer yard.

Mr. Petersen reported fuel inspection results and steam generator inspection review included no fuel defects identified and no significant fuel findings; the steam generators were not inspected nor were inspections required. Follow up items from the outage include electrical maintenance preparation of work packages and execution, Operations staffing strategy to ensure the necessary persons and crews are available for certain evolutions, and reactor cavity clarity. Mr. Petersen reported that upon refill of the reactor cavity, for reasons not yet understood, the clarity of the water was not sufficient to start moving fuel into the core. He reported there was nothing different from past outages in the source of the water and the issue, which was rectified using chemicals and filtration, is suspected to be chemical in nature and may be related to a localized pH difference which caused a crud burst of some kind. He reported DCPP encountered a similar issue some years ago and the issue has occurred at other plants.

In response to Dr. Lam’s inquiry, Mr. Petersen reported approximately 375 temporary maintenance workers were engaged for 2R20 and 1,000 contract personnel were on site for the outage. He reported the level of training required for these workers depends upon their experience within the nuclear industry and the industry shares a database of individual worker qualifications. In response to Dr. Budnitz’ inquiry, Mr. Petersen confirmed that during 2R20 there were no interactions with Unit-1 which continued in operation.

Following Mr. Petersen’s presentation, Dr. Gene Nelson of Californians for Green Nuclear Power was recognized. Dr. Nelson stated 26 years ago he developed a prototype tablet-based computer system for use by the nuclear power industry which he stated had advantages but was apparently ahead of its time. He remarked that utilizing tablet-based technology has great advantages but also a huge implementation cost. Dr. Nelson contrasted the experience of DCPP with its replacement of its steam generators with that of the San Onofre Nuclear Generating Station.
Ms. Rochelle Becker of the Alliance for Nuclear Responsibility was recognized. Mr. Petersen and Mr. Harbor clarified, in response to Ms. Becker’s inquiry, that the replacement stator he referred to in his presentation was for a reactor coolant pump and not the main generator.

Dr. Peterson recognized the presence in the audience of Mr. Ron Alsop, Emergency Services Manager for the County of San Luis Obispo’s Office of Emergency Services.

XXIV Information Discussion by Committee Members and Consultants

Committee Discussion of Post-Shutdown Roles Matrix of Areas for Review with reference to a Potential Role for the DCISC After Expiration of the Operating Licenses for DCPP and the Possible Engagement, on an Ad Hoc Basis, of a Consultant to Assist in the Identification of Decommissioning-related Issues.

Consultant McWhorter called the Members’ attention to a Matrix which he prepared with the assistance of Consultant Wardell as a tool to identify the several areas for which DCISC continuation or initial review might be appropriate following the cessation of generation operations by DCPP, with indications of what systems are important to safety or which affect safety systems, based upon items on the DCISC’s Open Items List. The Matrix identified four periods of time after cessation of generation for possible review activities which Mr. McWhorter described and briefly discussed as follows:

- Column “A” - prior to fuel removal from reactor vessel (30–60 days anticipated duration).
- Column “B” - after fuel removal from reactor but prior to fuel removal from the spent fuel pool (7–10 years anticipated duration).
- Column “C” - after fuel removal from spent fuel pool with fuel stored at the ISFSI with decommissioning in progress (tbd).
- Column “D” - after fuel removal from the spent fuel pool with fuel stored at the ISFSI and decommissioning complete (indefinite).

Mr. McWhorter briefly with the Members reviewed the possible interpretation and application of the Committee’s Restated Charter from the CPUC to each of these proposed phases.

Dr. Lam stated that while he believes this discussion may have merit for the benefit of the public he is hesitant to enter into a discussion regarding the application of the Restated Charter to the continuance of the DCISC as to do so may appear to be self-serving and the Committee does not know the positions of the Governor or the California Attorney General on this matter and it is entirely up
to the CPUC and the entities that appoint its members as to whether the Committee should continue after DCPP ceases generating electricity. Dr. Peterson observed there may be uncertainty about the application of the Restated Charter following cessation of generation operations and Dr. Peterson observed he believes the Committee has an obligation to gather information to inform a decision on the matter. Mr. Rathie remarked that the genesis for this discussion came from comments by members of the public.

The Members discussed the level of risk present following removal of all fuel from the spent fuel pools but while fuel remains on site at the ISFSI. Dr. Peterson suggested that Column “D” be revised to indicate that if the Committee were to continue during that period there might be certain activities to review but the effort to do so would be greatly reduced. Mr. McWhorter observed that any decision about a role in the time frame of Column “D” might be deferred and he remarked that in his view the Restated Charter very likely would encompass review activities during the period identified in Column “A” but those activities in Column “B” might need to be addressed sooner than those for Columns “C” or “D”.

Dr. Budnitz remarked that for Line 18 of activities to be reviewed entitled “Interface Between Security and Safety” for Column “C” the response should be “Yes.”

Dr. Budnitz stated his opinion that the Committee has an obligation to make a recommendation about a potential role to review decommissioning of the plant following cessation of generation operations and the Committee should engage in that debate now and settle, if possible, upon a recommendation to the CPUC and the entities that appoint its members. He stated his opinion that an appropriate role exists for the DCISC through the period identified on the Matrix by Column “C” although the work of the Committee would be very different during that period than it performs now when the plant is operating. Dr. Budnitz stated that if the Committee continues during the period after generation ceases it would continue to perform a role independent of PG&E and the NRC and continue to provide an additional level of review and to make reports to the citizens of California. He stated the Committee would be serving the CPUC which created it and the entities which appoint its members as well as the citizens of California by immediately sending a letter to the CPUC describing the scope and rationale for a post generation role in reviewing activities during decommissioning.

Dr. Lam stated his opinion a letter such as that described by Dr. Budnitz would be premature as the issue is not yet ripe for consideration. Dr. Budnitz replied and stated there may be an ambiguity as to the meaning of the term “operational safety” as used in the Restated Charter and the Committee has the obligation to tell the CPUC and its appointing authorities what the Committee believes that term means and the implications of the Committee’s interpretation sooner rather than later and if new information emerges in the future it can be dealt with at that time.

Dr. Peterson remarked that the Committee has also identified the possibility of
engaging a consultant on an *ad hoc* basis to assist it in better understanding specific activities that will occur during decommissioning and he agreed there is an important need to clarify the role of the DCISC under the Restated Charter once the plant has shut down. **Dr. Peterson suggested this item be placed on the October 2018 agenda for further discussion.** Mr. Rathie reported that Dr. David Victor, the Chair of the San Onofre Community Engagement Panel, has accepted the Committee’s invitation to attend the October 2018 public meeting to discuss the experiences and insights of the panel.

**Dr. Budnitz stated that prior to the October 2018 public meeting, he would draft a letter setting forth his view of a proposed position based on the continuance of the Committee though the period identified in the Matrix by Column “C” for the consideration of the other Members of the Committee.** Dr. Lam stated his belief that more deliberation would be beneficial before the Committee takes a position on the matter. **Dr. Budnitz stated he would provide the letter to the office of the DCISC Legal Counsel for review and a determination whether it would be appropriate under California’s open meeting laws to distribute it to the other Members and if so, the distribution would be from the Office of Legal Counsel.**

Following the Members discussion, Ms. Rochelle Becker of the Alliance for Nuclear Responsibility was recognized. Ms. Becker stated she agreed with the position that the matter of continuing the DCISC during the period following cessation of operations might be deferred as PG&E will be submitting a filing to the CPUC concerning decommissioning DCPP during the spring of 2019 and that might be a more appropriate time to address the matter. She stated the San Onofre Community Engagement Panel may be able to offer suggestions and she stated she is in support of the Committee’s continuance after the cessation of generation activities to review issues related to decommissioning. Ms. Becker remarked, as someone who was involved and instrumental in forming the DCISC in the 1980's, she believes that the reasons the Committee was formed continue to support the reasons it should continue to exist following cessation of generation operations and she believes the continuance of the DCISC would have the full support of the Alliance for Nuclear Responsibility.

**Mr. David Weisman of the Alliance for Nuclear Responsibility was recognized.** He observed that the possibility that the plant could enter a prolonged period of “safe store” would have an effect on the duration of Column “C”. Mr. Weisman observed that the Committee has set the date for its October 24–25, 2018 public meeting and Dr. Victor’s appearance, and it will be important to attempt to coordinate the activities of the DCISC with those of the Diablo Canyon Community Engagement Panel, which usually schedules meetings for the last week of the month in order to attempt to get as many experts on decommissioning as close to the same place and at the same time. Mr. Weisman remarked that once what he described as “a spent fuel pool island” is established it may continue to exist for five or six years or longer and will continue to require personnel and equipment to maintain the
functionality of the pool. Mr. Weisman stated he agreed with those who have advised that the matter of the Committee taking a position on continuing activities after cessation of generation could be deferred to October 2018.

Dr. Gene Nelson of Californians for Green Nuclear Power was recognized. Dr. Nelson observed DCPP has routinely operated in the top quartile of the nuclear industry for 34 years and he remarked it was his belief it will continue to do so through 2025. He encouraged the DCISC to look at what is best for both the environment and the economy.

Dr. Peterson stated he was willing to also defer consideration of a decision to engage a consultant to assist the Committee in identifying decommissioning-related issues until the public meeting in October 2018. Dr. Budnitz observed that he has provided the names of four persons for consideration for that role and he invited any member of the public to suggest other potential candidates. Dr. Peterson suggested a notice concerning the engagement of a consultant to review decommissioning be placed on the DCISC’s website.

Dr. Peterson left the meeting due to a previous commitment and the meeting continued with Drs. Lam and Budnitz making up a quorum.

XXIV Concluding Remarks of Discussion by Committee Members of Future of DCISC Activities

Dr. Lam expressed the thanks of the Committee to the DCPP senior managers, and particularly to Mr. Garcia and Mr. Harbor and to the DCPP directors and managers who made presentations to the DCISC during this public meeting and also to the technicians of AGP Video who are responsible for audio and visual recording of the DCISC’s meetings. The Chair also expressed the thanks and appreciation of the DCISC to the members of the public who attended and participated in this public meeting.

V Adjournment of Ninetieth Public Meeting

There being no further business, the ninetieth public meeting of the Diablo Canyon Independent Safety Committee was adjourned by its Chair, Dr. Peter Lam, at 2:25 P.M.
4.0 Summary of Major DCISC Review Topics

4.1 Conduct of Operations

4.1.1 Overview and Previous Activities)

The following are operations-related items the DCISC reviewed in the previous reporting period:

- Power Reduction and Load Following
- Operations Human Performance and Operations Excellence Plan
- Operator Aging and Retention
- Operator Daily Focus Briefings and Accompanying Operators on Rounds
- Operability Determination Program
- Winter Storm Events

The DCISC concluded in the last period that DCPP’s Power changes from 100% to 50% power do not appear to have an appreciable effect on thermal power systems because the temperature and pressure variations are small. Other effects, such as increased liquid radioactive waste discharges to the Pacific Ocean, are negligible. Procedures for responding to situations under which DCPP could be required to curtail operations by the CAISO or STES appeared appropriate and had not yet been required to be used. The Operations Department recognized a trend in the occurrence of low level human errors and was moving to implement appropriate corrective actions, including those contained in the Department Excellence Plan. DCPP’s “no solo” (i.e., limited solo activity) licenses were being appropriately managed. Because of PG&E’s recent decision to not pursue license renewal for DCPP, a Retention Plan has been put in place and overstaffing has been authorized to help ensure that adequate numbers of licensed operators remain on board through the end of the current plant license. The Operations Focus Daily Briefings regarding plant status and planned activities were well structured and informative. The Turbine Building Operators who escorted the Fact-finding Teams displayed effective Human Performance behaviors pertaining to data collection, nuclear and industrial safety, and security. The DCPP
Operability Determination Program and related programs for determining the operability of equipment found to be degraded or in non-conformance with regulatory bases were properly established and managed by DCPP. The plant successfully operated through winter storms during which kelp had the potential to reduce cooling water flow by temporarily reducing power using their storm procedures and equipment.

4.1.2 Current Period Activities)

During the current period, the DCISC had presentations on conduct of operations at five Fact-finding Meetings. The following topics were reviewed:

- Observe Chemistry Sampling Process
- Operator Staffing Adequacy
- Observe Auxiliary Feedwater System Pump Control Valve Periodic Test
- Operations Department Performance
- Observe Operator Rounds in Plant
- Reactivity Management

Observe Chemistry Sampling Process (Volume II, Exhibit D.2, Section 3.8)

The Fact-finding Team observed the DCPP process of obtaining a pressurized chemistry sample of the Reactor Coolant System. The weekly sampling process followed the DCPP Chemical Analysis Procedure CAP E-1:IV, “CVCS [Chemical Volume and Control System] Influent Sampling,” Revision 9, September 9, 2015. This procedure was appropriately detailed with requirements for technician qualification and with prerequisites, precautions and limitations, and personnel safety. The procedure also addressed apparatus, acceptance criteria, references and records. Two other applicable procedures were “Plant Logs” and “Conduct of Operations.”

The technician obtained the current revision of the procedure and assured that his qualifications were current. He then followed the procedural steps, using the human performance tool of “circling and slashing” each step as it was followed and completed. The group then walked to the Primary Sample Laboratory where the actual pressurized sample was drawn in an exhaust hood. Appropriate Radiation Protection practices were followed. Finally, the group returned to the Chemistry Laboratory where the sample was prepared for later chemical and radiation spectral analyses.

The DCPP Reactor Coolant System chemistry sampling process was performed by a Chemistry technician and observed by a member of the DCISC Fact-finding Team. The Chemistry technician correctly followed proper Chemistry, Radiation Protection and Human Performance practices
in obtaining the pressurized sample. The plant and Chemistry Laboratories appeared orderly and clean.

**Operator Staffing Adequacy (Volume II, [Exhibit D.2, Section 3.9](#))**

DCPP developed a Retention Plan which offers 25% annual salary bonuses for each employee who commits to continue working at the station for at least four more years. For licensed operators, license premium pay will be included in the base for calculating the bonus. Additionally, the Operations Department has obtained approval to overstaff positions in 2017 to help ensure that adequate numbers of fully trained operators remain on staff through the end of the current plant license.

DCPP has a required minimum Control Room staffing of Licensed Operators and Nuclear (Non-Licensed) Operators. To assure it meets or exceeds these numbers, DCPP plans five years ahead for the testing, hiring, training, and qualification of its operators. DCPP includes in its plans such factors as early and normal retirements, historical resignation trends, and projected resignations due to the Joint Proposal’s planned cessation of remaining plant operation in 2025. DCPP has developed a detailed five-year plan with different staffing attrition scenarios and a year-by-year action plan to adjust hiring, retaining, and training of Licensed Operators. This action plan appears to be flexible and has a good rationale for anticipating different staffing contingencies.

**DCPP appears to be appropriately planning ahead for operator staffing, taking into account potential early and normal retirements, resignations, and the possible effects on staffing of the Joint Proposal, which requires plant shutdown in 2025. The DCISC should keep an Open Item for follow up on staffing when incentive plans end.**

**Observe Auxiliary Feedwater System Pump Control Valve Periodic Test (Volume II, [Exhibit D.5, Section 3.1](#))**

The DCISC Fact-finding Team reviewed the Auxiliary Feedwater (AFW) System and observed the quarterly DCPP Surveillance Test STP V-3P6B, “Exercising Valves LCV-115 and 113 Auxiliary Feedwater Pump Discharge,” Revision 27, November 14, 2017. The purpose of the surveillance test was to measure and record the stroke times of the control valves on the discharges of the Auxiliary Feedwater Pumps. The test consisted of timing the rapid closure of the valves when a deviation exists between valve standby position full open and valve demand position full closed prior to actuator energization and a fail-safe test when the valve actuators are de-energized and the valves are allowed to fail open from a full closed position.

The team processed through Security and through Radiation Protection into the Radiation Control Area to observe the surveillance test. Upon arriving at the valve location, the team observed a two-person Maintenance team in the process of
cleaning and adjusting the valves. Maintenance was performing normal, scheduled preventive maintenance on the valves, and the testing was required as a post-maintenance test to ensure the maintenance operation did not adversely affect the valves. Because this operation was to take over an hour, delaying the surveillance test, the team decided to walk down various components of the AFW System instead.

The DCISC Fact-finding Team’s (FFT’s) plans to observe a valve surveillance test were cancelled due to a delay in Maintenance valve preparation. The FFT instead performed a system review and component walkdown with the System Engineer. The system components and plant itself appeared to be in good condition.

Operations Department Performance (Volume II, Exhibit D.6, Section 3.6)

A focus area of the Operations Department and its Excellence Plan was to review and implement corrective actions for two Areas for Improvement that were noted during a recent external evaluation of the Operations Department. The first area was a lack of formality in shift operations in that foremen dispatching operators may ask them to perform tasks for which no pre-work brief was performed and for which no procedure was provided. Although such tasks were considered minor, DCPP acknowledged the risk that such practices presented and was taking steps to raise the standards. In the future, operators would be required to always have a procedure in hand when performing any task unless timeliness of the task was critical to plant operations. The second area was a lack of full and proper operational risk assessments by the shift operations staff when reviewing notifications (reports of equipment problems). This concern arose in part from recent events involving extended degraded conditions for nitrogen leakage in containment and for stator cooling water tank level indication. Steps were being taken also in this area to raise the standards for shift operators.

An additional focus area of the Operations Excellence Plan was Institute of Nuclear Plant Operators Event Report (IER) 17-005, regarding “Line of Sight to the Reactor Core.” This area concerned ensuring that all Operations personnel remain focused on protecting the integrity of the reactor core at all times. To that end, DCPP was implementing several initiatives to emphasize conservative decision making and ensure proficiency in individuals performing operations tasks. Also, an additional focus was being placed on watchstation ownership through training on the attributes of watchstation excellence and the issuance of written expectations for watchstanders and supervisors. Lastly, efforts were underway to assess and reinforce proper fundamental Operator behaviors.

In response to questions from the Fact-finding Team, the Operations Shift Manager noted that the Joint Proposal for DCPP to cease operations at the end of its current operating license was a large distraction to Operators. This was particularly true at the time of the Fact-finding Team’s visit when it had just been
learned that the California Public Utilities Commission might not approve full retention bonuses as anticipated for DCPP staff. The Department was working to set aside such distractions when on shift at the plant and remain focused. Finally, the Operations Shift Manager confirmed with the team that DCPP had not been requested by the California Independent System Operator to implement any procedures for load following.

**External organizations have noted areas for improvement in the Operations Department, and DCPP has moved to implement appropriate corrective actions and include those actions in the Department Excellence Plan. The DCISC should reexamine performance in these areas in approximately one year. DCPP had not been requested by the California Independent System Operator to implement any procedures for load following.**

**Observe Operator Rounds in Plant (Volume II, Exhibit D.7, Section 3.1)**

The DCISC Fact-finding Team observed an operator on his rounds of the DCPP Emergency Diesel Generators (EDGs). The particular round of interest was the daily recording of data from instruments for the DCPP EDGs, in this case EDG 1-3. The team held a “pre-job brief” in which they discussed the requirements and steps of the activity about to take place. They then donned personal protective equipment and proceeded into the powerhouse and down into EDG 1-3 Room. Inside the room the team performed a general observation walkdown around EDG 1-3 looking for leaks or other off-normal conditions. Then, using his handheld Portable Digital Assistant (PDA), the operator proceeded to record data from various instruments and gauges associated with the EDG. The data were comprised mostly of temperatures and pressures of EDG pre-start and startup components such as engine oil and air start equipment. All readings were in the normal range. The operator was careful to ascertain that he was reading and recording the correct data from the appropriate instrument. The operator then downloaded his PDA into the Plant Computer for trending and record-keeping.

**The DCISC Fact-finding Team’s observation of an operator on data recording rounds in an Emergency Diesel Generator room was positive in that the operator stressed personnel safety as well as good human performance practices in ascertaining that he was recording the correct data from the appropriate instruments. All data were in the normal range.**

**Reactivity Management (Volume II, Exhibit D.9, Section 3.5)**

Reactivity is defined in DCPP’s controlling Procedure OP1.ID3, “Reactivity Management Program” (RMP) as “the fractional change in neutron population from one neutron generation cycle to the next, or the measure of departure from criticality.” In general, it is a measure of the potential for a nuclear core to increase or decrease in its chain reaction rate or power level. Procedure OP1.ID3
defines the roles, responsibilities and actions associated with the control of reactivity to ensure safe and reliable operation. It provides the guidance to ensure that all plant evolutions affecting reactivity will be controlled, safe, and conservative.

The Operations Manager is responsible for plant reactivity management, including the direct control of reactivity, and for ensuring conservative actions with regard to nuclear fuel integrity during operations, fuel handling, and storage. The Reactivity Management Leadership Team (RMLT) is a team of individuals representing Operations Services, Maintenance Services, Engineering Services, Learning Services, and the Corrective Action Program. The team reviews reactivity events and adverse trends to identify needed corrective actions and recommend additional training or qualification for groups that can affect reactivity.

Reactor Operators (ROs) and Senior Reactor Operators (SROs) are responsible for fulfilling the requirements of the Reactivity Management Program, including (1) ensuring that expected responses to a reactivity change are identified and fully understood prior to initiating any action that affects reactivity, (2) closely monitoring appropriate indications for reactivity changes to verify the expected magnitude, direction, and effects, (3) remaining alert for situations that could affect reactivity, and initiating appropriate conservative corrective actions, (4) reducing reactor power or tripping the reactor without the need for concurrence of the unit Shift Foreman or reactivity SRO when the reactor operator deems that the action is immediately necessary to protect the reactor core, and (5) maintaining the reactor core parameters within established limits. Reactor Engineering provides technical support for the RMP and also provides a Reactor Engineering representative to the RMLT.

Reactivity manipulations for the operation of Control Rods, Reactor makeup control, and Main Turbine control are described and controlled by operating procedures. Other system operations, surveillance test procedures or maintenance activities that may affect reactivity are required to be preceded by an operating crew reactivity brief to ensure that the reactivity impact is understood and managed. Examples include starting a Reactor Coolant Pump, manual control of Steam Dump Valves, paralleling or stopping a Turbine Generator, Main and Auxiliary Feedwater Pump operational changes at power and core offload and reload. Reactor Engineering is also intimately involved with controlling reactivity whenever one of the reactors enters an outage and during each outage, and as the reactor emerges from an outage and ascends to power. The Shift Foreman also conducts reactivity briefs at the beginning of each operating shift, prior to planned plant evolutions, and following plant transients. Reactivity briefs include a review by the operator at the controls of expected control rod movement, Reactor Coolant System boron level dilutions and increases and turbine load changes anticipated to maintain or establish desired plant conditions. The operator at the controls must obtain SRO approval and oversight for each reactivity manipulation during normal operation. DCPP’s performance measures for Reactivity Management were Green
The DCISC Fact-finding Team concluded that the DCPP Reactivity Management Program was satisfactorily designed and implemented with tight controls and Green (good) performance measures.

4.1.3 Conclusions and Recommendations

Conclusions:
A Chemistry technician correctly followed proper Chemistry, Radiation Protection and Human Performance practices in obtaining the pressurized sample. The plant and Chemistry Laboratories appeared orderly and clean. DCPP appears to be appropriately planning for operator staffing, taking into account potential early and normal retirements, resignations, and the possible effects on staffing of the Joint Proposal, which requires plant shutdown in 2025. Plans to observe an Auxiliary Feed Water valve surveillance test were cancelled due to a delay in Maintenance valve preparation. The system components and plant itself appeared to be in good condition. External organizations noted areas for improvement in the Operations Department, and DCPP has moved to implement appropriate corrective actions and include those actions in the Department Excellence Plan. DCPP had not been requested by the California Independent System Operator to implement any procedures for load following. An observation of an operator on data recording rounds in an Emergency Diesel Generator room was positive in that the operator stressed personnel safety as well as good human performance practices. The DCPP Reactivity Management Program was satisfactorily designed and implemented with tight controls and Green (good) performance measures.

Recommendations:
None
4.2 Conduct of Maintenance

4.2.1 Overview and Previous Activities

The following are maintenance-related items the DCISC reviewed in the previous reporting period:

- Electronic Work Orders

The DCISC concluded the following during the previous reporting period:

DCPP’s use of electronic work orders was just beginning in 2016. These work orders are primarily used for preventive maintenance and simpler work not involving many drawings. Although not used extensively, the electronic work orders appear to be a step in the direction of a more effective and efficient process of work direction.

4.2.2 Current Period Activities

During the current period, the DCISC had presentations on conduct of maintenance at one Fact-finding meeting. The following topic was reviewed:

- Maintenance Department Performance
- Foreign Material Exclusion Program
- Use of Portable Electronic Devices in Power Block
- Electronic Work Management System
- On-line Maintenance Status

Maintenance Department Performance (Volume II, Exhibit D.3, 3.4)

The DCISC Fact-finding Team examined the DCPP Plant Performance Improvement Report (PPIR) and reviewed various Maintenance-related reports from the Quality Verification (QV) Department received as a part of DCPP’s Monthly Documents Transmittals to the DCISC. Significant indicators noted in the reports included the fact that Maintenance Human Performance and Electrical Safety Challenges were listed as top performance issues by the QV Department. Weaknesses in procedural use and adherence expectations as well as the management actions taken in
response to performance shortfalls were also specifically noted as areas of concern by QV. Additionally, various PPIR indicators such as station re-work, work management, recordable injuries, and department level event rate displayed data and trends that were indicative of weaknesses in Maintenance Department human performance.

The Fact-finding Team also reviewed a recent Apparent Cause Evaluation, “DCPP 12kV Ground Buggy Near Hit Potential SIF,” (SAPN 50923422) for a near Significant Injury or Fatality (SIF) event in which a 12kV ground buggy was nearly racked into an incorrect and energized 12kV cubicle. The activity was halted prior to execution by a question from a nearby supervisor who overheard the workers and realized that the ground buggy was possibly in the wrong cubicle. Had the ground buggy been racked into the incorrect and energized 12kV cubicle, the resulting arc flash would have released considerable electrical energy into the breaker room and could potentially have caused serious injuries. The direct cause of the event was determined to be the failure of the workers to follow Electrical Maintenance procedures or to use standard human performance tools for risk mitigation. Corrective actions for the event included removal of qualifications and remediation for the workers involved, Electrical Maintenance stand downs to review the event, revising procedures, enhancing cubicle component identification, and developing and conducting an Electrical Maintenance Dynamic Learning Activity to reinforce the use of human performance tools for risk mitigation.

Maintenance was focusing on completing the following initiatives to address performance weaknesses within the Department:

- Optimizing Outage Scope
- Improving Workweek T-4 (four weeks prior to the work) Walkdowns
- Improving Maintenance Fundamentals as defined in the Institute for Nuclear Power Operations Event Report (IER) 17-05
- Clarifying the Roles and Responsibilities of the Shop Coordinators
- Improving Housekeeping
- Improving the Leak Indicators used in the PPIR

The Maintenance Department Dashboard, which was a consolidated representation of multiple indicators of Department performance, showed a high number of station leaks and Deficient/Non-critical Work Orders stood out as warranting increased attention. The Fact-finding Team concluded that the Department’s initiatives were appropriate, and the focus areas were correctly targeted toward the recently-identified weaknesses.

DCPP has identified several low-level concerns with Maintenance Department Performance, and Maintenance Department leadership is taking action to address the issues. DCISC should review the performance
of the Maintenance Department in late 2018 to evaluate the effectiveness of the actions to improve performance.

Foreign Material Exclusion (FME) Program (Volume II, Exhibit D.3, 3.5)

DCPP’s FME Program is governed by procedure AD4.ID6, “Foreign Material Exclusion Program.” The purpose of the FME Program is to prevent the undesired and potentially harmful intrusion of foreign materials into plant systems or components. Situations in which this intrusion can most likely occur are during maintenance when normally closed systems and environments are open or during inspections or tests under those same types of conditions. In such situations, it is important to maintain control of tools, fasteners, repair parts, replaced parts, safety items, and residue resulting from the work, items attached to clothing, and anything else that could become loose and enter a system or environment. The vast majority of FME problems typically occur during plant outages when many system repairs, modifications, inspections, and tests are performed.

DCPP considered its FME Program to be generally healthy, although there was an identification of a negative trend (documented in SAPN 50920493) late during the recent 1R20 Refueling Outage. The overall number of low-level events identified, approximately 26, was typical for an outage. The low-level events include such events as loss of FME barriers, small debris found when systems were opened, and small items found in the reactor or reactor cavity during refueling.

The negative trend was driven primarily by two major FME events. First, during refueling a synthetic hood was dropped into the reactor cavity and could not be retrieved before being drawn into the suction of the operating Residual Heat Removal pump. Analysis after the event determined that the hood would have easily disintegrated in the pump without causing damage and any remaining material would dissolve in the Reactor Coolant System upon plant heatup. Second, a box of rivets was dropped from a scaffolding, fell several levels in the Turbine Building, and scattered inside sections of a Main Feedwater Pump turbine casing that was open for maintenance. Open areas of the turbine casing were inspected in detail to identify and retrieve the dropped rivets. The 1R20 events drove the monthly PPIR FME Program Health indicator for May to drop from Green to Red, but the indicator recovered to Yellow in June and to Green in July.

Most events in past outages were associated with work performed by PG&E employees; however, during the 1R20 outage, the majority of events were associated with work performed by contract employees. Consideration of this trend had found that recent changes to move pre-outage training for contract employees off site had resulted in contract employees not being required to participate in an on-site FME Dynamic Learning Activity as was required prior to past outages. DCPP will be taking action to re-establish the requirement for contract employees to complete the FME Dynamic Learning Activity during pre-outage training.
DCPP’s recent FME Program performance has been generally good, except for several FME events, which occurred during the 1R20 Refueling Outage. Actions taken with respect to those events were appropriate.

Use of Portable Electronic Devices in the Power Block (Volume II, Exhibit D.6, 3.8)

In 2015 DCPP began projects to implement Electronic Work Management tools (“eWM”, see below) and to improve Operator electronic logs. Also, at that time, plans were being made to move to “Smart Procedures” which are electronic procedures that are interactive in nature; meaning, the electronic document can be used to record the performance of individual steps and/or provide reference information via active links to other electronic documents. The Smart Procedures project was scoped and found to be a major effort for both the station and IT departments, which would require about three years to complete along with significant funding. At the same time, the process for funding IT projects changed to one requiring proposed projects to be judged on their merit as a part of the IT funding across the entire PG&E company, and not just based on individual departmental needs or funds availability. As a result of those changes as well as the pending Joint Proposal for DCPP to cease operations at the end of its current license, the Smart Procedures project was placed on hold. IT was continuing to support further implementation of the Electronic Work Management initiative and upgrades to the software and platforms for operator electronic log keeping.

Availability and reliability of wireless networks in the power block area initiatives were also on hold pending the Joint Proposal for DCPP to cease operations at the end of its current license. The project was made complex and expensive by the high standards required for running power and data cables in the power block areas to avoid impacts to safety related systems. Additionally, 500 to 600 access points would be required to be installed due to the size of the power block area and the general impermeability of the areas to wireless signals due to the large amounts of concrete and steel.

Projects for implementing Smart Procedures and for expanding wireless network access in the power block have been placed on hold due to IT funding constraints and in light of the pending Joint Proposal for DCPP to cease operations at the end of its current license. Existing uses of electronic information such as Electronic Work Management and operator electronic log keeping continue to be fully supported. The implementation of Smart Procedures can bring significant benefits, so continuing some level of investment could be worthwhile.

Electronic Work Management System (Volume II, Exhibit D.6, 3.9)

In early 2017, the eWM program was piloted and implementation began across the Maintenance Department. As of the end of 2017, implementation was not as far along as desired. Initiatives were underway to encourage more use of the eWM
process. Ultimately, DCPP’s goal is for 75% of work packages to utilize the eWM process, but no target date has been set for achievement. The eWM system uses Windows-based tablets and is primarily a tool to index and manage multiple PDF documents that form a maintenance work package. One of the major advantages of the eWM process is the reduction in work for planners who assemble the work packages. The use of eWM allows planners to skip the steps of printing and assembling work packages as well as to skip the steps of manually scanning and entering completed records into the station Records Management System. One other advantage is that the use of eWM avoids the need to carry large amounts of paper into and out of the Radiologically Controlled Areas of the plant. Currently, the eWM system does not automatically transfer numerical data into the SAP system for use in trending equipment performance. Instead, the system still relies on reviewers of a completed package, such as System Engineers, to pull the desired data from the maintenance package and place it elsewhere in SAP or other analytical programs for trending.

**DCPP is continuing to implement the process for Electronic Work Management, but implementation has been slow. The DCISC should review the status of implementation again in early 2019.**

**On-Line Maintenance (Volume II, Exhibit D.9, 3.10)**

The DCISC has been following On-Line Maintenance (OLM) regularly for a number of years. DCPP evaluates the risk of taking equipment out of service for maintenance with the Phoenix Risk Model, which incorporates the updated DCPP PRA as well as the presence of new Reactor Coolant Pump Seals, which prevent reactor coolant leakage via the seals upon a loss of power/cooling event, significantly reducing the risk of core damage. To evaluate specific OLM risk Operations Planning performs Phoenix runs prior to taking equipment out-of-service for OLM. During refueling outages, DCPP performs daily Phoenix runs to assure Defense-in-Depth of safety systems and to assure the Outage Safety Checklist requirements are met.

DCPP’s use of this OLM process was expanded substantially with the formation of the DCPP Integrated Risk Review Team (IRRT), which included an Operations Senior Reactor Operator (SRO) and representatives from I&C Maintenance, Mechanical Maintenance, Electrical Maintenance, Radiation Protection, Chemistry and Environmental Services, Safety, Security, Engineering Services, Emergency Planning, and Work Planning.

Managing the risk of performing maintenance on a Unit that is operating on-line is governed by the NRC’s Maintenance Rule. This rule provides guidance for managing plant trip risk, probabilistic risk, and safety function degradation risk.

A 12-week rolling work matrix, developed for DCPP’s pre-planned OLM for all the major Systems, Structures, and Components, is based on the Surveillance Test
Procedures (STPs) performed in MODE 1, Power Operation. By knowing which equipment is to be taken out of service 12 weeks ahead of time, DCPP can determine the corresponding change in the risk of core damage. DCPP has rules on what levels of risk are acceptable during maintenance work windows.

Risk is minimized by the following methods:

- Performing only those maintenance items on-line required to maintain the reliability of the System/Structure/Components (SSCs)
- Minimizing the cumulative unavailability of SSCs in DCPP’s PRA model by limiting the number of at-power maintenance outage windows (MOW) per cycle per train/component
- Minimizing the total number of SSCs out-of-service (OOS) at the same time.
- Minimizing the risk of initiating plant transients that could affect safety systems.
- Avoiding higher risk combinations of items OOS by using PRA insights.

**DCPP’s process for evaluating risk when taking equipment out-of-service during operation for on-line maintenance appeared satisfactory. The process was structured and controlled by procedure and employed good tools for evaluating risk.**

### 4.2.3 Conclusions and Recommendations

**Conclusions:**

DCPP Maintenance performance is generally satisfactory with initiatives for improvement in selected areas, such as Foreign Material Exclusion and the work order process. Maintenance is beginning to use electronic work orders to streamline the work order process and reduce paper. On-line maintenance is performed effectively with emphasis on managing risk caused by taking equipment out of service while operating.

**Recommendations:**

None
4.3 Engineering Programs

4.3.1 Overview and Previous Activities

The following are engineering-related items the DCISC reviewed in the previous reporting period:

- Design Quality
- Plant Health Committee
- Buried Piping & Tanks Program
- Margin Management Program
- Classification of SSCs

The DCISC concluded the following during the previous reporting period:

**Overall, DCPP’s Engineering Programs appear to be healthy and effective. Design Quality, an issue for the past several years, has improved due to corrective actions to tighten the design process. Design Quality measures showed satisfactory performance based on scores of final designs released for installation. The DCISC will continue to monitor Design Quality.**

4.3.2 Current Period Activities

During the current period, the DCISC had presentations on engineering programs at eight Fact-finding meetings. The following topics were reviewed:

1. Equipment Qualification Process
2. Engineering Excellence Plan
3. Equipment Reliability Process Status
4. Boric Acid Corrosion Control Program
5. System Engineering Managed Programs
6. Commercial Grade Dedication Program

**Equipment Qualification (EQ) Process (Volume II, Exhibit D.2 Section 3.6)**
The EQ Process is within the Electrical Engineering Department, which requires the generation and maintenance of evidence to ensure that electric equipment important to safety will operate when required to meet system performance requirements when subjected to expected environmental conditions. This includes mostly electrical equipment located where environmental conditions could be harsh during normal or postulated accidents, such as high temperature, high radiation, water spray, steam, etc. The controlling DCPP procedure specifies the design bases for environmental conditions in various locations of the plant, the EQ Master List, applicable departmental procedures, deficiency identification and resolution, documentation requirements, and records retention. The procedure lists responsibilities for Engineering, Operations, Maintenance, Procurement, Learning Services, Document Services, and Quality Verification personnel for their parts of the program.

The EQ Procedure includes the following:

- Personnel qualification
- EQ Master List Maintenance
- EQ file preparation, revision and retention
- Procurement and shelf life requirements
- Maintenance and surveillance of EQ equipment
- EQ deficiencies and EQ discrepancies
- Condition monitoring and self-assessment
- Assessment of industry operating experience

The EQ Process requires the EQ Process Coordinator to prepare a self-assessment (S-A) report following each Unit 2 refueling outage. The most recent report dated January 2016 serves as the program “health card.” The self-assessment included the following items:

**Industry**

- NRC has been developing a new “deep dive” EQ inspection procedure, which is being tested at several other nuclear plants.
- There is a Part 21 (required reporting to NRC of equipment problems) concern regarding unaccounted-for uncertainties in dosimetry readings from a dosimetry vendor. This is being monitored by DCPP for impact.
- Sufficient margins exist for ASCO solenoid valves, and there are no EQ concerns; however, there is a potential cable EQ issue.
- Several DCPP engineers attended the 2015 EQ Technical Conference in Dallas, and one presented a paper on the 4kV bus steam issue during a
postulated Main Steam Line Break.

- Two DCPP engineers each attended two technical conferences on temperature monitoring and EQ testing.

**DCPP Site**

- EQ Engineer qualifications have been simplified, and there are now five qualified EQ Engineers.
- The EQ Procedure has been upgraded, and the “EQ Program” converted to an “EQ Process” to become better aligned with industry guidelines and practices.
- Several minor issues with EQ qualification records have been corrected.
- The EQ Master List review resulted in no concerns or problems.

**The DCPP Equipment Qualification (EQ) Process appeared healthy with no major outstanding issues. Depth of staff expertise appeared satisfactory with five qualified EQ Engineers.**

**Engineering Excellence Plan (Volume II, Exhibit D.2, Section 3.7)**

The purpose and vision of this Plan are to: “Provide outstanding operational focus to DCPP to ensure safe, reliable, and affordable operation by acting as the organization’s technical conscience for the design and licensing basis compliance and excellence in equipment reliability for the long term.”

The DCPP 2017 Generation Operating Plan consists of the following attributes (paraphrased):

1. Safety – operating in a manner that puts health and safety first
2. Reliability – ensure reliable and clean generation
3. Affordability – operate in a manner that meets the affordability expectations of customers and shareholders
4. Risk, Compliance & Ethics – ensure a comprehensive, demonstrable compliance program, resulting in zero significant findings or infractions
5. People – engage the full spectrum of the workforce and leverage technology to ensure employees have the skills, tools, and training to provide excellent service
6. Regulatory, External, Strategy – engage regulators, external stakeholders, and internal business partners to position DCPP for a strong run through end of license and ensure a smooth decommissioning transition.

This Excellence Plan is aligned with the above Generation Operating Plan, the Premier Culture Survey, and Joint Proposal, *inter alia*, and its “path to success”
includes the following attributes:

- Empowering and engaging employees
- Strong integration with station Operations and a customer focus
- Simplification and process improvement
- Continuous improvement through the use of operating experience, benchmarking, and self-assessment
- Cost effective, innovative, and compliant engineering solutions
- Strong single point of contact (Engineering Fix It Now)

Engineering Excellence Plan Measures of Success are as follows:

- No safety incidents (recordable injury, lost work days or Significant Incident or Fatality
- Execute the 2020 people planning
- Execute the Configuration Management initiative
- Maintain an average ERI (Equipment Reliability Index) Score greater than 94 throughout 2017
- Maintain a top quartile Plant Equipment Indicator throughout 2017
- Meet the Engineering budget goals within 2%
- No executive level Areas for Improvement in Engineering, Equipment Reliability or Configuration Management during industry evaluation
- Complete actions on top three Premier Survey feedback areas
- Less than or equal to four critical equipment clock resets for 2017
- Meet 1R20 Safety, Reliability, Schedule and Cost goals
- Continue DA Notification reduction to less than 150 by end of 2017
- Implement key DNP (Delivering the Nuclear Promise) in systems and program engineering administrative burden reduction and pilot initiatives in Critical Component reclassification, high cost non-critical PM review and value-based maintenance, and standard design change process.

Appropriate elements of the Excellence Plan are included in supervisors’ and individual employees’ Performance Management Plans.

A continuous improvement process is utilized for a “living plan,” and actions are to be added and later deleted as objectives are met.

The Plan describes the various actions that are prescribed for implementing the elements of the above areas of action. The plan appears to serve as an effective mechanism for identifying, prioritizing, and tracking key department activities.
The DCPP Engineering Excellence Plan appears appropriate for achieving and maintaining excellence in engineering support to the plant.

Equipment Reliability Process (Volume II, Exhibit D.7, Section 3.10)

As a station and its equipment age, there is an increasing focus on equipment reliability, and in DCPP’s case, the station’s heightened focus on equipment reliability appears to have been driven in large part by recurring losses of electric generation, a number of which resulted from flashovers on Unit 2’s 230 kV system. Until mid-2015, the individual at DCPP having direct responsibility for equipment reliability occupied the position of “Manager (emphasis added) of Equipment Reliability and Senior Consulting Engineer,” and was elevated to a higher position of “Director of Equipment Reliability,” that had not previously existed. The station’s approach to Equipment Reliability has expanded from being primarily Engineering-focused to a more integrated plant-wide approach that also involves the active participation of Operations and Maintenance as well as Engineering. All three station groups have active roles in overseeing and reporting equipment condition and performance and in ensuring that appropriate actions are planned and taken to maintain station equipment and systems in a healthy condition.

The ER process and results had improved substantially to the point where DCPP moved responsibility back to the Manager level. The following Equipment Reliability Index chart shows DCPP ER performance.
As can be seen from the chart DCPP scores full marks for all attributes, except the PM Change Request (PMCR) Backlog for which it scores one-out-of-two for each unit. DCPP achieved full PMCR recovery by the end of the first quarter 2018. The DCISC considers this to be good performance.

**DCPP Equipment Reliability performance is adequate in all but two categories, Unit 1 and Unit 2 Preventive Maintenance Change Request Backlog. DCPP achieved full recovery by the end of the first quarter 2018. This is good performance.**

**Boric Acid Corrosion Control Program (Volume II, Exhibit D.9, Section 3.6)**

DCPP, like other nuclear power plants, uses boric acid in the Reactor Coolant System for long-term, slow reactivity control along with the fast-acting control rods. Boron absorbs neutrons, and as the reactivity in the nuclear fuel drops due to burn up, the concentration of boron in the coolant is reduced. The use of boric acid makes the coolant corrosive to metal components, and this potential for corrosion must be properly managed to avoid equipment damage. The DCPP BACCP is controlled by Procedure ER1.ID2, “Boric Acid Corrosion Control Program.”

The procedure provides instructions for documenting and evaluating boric acid leaks and any material damage. When leaks do develop they can be visually identified by the boric acid crystals coating the leak area. Leaks are classified as either Active or Inactive Boric Acid Leaks, depending on their characteristics. All leaks are included on the DCPP Boric Acid Leaker List. The procedure calls for a Boric Acid Review Team, which is made up of representatives from many station functions, to review new boric acid leaks and indications in order to resolve those that can’t be easily corrected. Minor leaks may be corrected by tightening or re-torquing fasteners, adjusting valve packing, repairing gaskets, or repacking leaking valves. Long-term corrective actions include upgrading valve packing materials and loading configurations, gasket replacement, protective coatings and cladding to impede boric acid attack, material changes to replace low carbon steel with corrosion-resistant materials, or other design modifications.
A review of the most recent Boric Acid Corrosion Control Program Health Reports for Units 1 and 2 revealed the following, where the definitions of LK2 and LK3 are in the caption of the figure just above:

- Unit 1 LK3 (dry, discolored or excessive leaks) health was rated Yellow for the current month and previous two months
- Unit 1 LK2 (wet leaks) was rated White for the current month, down from Green the previous two months
- Unit 2 LK3 had improved to Green for the current month and previous month
- Unit 2 LK2 had degraded to White from Green the previous month

Unit 1 Wet leaks are scheduled for resolution in Refueling Outage 1R21, and dry leaks are scheduled to be resolved by June 1, 2018, which will return the rating from Yellow to Green.

Unit 2 Wet leaks are scheduled to be corrected by August 31, 2018, which will return the rating to Green.

**DCPP Boric Acid Corrosion Control Program is being implemented satisfactorily. There are some visible wet and dry leaks, which are being addressed to bring their health back to Green (Good) by August 2018.**

**System Engineering Managed Programs (Volume II, Exhibit D.10, Section 3.4)**

The status of component programs managed by the System Engineering Department is shown below (White = Needs Improvement; Green = Healthy):

<table>
<thead>
<tr>
<th>Program Overall</th>
<th>Overall Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor-operated Valves (MOVs)</td>
<td>White</td>
</tr>
<tr>
<td>Air-operated Valves (AOVs)</td>
<td>Green</td>
</tr>
<tr>
<td>In-service Testing (IST)</td>
<td>White</td>
</tr>
<tr>
<td>Fire Protection</td>
<td>White</td>
</tr>
</tbody>
</table>

Regarding the ‘White’ status of the MOV Program, it was rated as needing improvement primarily due to uncertainty surrounding required future actions that may be required in response to industry issues with Anchor Darling double disc gate valve wedge pin failures. Although DCPP’s population of the subject valves was considered not to be susceptible to the industry issue based on engineering analyses, future NRC guidance could result in the need for additional actions. Additionally, there were only two engineers with the qualification necessary to perform MOV diagnostic inspections with two more currently working to obtain the qualification. Lastly, recent changes in MOV calculation methodologies found that 16 MOVs had design margins for internal forces of less than 10%.

The IST Program was rated as ‘White’ due primarily to pending work to implement changes made necessary by the adoption of the Alternate Source Term license amendment at DCPP. Also, several minor discrepancies with pump testing data and valve stroke times were driving Corrective Actions that should be implemented during upcoming outages.

Regarding the Fire Protection Program, the ‘White’ rating was driven by the fact that the Program owner backup position was unfilled and multiple Fire Protection procedures were still being revised in support of implementation of the National Fire Protection Association (NFPA) 805 Program at DCPP. Mr. Fusco noted that implementation of the NFPA 805 Program has not, as yet, made management of the Fire Protection Program any easier at DCPP.

The Department was working to improve the proactiveness of System Engineers, improve their adherence to standards, and increase the frequency at which System Engineers challenge or question the technical consensus on equipment issues. During 2017, the Mechanical Engineering Group lost 11 of 34 engineers to retirement, transfers to other departments, or other reasons. The number of Fire Protection engineers in the Department had been particularly hard hit. He also noted that the Department was being challenged by a high rate of turnover with engineers. In response to the losses, the Department was aggressively hiring new engineers and was generally being successful in doing so.

**DCPP’s equipment programs are being managed well by the System Engineering Department. The recent turnover of System Engineers has been high, and the DCISC should follow up on this issue at a future Fact-finding Meeting.**

**Commercial Grade Dedication Program (Volume II, Exhibit D.10, Section 3.6)**

Commercial-Grade Dedication (CGD) is a process by which a commercial-grade item is designated for use as a basic component in a nuclear safety-related system. This acceptance process is authorized by 10 Code of Federal Regulations (CFR) Part 21, and is undertaken to provide reasonable assurance that a commercial grade item to be used as a replacement part would perform its intended safety function. In this respect, a commercial grade item can be deemed equivalent to an item designed and manufactured under a 10 CFR Part 50, Appendix B, Quality Assurance (QA) program. This assurance is achieved by identifying the critical characteristics of the item and verifying their acceptability by inspections, tests, or analyses by the purchaser or a third-party dedicating entity.

Most replacement parts for nuclear safety-related equipment are purchased through vendors qualified to produce nuclear safety-related components through a vendor QA Program based on 10 CFR 50, Appendix B. To facilitate the process of establishing and maintaining QA Programs for vendors, the U.S. utility industry
created the Nuclear Utility Procurement Issues Corporation (NUPIC). The NUPIC establishes a common process for vendor QA Program certifications and coordinates audits for vendors, typically on a triennial basis. The CGD program comes to bear if a repair part is needed for a nuclear safety-related component and no vendor with a certified QA Program is available. Such situations occur most often when the original vendor which supplied the part no longer has a certified QA Program or is no longer in business. The CGD program is not used to save costs as it is typically more cost-effective to purchase components from certified vendors. In all cases, once a part is qualified for use in nuclear safety-related equipment, 10 CFR 21 requires that complete traceability be maintained, including tracking of when and where the part was produced or dedicated, how the part was purchased, where the part was stored, and where the part may be installed during maintenance activities. The traceability process is critical to ensure any failures that occur can be properly investigated with regards to evaluating the possible risks to other equipment where identical parts may be in use.

DCPP’s CGD process is controlled by Procedure CF3.ID13, “Replacement Part Evaluation and CITE (Commodity Items Technical Evaluations).” The procedure is based on the process described in 10 CFR 21, and delineates the responsibilities, process and documentation for Replacement Part Evaluations (RPEs). Individuals preparing or independently verifying RPEs must be qualified to the appropriate standards. Typically, these individuals are in the applicable engineering group.

The DCISC Fact-finding Team toured a small testing laboratory used for CGD testing. The laboratory contained instruments used for checking such things as material hardness, types of metals (Nitron Alloys analyzer), and types of polymers (infrared photospectrometer). Testing using each instrument was performed in accordance with a procedure approved for the use of that particular instrument. The Fact-finding Team also noted how material is tagged and tracked in the warehouse and observed that the warehouse appeared well organized and clean.

The DCPP Commercial Grade Dedication (or Replacement Parts Evaluation) Process appeared sound. The Santa Fe Road Warehouse and testing laboratory appeared to be clean and well maintained.

4.3.3 Conclusions and Recommendations

Conclusions:

The DCPP Engineering Program appeared to be functioning satisfactorily with improvements being targeted in its Excellence Plan.

Recommendations:

None
4.4 Human Performance: Human Errors and Improving Safety and Efficiency of Plant Performance

4.4.1 Overview and Previous Activities

Human Performance is usually used to refer to as “human error” and the term is used herein in that manner. The issues around plant safety and plant efficiency having to do with human error reduction are also included in this section. The goal of the human performance program is to reduce the number of human errors to improve plant safety and plant efficiency by improving human performance.

During the previous period the DCISC reviewed one following human performance-related item:

- Safety and Wellness Exposition

The DCISC concluded during the last period that The DCPP Safety and Wellness Expo and Barbeque Throwdown was well implemented. The earthquake-simulating shake trailer was particularly helpful in showing why it is important to brace furniture, something in which the DCISC has had longstanding interest.

4.4.2 Current Period Activities

During the current period, the DCISC did not review any human performance-related topics, per se, at Fact-finding Meetings, although it did monitor human performance via such measures as outage performance, operations department performance, etc. The DCISC plans to review human performance during the next reporting period.

4.4.3 Conclusions and Recommendations

Conclusions:

Although the DCISC did not review human performance, per se, during this reporting period, it has found DCPP human performance
satisfactory in the previous period and did not observe any indicators during this period to indicate otherwise.

**Recommendations:**

None
4.5 Nuclear Safety Culture, and Safety Conscious Work Environment

4.5.1 Overview and Previous Activities

The purpose of Nuclear Safety Culture, and Safety Conscious Work Environment (SCWE) is twofold: 1) the health of the individual employee, and 2) nuclear and personnel safety as the context and requirement for all DCPP employees. Included in the area are all health related issues. This section also focuses on Safety as a contextual, cultural requirement.

In the previous reviewing period (2015–2016) the DCISC did not review topics that focused specifically on Health, Nuclear Safety Culture, or Safety Conscious Work Environment; however, the DCISC concluded the following:

1. Employee Concerns Program
2. Nuclear Safety Culture Health & Survey

DCPP’s nuclear safety culture appears strong according to its Nuclear Safety Dashboard and from early results of its latest Nuclear Safety Culture Survey. The DCISC will follow up on the latter during its next operating period.

4.5.2 Current Period Activities

During the current period (2016–2017) the DCISC reviewed the following topics that focused specifically on Health, Nuclear Safety Culture, or Safety Conscious Work Environment:

○ DCPP Safety Culture

DCPP Safety Culture (Volume II, Exhibit D.1, Section 3.11)

DCPP had performed a plant-wide Nuclear Safety Culture Survey Assessment in February 2017, which, concluded at a high level that, “The DCPP nuclear safety culture supports all of the INPO [Institute of Nuclear Power Operations] Traits and is not compromised by production priorities.”
DCPP's Nuclear Safety Culture Dashboard, which is its performance measurement system for safety culture, showed Safety Culture to be Green overall, or in good health. Several areas as follows were classified as White, healthy but needing improvement:

- Personal Accountability
- Leadership Safety Values and Actions
- Respectful Work Environment
- Work Processes

The following observations were noted in the results. These were employee comments on various parameters.

**Strengths**

- Questioning Attitude – a robust questioning attitude exists.

**Positive Observations**

- Decision Making – plant staff routinely follows a consistent and systematic process to make decisions, ensuring key stakeholders are involved.
- Respectful Work Environment – trust is good, communication is improving, and differing opinions are encouraged.
- Continuous Learning – leadership training and Dynamic Learning Activities are positive.
- Effective Safety Communication – increased face-to-face communications are noted across the site.

**General Observations**

- Leadership Safety Values and Actions – positions are being filled when necessary, and tools and equipment were properly funded, and change management was cited as effective.
- Work Processes – long-standing equipment issues are being addressed, and there is a focus on addressing late preventive maintenance.
- Respectful Work Environment – overall work environment is healthy, and employees want to know why certain decisions are made.
- Environment for Raising Concerns – workers feel free to raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination.
- Continuous Learning – continuous learning is generally in keeping with nuclear industry high standards.
Problem Identification and Resolution – an increased focus on resolving conditions adverse to safety is recognized across the site, although some groups believe they do not receive feedback on Notification resolutions.

Effective Safety Communication – an increase in effective safety communication is recognized by the site, and face-to-face communications are preferred. v

Personal Accountability – the attributes of standards and job ownership received high ratings.

Security Organization Challenges – there were mixed responses regarding Security.

Negative Observations

Personal Accountability – a lack of coordination around station work activities has created a strain on time and resources mainly in projects and security.

Leadership Safety Values and Actions – most worker level employees were satisfied with the amount of time their direct supervisor spent with them, but not so for upper level leaders.

Work Processes – employees perceive that a weakness exists with coordination and schedule adherence of Security Projects and Security-related emergent work; however, improvements are noted.

Continuous Learning – there is the perception that after the four-year extension offer ends and many workers leave, it will be difficult to qualify new workers.

Weaknesses

None identified

The DCISC FFT determined that these results were positive.

The DCISC believes the results of the February 2017 DCPP Nuclear Safety Culture Survey show that DCPP continues to exhibit the traits of a healthy nuclear safety culture.

4.5.3 Conclusions and Recommendations

Conclusions:

DCPP’s nuclear safety culture appears strong according to its Nuclear Safety Dashboard and from early results of its latest Nuclear Safety Culture Survey.

Recommendations:
None
4.6 Performance Improvement Programs

4.6.1 Overview and Previous Activities

Performance Improvement Programs include multiple programs included in DCPP’s Performance Improvement Initiatives, such as Corrective Action, Industry Operating Experience, Benchmarking, Self-Assessments, etc. Many consider these to be “learning” programs whereby the organization learns to improve from its and others’ experiences.

As have all nuclear plants, DCPP has implemented a Corrective Action Program (CAP). The CAP is a formal, controlled process used to identify and correct problems which occur. A key part of the CAP is root cause analyses, which are utilized to ascertain the real causes of problems or events such that corrective actions can be taken to prevent their recurrence. During the previous reporting periods, the DCISC has reviewed the DCPP CAP and numerous events, which were identified and resolved using the CAP. The NRC refers to these type of programs as Problem Identification and Resolution (PI&R).

Programs reviewed during the previous reporting period included the following:

- Self-Assessment Program
- Performance Improvement Program

The DCISC concluded in the last period that DCPP’s Self-Assessment Program appears to be implemented satisfactorily in that many self-assessments are performed; however, their quality is somewhat questionable as some are determined to need changes by the Performance Improvement Review Board before becoming final.

4.6.2 Current Period Activities

During the current period, the DCISC reviewed Performance Improvement Programs at four Fact-finding Meetings. The following topics were reviewed:

- Meeting with Three Performance Improvement Coordinators
Observe Corrective Action Review Board Meetings

- Management of Data in the Performance Improvement Program
- Leadership Engagement in the Performance Improvement Processes
- Equipment Data Collection, Trending and Retention

Meeting with Three Performance Improvement Coordinators (Volume II, Exhibit D.5, Section 3.3)

The DCPP Performance Improvement (PI) Department was comprised of the following groups (functional areas):

- Corrective Action Program
- Performance Programs
- PI Process
- Human Performance

The PI Department measures, monitors, trends, and reports on plant performance with the intent of continuous improvement. Department Performance Improvement Coordinators (PICOs) reside both within the PI Department (as heads of the groups and functional areas shown above) and within the line departments, e.g., Operations, Maintenance, Engineering, etc., to coordinate performance within their departments. The PICOs described their work, with an emphasis on their interfaces with the technical staff doing the actual work whose performance improvement is being evaluated. They emphasized how important it is that the individual PICO residing within a given line department maintain coordination with other PICOs throughout the plant. It appeared that the PICO organization was performing satisfactorily for DCPP.

DCPP’s Performance Improvement Department, along with its Performance Improvement Coordinators (PICOs) appears to be an effective asset for plant problem solving and continuous improvement.

Observe Corrective Action Review Board Meetings (Volume II, Exhibit D.6, Section 3.5, and Exhibit D.10, Section 3.5)

The CARB is governed by DCPP Procedure OM4.ID15, “Corrective Action Review Boards” and its purpose is to provide a significant venue for station personnel to demonstrate commitment to Corrective Action Program (CAP) excellence. The CARB fulfills a need for senior management oversight of the CAP and this oversight function includes:

- Reviewing Root Cause Evaluations (RCEs) for accuracy, completeness and alignment of the problem, causes and corrective actions.
- Approving extensions to the due dates for Corrective Actions to Prevent
Recurrence.

- Approving effectiveness evaluations for CAP documents.
- Periodically reviewing CAP metrics to ensure the CAP is meeting management expectations.
- Reviewing and disposition requests for Cause Evaluation downgrades.
- Reviewing notifications screened by the Notification Review Team

The membership of the CARB consists of regular and alternate members designated in writing by the Station Director. CARB meetings are held as necessary, typically on a weekly meeting.

The team observed a December CARB meeting which was conducted with efficiency; however, it was recognized shortly after the start of the meeting that the minimum quorum of four members or alternates was not present. As such, the CARB was unable to approve documents as planned by the agenda, and a Corrective Action Program Notification was written to document the failure to achieve a quorum (SAPN 50954497). The CARB did make an effort to discuss items for which approval was not required. In particular, the CARB reviewed one Cause Evaluation (SAPN 50948863) with a presenter and provided feedback that would be useful in revising the Cause Evaluation prior to returning to the CARB for approval at a later date. This review was an appropriate and productive use of the time despite the absence of a quorum.

In May, the DCISC observed another CARB meeting, the agenda for which included the following:

- Safety Assignments
- Facilitative Leadership Minute
- Review Desired Outcomes
- Verify Quorum
- Review and Approve Minutes from Previous Meeting
- Review of Action Items
- Review of Overdue Notifications
- Review of CARB Products
- Review Condition Reports
- Additional Reviews as Needed
- Actions and Meeting Evaluation

The meeting was conducted with efficiency, and the agenda was covered as scheduled. A strong emphasis was placed on plant safety and reliability throughout the discussion. The agenda items focused on during the meeting were appropriate
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for ensuring effectiveness of the Corrective Action Program. Two major items on the agenda were ‘bringback’ items, meaning items that had been previously discussed and were being brought back for additional discussion and approval. The CARB also spent a significant amount of time reviewing Condition Reports (Notifications) processed since the last meeting to ensure that the classification and initial actions were appropriate. This process was an important element of the Corrective Action process to ensure that plant management was familiar with and approved actions taken by the Notification Review Team during daily Condition Report reviews. It was noteworthy during this review that the members had all reviewed the items in advance and were prepared to make the best use of the time in the meeting. Additionally, the CARB reviewed the status of the 20 oldest corrective action assignments to ensure that the actions were going to be completed by the assigned due dates along with trends for the overall backlog of open actions being tracked in the Corrective Action system.

The Fact-finding Team’s observation of a December Corrective Action Review Board (CARB) meeting was hindered by the fact that a quorum was not present for the meeting. A Corrective Action Program Notification was submitted for the lack of a quorum, and those present at the meeting made a productive use of the time. A May DCPP Corrective Action Review Board meeting was performed efficiently and effectively. It was evident that members were prepared, facilitated open and effective discussion, and made clear decisions and action assignments.

Management of Data in the Performance Improvement Program (Volume II, Exhibit D.6, Section 3.10)

Five coordinators in the PI Department serve as the core group to review all performance data inputs obtained through the Corrective Action Program (CAP) and look for trends. The coordinators come from Operations, Maintenance, Engineering, Work Management, and Radiation Protection/Chemistry. When trends are found, they document the trends and enter the existence of the trend back into the CAP. On a quarterly basis, Integrated Performance Monitoring (IPM) meetings are held with each department to review trends, and the results of the meetings are documented in an IPM quarterly report for the department. The results of all IPMs are rolled up to a Station-level IPM.

The trending done by the PI Department is mostly cognitive trending (meaning, using individual judgment to review data and identify trends) and not statistical trending. In the past, more statistical trending had been done by the PI Department, but it was found that such trends were delayed indicators and not useful for identifying problems at an early stage. Most data analysis that is done at DCPP uses manual processes to pull data from the SAP system and uses other analytical programs to analyze the data. One small exception would be the recent implementation of the eCAP program, a web-based portal to the CAP data in SAP which is accessible to everyone. That program includes a ‘dashboard’ which
provides a small amount of front-end analytics of CAP data. Detailed equipment data such as process data (pressure, temperature, flow, vibration, etc.) are captured in the Plant Computer System, and the Engineering Department is responsible for analyzing and trending that data as needed.

Industry data on operating events that are reported to the station are analyzed using a detailed form which is intended to ensure that any possible applicability to DCPP is recognized and entered into the CAP for review. For the year to date at the time of the meeting, 135 of 1038 industry events had been found possibly to be applicable to DCPP.

Regarding human performance error tracking, DCPP used the “Human Factors Analysis Categorization System,” (HFACS) to place human performance events into categories for trending and review. The HFACS system is intended to be a supplement to the Root Cause Evaluation process and uses a check list that is ‘why?’ based to ensure that the appropriate underlying reasons for a human error are identified and corrected. The results of the HFACS analysis are captured in the SAP system. The results also provide input into Department level ‘clock resets’ for human performance.

The DCPP Performance Improvement Department effectively reviews information from the Corrective Action Program to identify adverse trends and initiate appropriate corrective actions. The DCISC should review the trending of plant data by the Engineering Department during a future Fact-finding Meeting.

Leadership Engagement in the Performance Improvement Processes (Volume II, Exhibit D.9, Section 3.3)

DCPP initiated a new Leadership Engagement in the Performance Improvement (PI) Process. Through this process, DCPP expected, “Management engagement in all aspects of performance improvement processes so that all levels of leadership properly implement PI processes to achieve continuous performance improvement and successful resolution of station performance gaps.” DCPP shared their document, “Our Path Forward 2017–2018, Leadership Engagement in PI Processes.” This document spelled out top management expectations and action steps for the leadership team. The DCISC regarded DCPP’s initiatives to involve its leadership more in their PI Process as positive.

DCPP plans for augmented leadership engagement in Performance Improvement (PI) processes (corrective actions, self-assessments, benchmarkings, operating experience, and cause evaluations) appear appropriate. The expectation is that all levels of leadership will properly implement the PI processes to achieve continuous improvement and successful resolution of station performance gaps.
Equipment Data Collection, Trending and Retention (Volume II, Exhibit D.10, Section 3.3)

Most process data from plant instrumentation was collected and stored by the Plant Process Computer (PPC). The PPC archived data regularly and large amounts of historical data were available for review and analysis on an as-needed basis. Nearly all trending and analysis was performed manually via the use of a stand-alone analysis software package, called eDNA, which was required to build and run reports. That software was not generally available on all network computers but rather required engineers to travel to and use specific workstations available in the Administration Building. Regarding advanced or automated monitoring of PPC data, there were several Efficiency Bulletins provided by the Nuclear Energy Institute that discussed the use of additional equipment monitoring tools as a basis for optimizing maintenance planning. DCPP had not yet initiated any specific capital projects as a result of those initiatives but was in the process of reviewing the applicable Efficiency Bulletins for possible recommendations. The Fact-finding Team noted that adopting such advanced monitoring tools would likely be of interest to most engineers and that it could boost morale for engineers to be able to implement and use such state-of-the-art monitoring tools on a regular basis.

During a previous Fact-finding Meeting, the DCISC learned that the capability of the currently installed Reactor Coolant Pump (RCP) Vibration Monitoring systems to retain historical data for later analysis was extremely limited. DCPP informed the team that it was planning to replace the RCP Vibration Monitoring system with a more capable system. A new system based on the “System 1” technology from Bentley-Nevada would be installed on the RCPs in three stages starting in the summer of 2018. The new system would continue its primary, hard-wired function to provide an alarm in the Control Room and would also have the ability to store vibration data virtually indefinitely.

DCPP routinely collects data from plant equipment, and such data can be manually collected and analyzed on an as needed basis. Possible future uses of advanced or automated equipment data monitoring systems are being reviewed, but no plans currently exist for the installation of such systems. The Fact-finding Team noted that adopting such advanced monitoring systems would likely be of interest to most engineers to be able to use such state of the art monitoring systems on a regular basis. The DCISC should follow DCPP plans for implementing and using state-of-the-art plant health monitoring technologies closely.

4.6.3 Conclusions and Recommendations

Conclusions:
DCPP’s Performance Improvement Department, along with its Performance Improvement Coordinators appeared to be an effective asset for plant problem solving and continuous improvement. The Fact-finding Team’s observation of one Corrective Action Review Board meeting was hindered by the fact that a quorum was not present for the meeting. A Corrective Action Program Notification was submitted for the lack of a quorum, and those present at the meeting made a productive use of the time. A second Corrective Action Review Board meeting was performed efficiently and effectively. It was evident that members were prepared, facilitated open and effective discussion, and made clear decisions and action assignments. The DCPP Performance Improvement Department effectively reviews information from the Corrective Action Program to identify adverse trends and initiate appropriate corrective actions. DCPP plans for augmented leadership engagement in Performance Improvement processes appeared appropriate. DCPP routinely collects data from plant equipment, and such data can be manually collected and analyzed on an as needed basis. Possible future uses of advanced or automated equipment data monitoring systems are being reviewed, but no plans currently exist for the installation of such systems.

Recommendations:

None
An Emergency Preparedness (EP) Program has been in-place since the beginning of the nuclear power industry; however, the accident at Three Mile Island brought substantial changes. Prior to Three Mile Island, Emergency Operating Procedures (EOPs) were primarily event-based, requiring the operator to know which event was taking place. Afterward, the EOPs became symptom-based, making it easier for the operator to decide what actions to take. The five major EP facilities include (1) the Control Room (simulator in practice) where operators respond to the accident, (2) the station Technical Support Center (TSC) where engineering, computer, radiological assessment, NRC, and operations, as well as documents and procedures, are located, (3) the offsite Emergency Operations Facility (EOF) where the Recovery Manager and administrative and technical staff are located, (4) a station Operations Support Center (OSC) that provides a location to stage and dispatch operations, maintenance, firefighting, and radiation protection personnel, and (5) the Joint Information Center (JIC) where DCPP and San Luis Obispo County interface with the media.

The DCISC reviews Emergency Preparedness at DCPP on a regular basis. Past Committee activities have included observations and reviews of drills and full, graded emergency exercises each year and related issues from the observations.

During the previous reporting period, the DCISC reviewed the following specific items:

- Update on DCPP EP Programs
- Observe November 2, 2016 Ingestion Pathway Emergency Exercise

The DCISC concluded the following during the previous reporting period:

The three-day DCPP November 2, 2016 Ingestion Pathway Emergency Preparedness Exercise successfully achieved its objectives. It involved multiple local, state and Federal agencies and organizations. Drill critiques and evaluations were positive. The DCPP Emergency Response Organization was proficient in its implementation of the exercise.
4.7.2 Current Period Activities


4.7.3 Conclusions and Recommendations

Conclusions:

Although the DCISC did not review DCPP Emergency Preparedness in the current reporting period (2017–2018), it has concluded in previous reporting periods that the program was satisfactory.

Recommendations:

None
4.8 Risk Assessment and Management

4.8.1 Overview and Previous Activities

PG&E has developed in-house capability to perform risk assessments and periodically updates its Probabilistic Risk Assessment (PRA) to incorporate changes in plant configuration and, if appropriate, operations. PG&E controls its risk from on-line maintenance procedurally. For On-Line Maintenance the PRA Group prepares a Risk Profile on a weekly, monthly and fuel cycle basis. The PRA Group works very closely with personnel performing the On-Line Maintenance risk assessment, and the program has been working well. The On-Line Maintenance (OLM) model has been used by Operations and Maintenance as an on-line planning tool for various operations and maintenance activities.

The DCISC reviewed the following item in DCPP’s Probabilistic Risk Assessment Program during the prior reporting period:

1. PRA Program
2. PRA for NRC White Finding

In its previous reporting period the DCISC concluded that Probabilistic Risk Assessment is an effective tool in understanding and improving nuclear reactor safety. PG&E has established an effective PRA Program staffed by experienced personnel and utilizes PRA to the full extent in analyzing and operating DCPP safely.

4.8.2 Current Period Activities

The DCISC reviewed the following topics during the current reporting period:

1. Non-seismic PRA Programs
2. Seismic PRA Program
3. Human Performance Data in PRA Assessments

Non-seismic Probabilistic Risk Assessment Programs (Volume II, Exhibit D.3, Section 3.2)
**Fire PRA:** The DCPP team has been working on a new fire PRA for a few years, and it is now in regular use at the plant. The model and analyses using it served as a major part of the plant’s submittal to the NRC for switchover of its NRC fire-protection regulations from the older Appendix R-based approach to the new approach based on National Fire Protection Association (NFPA) Standard 805. That switchover was approved by the NRC in April 2016 and, one year later, in April 2017, the new NFPA requirements for DCPP took effect.

The plant has also begun to use the fire PRA in NRC Regulatory Guide (RG) 1.174 applications, in which the PRA is used to justify certain plant configuration changes that need NRC approval. A good example is using the fire PRA to support changes to Unit One in the recent outage for which it can be demonstrated that the change in plant core-damage frequency is smaller than the RG 1.174 decision thresholds. Modifications to Unit 2 in the upcoming 2R20 Refueling Outage in early 2018 will also be made on the same basis.

**Internal-flooding PRA:** the PRA team’s internal-flooding PRA model is now complete and in use, after several years of development. An external peer review was conducted in 2012, which was quite positive, and which provided helpful findings and observations. The findings and observations have all been resolved, resulting in the issuance of an updated model in 2015. The team is now working on an updated model to be implemented during the next year. The contribution of internal flooding to the total plant core damage frequency is small, in the 5% range.

**Low Power and Shutdown (LPSD) PRA:** TDCPP reported that their plans to initiate a new PRA to evaluate LPSD conditions is on hold awaiting the completion of two pilot applications of the new ANS-ASME LPSD standard at other US plants, in order to benefit from the insights gained during those pilot studies. In the meantime, they are switching over their shutdown risk analysis methodology from “Safety Monitor,” which had been in use for several years, to the new “Phoenix” analysis methodology. Both of these methodologies use PRA-type analysis methods. The plant is already using Phoenix to support decisions about online maintenance, and will be using it to support outage risk management decision-making for the upcoming Unit 22R20 Refueling Outage in early 2018.

**PRA for Other External Events:** The team reported that accidents arising from external flooding still screen out as contributing very little to the risk profile, after having done additional work on modeling external-flooding scenarios arising from severe flooding in Diablo Creek. They reported to the DCISC earlier (in 2016) that risks from aircraft impacts have been screened out based on data from the Department of Transportation, and this is still true. The team reported on recent work on modeling tornado missile impacts as part of a high-winds PRA, but no results are available yet. They also reported on PRA work to model seismic-induced near-shore landslide tsunamis. This topic is covered in a separate section.
PRA Application - GI-191: For a few years, the PRA team has been active with an industry consortium of 14 other nuclear power plants that is fostering the use of PRA risk insights in the resolution of NRC Generic Issue 191, "Assessment of Debris Accumulation on PWR Sump Pump Performance.” Testing work at a contractor’s laboratory was completed toward the end of last year, and that provided a basis for a more realistic probabilistic model of this phenomenon. However, the plant has decided that this NRC regulatory issue can be more easily resolved for Diablo Canyon using deterministic analysis approaches rather than the probabilistic approaches that have been developed. The regulatory submittal relying on these deterministic analyses is now in preparation.

PRA Application - Revision to Technical Specifications Based on Risk Insights: In late 2013, the plant submitted a License Amendment Request to the NRC to revise the plant’s Technical Specifications based on insights from the plant PRA. Recently, another plant has received a regulatory approval using similar arguments, and DCPP expects its approval sometime soon. If the approval is granted, the plant expects to make some modifications (such as changes to certain allowed outage times and testing intervals for vital equipment) in the next two upcoming outages.

The DCPP Probabilistic Risk Assessment (PRA) group’s development work today is emphasizing the support of various applications, such as resolving generic issues and modifying technical specifications, and the use of the PRA for these purposes continues effectively. The DCISC Fact-finding Team concludes that the PRA group is doing excellent work. The DCISC should continue to follow developments in this area closely.

Seismic Probabilistic Risk Assessment Program (Volume II, Exhibit D.3, Section 3.10)

The background of this discussion is that after the 2011 nuclear accident at Fukushima in Japan, NRC made an industry-wide information request in a 50.54(f) letter in March 2012 (Reference 6.18) that, among other issues, covered asking the plants to perform some additional analyses of the risk from earthquakes. In response, PG&E has been working ever since on a long series of studies, based on probabilistic methods, to provide an up-to-date SPRA.

At this Fact-finding Meeting, the DCPP team presented a progress report. The SPRA is almost complete, and the DCPP team reported that in May the SPRA analysis had been subjected to an outside peer review by a team of experts, as part of its program to assure that their SPRA was in conformance with the ASME-ANS PRA Standard. These PRA peer reviews generally result in a few Findings and Observations (F&Os), and this peer review was no exception. It is necessary that each F&O be resolved before the PRA (in this case, the SPRA) can be submitted to the NRC for its acceptance. After NRC acceptance, the PRA can then be used in
The peer review resulted in a few dozen F&Os. Some of these cover documentation, and will be resolved easily. Among the F&O issues that will require some extra analysis or other work are issues involving so-called 2-over-1 configurations in the plant, where a non-seismically-designed item might fall during a postulated earthquake and damage an important item needed to respond to the earthquake. The F&O involved assuring that these items are walked down after the analysis to verify their configuration. Another F&O involved the vulnerability of a slope on the site to seismic-caused slumping. This will require further checking in the field. Still another one involves whether the list of equipment being studied in the SPRA is in fact complete, especially in regards to certain portable generators.

Other issues identified by the peer review team involve analysis of the potential for seismic-induced internal flooding, the potential for a seismic-caused fire due to high-energy electric arcing in a cabinet, and the potential for seismic-caused damage to a lubrication-oil reservoir.

The DCPP team reported that these issues should not be difficult to resolve and that they believe none of them is important to overall plant seismic risk. The Fact-finding Team concurs in this evaluation. However, the additional work will delay the schedule. The DCPP team is now pointing toward a submittal to the NRC in April 2018.

The DCPP Probabilistic Risk Assessment (PRA) Group’s development work on the Seismic PRA is proceeding well. A recent outside peer review provided some review comments that will require resolution before the analysis can be considered complete and ready to submit to the NRC. The DCISC Fact-finding Team concludes that the Seismic PRA team is doing competent work. The DCISC should continue to follow developments in this technical area closely over the next year.

Human Performance Data in PRA Assessments (Volume II, Exhibit D.8, Section 3.2)

The technical issue is as follows: One of the most important tasks in performing any PRA, such as the DCPP’s PRA, is to identify all of the important individual sequences of events (so-called “accident sequences”) that could lead to a severe accident involving the melting of the reactor core. Many of these sequences involve a combination of equipment failures and human errors, and the identification of the various human errors and the role that each would play in the evolution of the accident sequence is typically very complex. Once identified, each human error must be assigned a numerical value representing the probability that the error will occur.

There are many different categories of human errors: for example, errors of
commission are distinct from errors of omission. (An error of omission occurs when a person fails to perform an action that should have been performed. An error of commission occurs when a person performs an action that should not have been performed.) Also, errors that occur prior to the initiation of a sequence are necessarily treated differently than errors that initiate the sequence or errors occurring while the sequence is evolving after starting with some other failure.

This entire PRA area is known as Human Reliability Analysis (HRA). There are several different accepted methodologies for performing HRA, each documented in the literature and many of them in wide use. They can differ considerably in both the approach to structuring the analysis and the way in which the numerical probabilities are determined and assigned. There is also an American Society of Mechanical Engineers (ASME)/American National Standard (ANS) for PRA analysis, the ASME/ANS PRA Standard (Reference 6.8), which has requirements for what to do to perform a technically adequate HRA analysis that can be used in PRA applications. The DCPP PRA has met that standard and has received a peer review to provide additional assurance that it has been met.

The standard, however, is a “what to do” standard, and the “how to do” is left up to the analysis team, subject to the peer review. It is the “how to do” aspect of the DCPP HRA analysis that was the subject of this Fact-finding meeting.

**Plant-specific data**: One aspect of the discussion in this meeting was the extent to which the DCPP PRA uses plant-specific data as a partial or major basis for the quantification aspect of the HRA. Generally, the state-of-practice in PRA is to use plant-specific data wherever it is both available and applicable.

The DCPP analysts reported that there is not generally enough plant-specific (DCPP-specific) HRA data to support its use in their PRA, and that this is generally true of most other similar PRAs at similar nuclear power plants. They have attempted to incorporate plant-specific HRA data for the more important accident sequences, if available, but where used (most often in the pre-initiator aspect of their HRA analysis) they have found that it does not generally make much difference to either the numerical results or the PRA insights. The DCPP team also reported that developing plant-specific data can require extensive analyst work. The PRA team reviews those Corrective Action Program entries that might be relevant, and of course these are plant-specific.

They reported that they generally use Swain’s and Guttmann’s THERP (“Technique for Human Error Rate Prediction”) methodology and data (Reference 6.9). The Fact-finding Team is familiar with the THERP approach, which is widely used, well understood among the community of practitioners, and accepted as one of the most useful HRA methods.

**Recoveries**: One aspect of the HRA analysis is to estimate the numerical values assigned to certain human recovery actions – that is, after a failure, the human
action to recover the safety function, through either restoration of a failed piece of hardware or the overriding of a human procedural error by a more appropriate action. The time required for each individual modeled recovery needs to be determined, by developing what is known in the field as estimating the Time-Reliability Correlation (TRC). The DCPP team reported that they have generally used generic rather than plant-specific TRC values due to a lack of enough plant-specific data (which could in principle include either operational data or simulator data), but that using operator input they have modified a few of the TPC correlations to make them plant-specific.

They noted that the state-of-practice today is generally not to include post-accident cognitive errors of commission because they are generally believed not to be important contributors. However, for fire-initiated and seismic-initiated sequences the PRA team reported that they review the annunciator response procedures (ARPs) for potential errors of commission which are then included in their model.

On the issue of differentiating errors of commission from errors of omission, the team reported that they always differentiate between them including assigning different numerical failure probabilities as appropriate. That is today’s HRA state-of-practice.

DCPP has been performing Probabilistic Risk Assessment (PRA) for many years, and their PRA model is mature. The way the PRA team performs the Human Reliability Analysis (HRA) aspect of their PRA was reviewed. The DCISC team believes that the approaches being used generally follow state-of-practice methodologies, and that the PRA’s use of plant-specific HRA data, where those data are available, is appropriate.

4.8.3 Conclusions and Recommendations

Conclusions:
Probabilistic Risk Assessment is an effective tool in understanding and improving nuclear reactor safety. PG&E has established an effective PRA Program staffed by experienced personnel and utilizes PRA to the full extent in analyzing and operating DCPP safely.

Recommendations:
None
4.9 Nuclear Safety Oversight and Review

4.9.1 Overview and Previous Activities

Note: because of the confidentiality agreement between the Institute of Nuclear Power Operations (INPO) and its member nuclear plants, and a similar policy governing DCPP’s internal Nuclear Safety Oversight Committee (NSOC), only limited information can be presented in this public document.

Nuclear Safety Oversight and Review is an important function in the safe operation of nuclear power plants. This oversight represents an independent, higher and/or broader level of review of operations, events, occurrences, etc. than can be obtained from the organizations performing the day-to-day plant, technical and quality functions. The Nuclear Regulatory Commission (NRC) is charged by law to regulate the nuclear industry. In carrying out this responsibility the NRC issues regulations and guides for nuclear safety and performs inspections at facilities to assure regulations are met. NRC's role at DCPP is discussed in Chapter 3.0 NRC Assessments and Issues. NRC regulations require, and DCPP Technical Specifications (TS) provide for, a high level of oversight in the form of the Nuclear Safety Oversight Committee (NSOC).

Additionally, the nuclear industry monitors and enhances operational safety and excellence with the Institute of Nuclear Power Operations (INPO) which performs periodic performance evaluations of each operating nuclear plant; coordinates the collection, review and dissemination of operating event information; issues good practice guidelines; provides specific event, technical and functional reviews; and issues and monitors performance goals for the industry. PG&E is a member of INPO and participates in their programs.

The Diablo Canyon Independent Safety Committee (DCISC) provides an additional level of nuclear safety review and oversight. As stated in Chapter 1.0, DCISC is charged to "...review Diablo Canyon operations for the purpose of assessing the safety of operations and suggesting any recommendations for safe operations". In carrying out its responsibilities DCISC receives and reviews DCPP operating and technical and NRC documents; performs fact-findings at DCPP and holds several public meetings and public plant tours each year to hear PG&E reports on plant
operational safety and receive public input.

The DCISC observed the following oversight meetings/items during the previous reporting period (2015–2016):

- INPO Update
- NSOC Summary Meeting

In the previous reporting period the DCISC concluded that Attending Nuclear Safety Operating Committee (NSOC) meetings is an excellent way for the DCISC to learn about various plant issues, and therefore the DCISC will continue to attend them regularly. The DCISC believes that the DCPP NSOC is effective in advising plant management on items of nuclear safety and operational improvement. DCPP is satisfied that DCPP is taking its Institute of Nuclear Power Operation/World Association of Nuclear Operators evaluation seriously and satisfactorily working to resolve the evaluation areas for improvement.

4.9.2 Current Period Activities

The DCISC has an agreement with DCPP to maintain NSOC information confidential, thus only limited information is presented here.

The DCISC reviewed the following oversight item during the period 2016–2017:

- INPO Evaluation Preparation
- INPO Evaluation Results (D.5, 3.4)

Institute for Nuclear Power Operations Evaluation Preparations (Volume II, Exhibit D.3, Section 3.6)

The DCISC Fact-finding Team reviewed DCPP’s preparations for the September 2017 INPO evaluation, including the results of the recently completed Crew Performance Evaluations and DCPP’s understanding of the focus areas to be reviewed in depth by INPO during the upcoming evaluation.

DCPP reviewed its preparations for its Institute of Nuclear Plant Operators September biennial evaluation with the DCISC.

INPO Evaluation Results (Volume II, Exhibit D.5, Section 3.4)

After reviewing and discussing the results of the evaluation, the DCISC FFT concluded that the evaluation was positive with areas for improvement, which appeared appropriate.
The Institute of Nuclear Power Operations biennial August 2017 evaluation of DCPP appeared to have been positive overall with some areas for improvement that seemed appropriate. (Because of its privacy agreement with DCPP, the DCISC cannot share the details of the evaluation.)

4.9.3 Conclusions and Recommendations

Conclusions:

The 2017 Institute of Nuclear Power Operations (INPO) evaluation of DCPP resulted in a positive assessment along with several Areas for Improvement. DCPP has made plans to address each Area for Improvement.

Recommendations:

None
4.10 Radiation Protection

4.10.1 Overview and Previous Activities

DCPP Technical Specifications contain requirements on Radiation Protection, and DCPP has corresponding programs and procedures to specify the details of their radiation protection programs. Although numerical limits are specified, plant personnel are also required to use the philosophy of As Low As Reasonably Achievable (ALARA) to minimize radiation exposures and releases. DCPP has a formal ALARA program; the program applies to personnel exposure in the plant as well as releases to the environment. PG&E files reports semi-annually regarding personnel exposures, releases outside DCPP and regular soil, vegetation, water and air samples taken around the plant.

The DCISC regularly monitors DCPP personnel exposure. Collective radiation exposure is one of DCPP’s routine performance indicators. DCPP also reviews any radiation protection events or incidents in the industry that are reported in Licensee Event Reports (LERs) or NRC violations. The majority of personnel exposure occurs during refueling outages when most of the work in the Radiation Control Area is performed. DCPP sets outage and annual goals for exposure, and reports these at DCISC public meetings. DCPP also submits a semi-annual report to NRC on any planned, normal radioactive releases from the plant; DCISC reviews this report. Any abnormal releases are reported in special reports, typically LERs, although there have been none related to releases since the DCISC began in 1990.

The Radiation Protection items reviewed during the previous reporting period included the following items:

- 2015 Radiation Release and Radiation Environmental Operating Reports

The DCISC concluded in the previous period that DCPP’s radioactive releases have been measured to be a very small fraction of allowable releases. This has been confirmed by environmental sampling around the plant.

4.10.2 Current Period Activities

During the current period, the DCISC reviewed the following Radiation
Protection items during two Fact-finding Meetings:

- Annual Radiological Release Report
- Annual Radiological Environmental Monitoring Report
- Unit 1 Increased Radiation Levels

Annual Radiological Release Report (Volume II, Exhibit D.1, Section 3.3)

DCPP submitted its 2016 Annual Radioactive Effluent Release Report (ARERR) to NRC on April 26, 2017. This report described the measured quantities of radioactive gaseous and liquid effluents released from the plant in 2016. Based on records of 2016 radioactive liquid and gaseous releases, the following radiation doses to the total body of a hypothetical individual at the site boundary (approximately 800 yards from the plant) and the corresponding percent of Technical Specifications limits for the year 2016 were reported in the ARERR as:

<table>
<thead>
<tr>
<th>Effluent Type</th>
<th>Calculated Radiation Dose</th>
<th>Percent of Tech. Spec. Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid</td>
<td>0.0002 milliRem</td>
<td>0.0066</td>
</tr>
<tr>
<td>Gaseous</td>
<td>0.0032 millirad</td>
<td>0.0032</td>
</tr>
</tbody>
</table>

A calculation was performed to determine the upper limit of possible radiation exposure for any member of the public. The calculation found that direct radiation was 5.1 milliRem per year to an individual working at the onsite makeup water facility up near the Independent Spent Fuel Storage Installation (ISFSI).

The DCISC Received and reviewed DCPP Procedure CY2.ID1, “Radioactive Effluent Controls Program,” Revision 14, March 16, 2017. This procedure appeared appropriate for controlling and measuring radioactive effluents from DCPP. All releases were planned, controlled ones with no accidental releases.

**DCPP’s Radiological Effluent Control Program was satisfactory in controlling and measuring the plant’s radiological effluents and keeping them within very small fractions of permissible limits.**

Annual Radiological Environmental Monitoring Report (Volume II, Exhibit D.1, Section 3.4)

The 2016 Annual Radiological Environmental Operating Report (AREOR), submitted to NRC on April 26, 2017, describes the results of the REMP, which reports and assesses the levels of radiation or radioactivity in the environment related to operation of DCPP. The 2016 REMP includes more than 2,400 samples (including Thermo-luminescent Dosimeters [TLDs]) with approximately 1,700 radionuclide or exposure rate analyses being performed. Samples included surface water, drinking water, marine samples, vegetation, food crops, milk, and meat. The report concluded the following:
The results of the 2016 REMP showed no unusual environmental isotopic findings from DCPP site operations. These results were compared to preoperational data and showed no unusual trends. Diablo Canyon site operations had no significant environmental radiological impact on airborne, surface water, drinking water, marine life aquatic vegetation, terrestrial vegetation, sediment, milk, or meat radioactivity.

Direct ambient radiation was continuously measured at 32 locations surrounding DCPP using TLDs. These 32 locations are made up of 29 indicator stations and 3 control stations. Three TLD badges are placed at each location, and each badge has three detectors to provide an average dose at each location. The dosimeters are collected and read every calendar quarter. The results are trended and compared with preoperational and historical operating values to look for adverse trends. The ambient direct radiation levels in the DCPP offsite environs did not change and were within preoperational ranges throughout 2016. Tritium levels in three monitoring wells beneath the power block all had detectable tritium at very low concentrations well below the Environmental Protection Agency (EPA) drinking water standard of 0.02 microcuries per liter. This tritium was attributed to rain-washout of gaseous tritium contained in water evaporated from the Spent Fuel Pools, exiting the plant through the plant ventilation exhaust system, which is an approved discharge path. All groundwater at the site flows into the Pacific Ocean and is not a source of drinking water.

An evaluation of direct radiation measurements and member-of-public occupancy times surrounding the Independent Spent Fuel Storage Installation (ISFSI) has indicated that all Federal criteria for member-of-public dose limits are being conservatively met. In addition, annual cumulative radiation dose is evaluated at the closest site boundary for the combined effects of the Steam Generator Storage Facility, the ISFSI, radioactive waste containers outside of plant buildings, and radioactive tools and equipment stored inside plant buildings. This cumulative annual radiation dose was reported in the ARERR to be less than 1.0 milliRem, compared to 310 milliRem average annual radiation exposure to people in the U.S. from natural sources (e.g., cosmic, terrestrial, radon, etc.).

The DCPP Radiological Environmental Monitoring Program appeared satisfactory in monitoring and measuring radioactivity in the environment surrounding DCPP. There were no abnormal levels of radioactivity detected.

Unit 1 Increased Radiation Levels (Volume II, Exhibit D.6, Section 3.3)

An issue where the general radiation levels present in the Unit 1 Containment rose to significantly higher values than usually present during shutdown conditions was first reviewed by DCPP in late 2015 when several notifications were written concerning upward trends in Unit 1 cobalt-60 (Co-60) concentrations. During the
early investigations, the evaluations identified a valve treated with Stellite, a cobalt-chromium alloy material used on surfaces for wear resistance, as a presumptive cause. [Stellite contains cobalt-59 (Co-59) which if released due to friction between surfaces will undergo neutron activation to become highly radioactive Co-60.] Later, projections for dose during the upcoming 1R19 outage began to project slightly higher radiation fields in containment compared to Outage 1R18. During Outage 1R19 in November 2015, actual average dose rates were greater than 40% higher than those experienced during the previous outage.

In March 2017, a Root Cause evaluation (RCE) specific to the increased radiation levels was completed (SAPN 50888276). The RCE determined that the correct root cause of the high Co-60 levels was the misalignment of the 1-3 Reactor Coolant Pump (RCP) shaft during Outage 1R18, which resulted in mechanical wear of the shaft surfaces which are coated with Stellite. During replacement of the seal package, maintenance personnel found the pump shaft/seal to be misaligned due to the use of a shim package improperly installed during pump alignments in 1R18. The shim package caused a misalignment between the pump shaft and the seal package. The RCP vendor later confirmed that the improper shaft alignment resulted in wear of the bearing and cartridge assembly resulting in removal of some of the Stellite coating. The 2017 RCE reviewed shortcomings of a 2014 RCE and identified several safety culture issues as well as organizational and programmatic issues for which corrective actions were implemented.

With the root cause of the radiation increase identified and corrected by the RCP Seal replacement, several actions were also initiated to reduce the resulting radiation dose. Zinc injection into the Reactor Coolant System (RCS) was increased. The zinc preferentially deposits in fuel corrosion layers resulting in lower rates of activation of Co-59 to Co-60. Additionally, flow rates to RCS filters were increased, and filters sized to capture finer particles were installed. It is expected that over time, these actions will serve to slowly reduce the Unit 1 radiation levels.

It was also noted that within the Radiation Protection Department, current authorized staffing had been reduced from 89 to 83 and there had been an increase in losses due to transfers from the Department to other DCPP departments such as Quality Verification, Operations, Chemistry and Decommissioning. The Department would be continuing to hire new employees with a new training class to start in July 2018. The hiring of new employees would be made more difficult by the planned shutdown of the facility, but also the need for Radiation Protection personnel would continue to remain high during the decommissioning phase after plant shutdown.

DCPP has identified the cause of increased radiation levels in Unit 1 containment and has initiated appropriate corrective actions.

4.10.3 Conclusions and Recommendations
Conclusions:

The DCPP Radiological Environmental Monitoring Program appeared satisfactory in monitoring and measuring radioactivity in the environment surrounding DCPP. There were no abnormal levels of radioactivity detected. DCPP identified the cause of increased radiation levels in Unit 1 containment and initiated appropriate corrective actions.

Recommendations:

None
4.11 Quality Programs

4.11.1 Overview and Previous Activities

The DCISC has followed PG&E’s quality programs continuously since 1990. The DCISC looked at the following aspects of the quality programs in Fact-finding meetings and public meetings in the previous period:

- Lunch Meeting with the QV Department
- Audit Program and 2016 Audits
- QV’s Perspective on Plant Performance and the Quality Performance Assessment Report
- QV Top Issues and Pre-NIEP Self-Assessment

The DCISC concluded in the last period that DCPP’s Quality Verification Audit Program procedures appeared satisfactory as did program implementation. Quality Verification was actively identifying quality problems and following them to resolution. DCPP’s pre-Nuclear Industry Evaluation Program self-assessment was a good practice.

4.11.2 Current Period Activities

During the current period, the DCISC reviewed quality programs at three Fact-finding Meetings. The following topics were reviewed:

- Quality Verification 2017 Audits and 2018 Audit Plan
- Software Quality Assurance Programs
- Quality Verification Assessment of Outage 2R20 Activities

Quality Verification 2017 Audits and 2018 Audit Plan (Volume II, Exhibit D.7, Section 3.5)

DCPP’s Quality Verification (QV) 2017 audit schedule by function/department was as follows:

<table>
<thead>
<tr>
<th>Function/Department</th>
<th>Frequency</th>
<th>Audit Date</th>
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The 2017 audit of the DCPP and ISFSI Engineering and Maintenance Rule Programs, which was performed in November and December 2017 was reviewed by the DCISC. The audit team concluded that all of the audited areas were effectively implemented with the exception of equipment reliability being effective with concerns. The audit team identified three findings as follows:

1. Some Preventive Maintenance (PM) changes were processed without documented technical justification and without reviewing the PM basis as required by procedure.
2. Some PMs for safety-related equipment were incorrectly classified as Priority 2, which incorrectly gave approval to Maintenance.
3. A PM change request was approved for a reactor trip bypass breaker that was
contrary to a regulatory commitment. This PM was incorrectly classified as Priority 2.

These findings were entered into the Corrective Action Program. Additionally, the audit team performed follow-up reviews for the following findings created during the 2015 Engineering and Maintenance Rule Programs Audit:

1. The temporary modification process is not being implemented in accordance with procedure requirements and management expectations.
2. Maintenance Rule Functional Failure evaluations were not performed for some items that document problems with structures, systems, and components within the scope of the Maintenance Rule.
3. Some software quality assurance plans were not in accordance with procedures.

The audit team concluded that these findings were satisfactorily addressed.

**The DCISC Fact-finding Team concludes that the DCPP Quality Verification Audit Program appears to be effectively designed and implemented.**

**Software Quality Assurance Programs (Volume II, Exhibit D.8, Section 3.2)**

The Software Quality Assurance (SQA) Program and its governing procedures were recently modified based on industry input and guidance from the Electric Power Research Institute, and the DCPP SQA Program was split into two significant parts. The first part of the SQA program is now administered by the Digital Systems group and manages digital assets that are a part of plant equipment. This plant equipment portion of the SQA program provides a comprehensive process to develop and manage individual system SQA plans which ensure quality and maintain configuration during the development and maintenance of power plant related software applications. Applications covered in this program include those such as Plant Process Monitoring (scan, log, and alarm), Plant Process Control, and any other application with a safety, security, or Emergency Planning function. The program is controlled by a plant procedure CF2.ID2, “Software Configuration Management for Plant Operations and Operations Support.”

The team reviewed procedure CF2.ID2. The procedure was extensive and contained requirements both for the design and implementation of new digital systems as well as for the maintenance of existing digital systems. Newly developed software applications and revisions to existing plant applications are controlled by their individually prepared and approved SQA Plans. In the form of a procedure, an SQA Plan’s purpose is to provide requirements and guidelines for the design, development, modification, and documentation of the application software. It provided for the overall responsibilities, definition of terms, and general instructions for developing and maintaining the application software.
In general, if a change is required to an existing digital system, the change would be governed by a Design Change Procedure (DCP) that would be implemented by the Engineering Department. A part of the DCP would contain an implementation plan that would cover how verification and validation of software changes would be performed under the SQA Plan. If a software-related problem were to occur on an existing system, the Digital Systems group would be responsible for investigating the cause and determining the appropriate corrective action. Provided that the proposed corrective action did not change the scope or function of the software, it could be performed under controls specified in an associated Maintenance Work Order and the SQA Plan. If the scope or function of the software had to be changed, a DCP would be required. In either case and before implementing any software changes, any proposed change would be examined for possible adverse effects of the change and testing would be performed on a development system. Usually, the amount of testing required for any change would be based on a review of the verification and validation testing performed during the original installation of the system.

A development system contains hardware that duplicates that installed in the plant, but the development system is not connected to any actual plant equipment. Instead, the development system includes plant simulation equipment that provides any inputs needed to test the hardware throughout all of its functions and that measures outputs. DCPP had many development systems on site to allow testing and validation of any proposed changes prior to installation in the actual plant. The team toured the Digital Systems Lab and observed that it contained development systems for the Plant Process Computer System, the Digital Electro-Hydraulic (Turbine Control) System, the Digital Feedwater Control System, and other systems along with their associated computers to generate simulated inputs and measure outputs.

The Fact-finding Team inquired as to DCPP’s recent experience with the reliability of digital systems. The engineers responded that the reliability of digital systems had been much improved over the last few years. Currently, most problems in digital systems were related to hardware issues and not software. An example of this was the unreliability of workstations for the Plant Process Computer System, where the original workstation hardware was not designed for continuous operation. The workstation hardware was being replaced with industrially hardened components that were designed to operate continuously and with minimal moving parts.

The second part of the SQA program was managed by the Information Technology Department who are responsible for business-related software that is used in plant activities but does not directly support power plant operations. Examples of applications included in the program were commercial off-the-shelf software, databases and spreadsheets, project management and work scheduling software, and other vendor-provided products. The program is controlled by a plant procedure CF2.ID3, “Software Management for Business Information Computer
Systems.” The Fact-finding Team was provided a copy of and reviewed procedure CF2.ID3. The procedure required that applications not considered related to plant systems should be screened to determine if a SQA Plan was required. The key criterion for determining if an SQA Plan was required was whether or not the application or system fulfilled a critical function. A critical function was further defined as one whose failure could: a) affect safety-related systems or functions, b) affect the quality of operational, engineering, or maintenance decisions, or, c) result in significant financial loss. SQA Plans prepared for business-related software were required to include many as the same components of the SQA Plans prepared for plant systems, as discussed above.

**DCPP’s Software Quality Assurance Program appeared to be comprehensive and designed to assure computer software that could affect the safety of plant operations is developed, maintained, operated, and changed in an appropriately controlled fashion.**

**Quality Verification Assessment of Outage 2R20 Activities (Volume II, Exhibit D.9, Section 3.4)**

The Quality Verification (QV) Assessment of 2R20 Outage Activities report was reviewed. The assessment included activities of Operations, Maintenance, Engineering, Work Management, Radiation Protection, Security, Fire Protection, Safety, and supplemental personnel. The following significant problems were identified as follows:

- The DCPP Confined Space Program was not rigorously followed. This issue was escalated to management due to problems continuing from Outage 1R20. Ownership of the Confined Space Program was transferred to Radiation Protection.
- Challenges with ensuring adequate work instructions being available and utilized.
- Operators not taking appropriate actions to verify equipment configurations or plant conditions prior to completing activities or crediting equipment to support plant operations.

The following good outcomes were identified:

- All of the station goals set before the outage and communicated in each daily brief were met.
- After a high number of deficiencies relative to transient combustibles were identified early in the outage by QV to leadership, performance improved significantly.

The QV assessment of Refueling Outage 2R20 was thorough and comprehensive.
DCPP Quality Verification’s assessment of Refueling Outage 2R20 was thorough and comprehensive. Several issues were identified, including the escalation of the Confined Space Program implementation due to continuing problems from Outage 1R20.

4.11.3 Conclusions and Recommendations

Conclusions:

The DCPP Quality Verification Audit Program appeared to be effectively designed and implemented. DCPP’s Software Quality Assurance Program appeared to be comprehensive and designed to assure computer software that could affect the safety of plant operations was developed, maintained, operated, and changed in an appropriately controlled fashion. DCPP Quality Verification’s assessment of Refueling Outage 2R20 was thorough and comprehensive.

Recommendations:

None
4.12 Nuclear Fuel Performance

4.12.1 Overview and Previous Activities

The DCISC has been following performance of nuclear fuel and fuel-related matters at DCPP since its beginning in 1990. The Committee receives regular reports on nuclear fuel performance and any problems from PG&E both in fact-finding and public meetings and as input to the annual report. DCISC follows-up on problems and activities in its fact-finding meetings at DCPP and PG&E Headquarters.

DCPP fuel reliability is the most important fuel attribute monitored during operation. It is important to assure that the fuel integrity is preserved to avoid fission product leakage into the reactor coolant system (RCS) and ultimately into RCS cleanup and support systems resulting in increased personnel dose, radioactive waste and potential off-site releases.

Since the DCISC was formed in 1990, fuel reliability had been excellent until November 1994 when Unit 2 fuel began to show signs of leakage and experienced localized fuel damage. Unit 2 has had several additional fuel leaks since then. Leakage is measured by the amount of radioactivity in RCS samples, with a current goal of less than 5.0 x 10^-4 microroys (μCi) of Iodine-131 per gram of coolant. The following depicts the RCS radioactivity trend for a five-year period:

<table>
<thead>
<tr>
<th>Period</th>
<th>Goal (Ci/gm)</th>
<th>Unit 1 Actual (Ci/gm)</th>
<th>Unit 2 Actual (Ci/gm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13–14</td>
<td>5.0 x 10^-4</td>
<td>1.0 x 10^-6</td>
<td>4.2 x 10^-4</td>
</tr>
<tr>
<td>14–15</td>
<td>5.0 x 10^-4</td>
<td>1.0 x 10^-6</td>
<td>4.2 x 10^-6</td>
</tr>
<tr>
<td>15–16</td>
<td>5.0 x 10^-4</td>
<td>1.0 x 10^-6</td>
<td>4.2 x 10^-4</td>
</tr>
<tr>
<td>16–17</td>
<td>5.0 x 10^-4</td>
<td>1.0 x 10^-6</td>
<td>4.2 x 10^-4</td>
</tr>
<tr>
<td>17–18</td>
<td>5.0 x 10^-4</td>
<td>1.0 x 10^-6</td>
<td>4.2 x 10^-4</td>
</tr>
</tbody>
</table>

*Thru June 2018
The DCISC did not review specific nuclear fuel performance during this reporting period; however, it noted that there were no fuel problems in its reviews of DCPP refueling outage results.

**The DCISC concluded the following in the previous reporting period:**

**DCPP nuclear fuel has performed well for many years with no leaks or failures. DCPP’s programs for assuring nuclear fuel integrity appear effective.**

### 4.12.2 Current Period Activities

The DCISC reviewed the following aspects of DCPP nuclear fuel during this 2017–2018 period:

- Nuclear Fuel Performance

**Nuclear Fuel Performance (Volume II, Exhibit D.1, Section 3.9)**

Unit 1 has continued to run with no fuel defects since its Cycle 4, i.e. for 27+ years. Unit 2 has had no defects identified since a DCISC previous review of this topic in November 2011, when the Unit 2 fuel was in Cycle 17.

Close-up “four face” video inspections have been performed on all fuel assemblies removed from the reactor core in preparation for placing them either back into the Reactor Vessel for an additional operating cycle or into the Spent Fuel Pool (and eventually the Independent Spent Fuel Storage Installation [ISFSI]). No abnormalities were observed. There were no indications of leaking fuel or other problems noted in the periodic chemistry sampling of the Reactor Coolant System. However, Unit 1 coolant did exhibit slightly elevated Cobalt-60 due to the neutron irradiation of Stellite, which is believed to have come from the rubbing of a Reactor Coolant Pump shaft. Because of the excellent performance of the Westinghouse nuclear fuel used, DCPP plans no fuel changes.

As of this fact-finding meeting in July 2017 following Refueling Outage 1R20, there have been no recent indications of fuel leaks or failures. The DCISC FFT reviewed DCPP procedures on Fuel Integrity Monitoring, Failed Fuel Mitigation Program, and Failed Fuel Prevention and Healthy Fuel Inspection Program. These procedures appeared effective in assuring healthy nuclear fuel. Fuel performance data support this conclusion.

In addition to its normal cycle-to-cycle nuclear core design and analysis, the Reactor Engineering Group is performing extended analysis of core design out through 2024 and 2025, when the plant is planned to be shut down.

**DCPP nuclear fuel has been performing as designed based on results of**
fuel inspections and chemistry sampling through Refueling Outage 1R20. DCPP plans to stay with its same Westinghouse fuel design throughout its remaining operating license in 2024 for Unit 1 and 2025 for Unit 2.

4.12.3 Conclusions and Recommendations

Conclusions:

DCPP nuclear fuel has performed well for many years with no leaks or failures. DCPP’s programs for assuring nuclear fuel integrity appear effective.

Recommendations:

None
4.13 Equipment Reliability

4.13.1 Overview and Previous Activities

Aging-related degradation is the gradual degradation in the physical characteristics of a system, structure, or component (SSC) which occurs over time and use, and which could impair the ability to perform its design functions. The purpose of the Equipment Reliability Program is to ensure that the plant continues to operate safely and within its design and licensing bases throughout its life through the process of involving engineering, operation, and maintenance in activities to control age-related degradations or failures of SSCs to within acceptable limits. The scope of the SSCs to be covered by the program continues to evolve and expand, and DCPP has established an Equipment Reliability Program with a dedicated Program Director.

During the previous reporting period, the DCISC did not review equipment reliability.

4.13.2 Current Period Activities

During the current period, the DCISC did not review any equipment reliability-related topics, per se, at Fact-finding Meetings, although it did monitor equipment reliability via such measures as forced outage rate, maintenance department performance, etc. The DCISC plans to review equipment reliability during the next reporting period.

4.13.3 Conclusions and Recommendations

Conclusions:

During the current period, the DCISC did not review any equipment reliability-related topics, per se, at Fact-finding Meetings, although it did monitor equipment reliability via such measures as forced outage rate, maintenance department performance, etc. The DCISC plans to review equipment reliability during the next reporting period.

Recommendations:

None
4.14 Organizational Effectiveness and Development

4.14.1 Overview and Previous Activities

The focus of Organizational Effectiveness and Development is centered upon process transformation, process structure, and organizational effectiveness initiatives. DCPP’s cultural change efforts, leadership initiatives and activities, strategic change efforts, etc., are intended to function as interrelated efforts. This focus also supports an industry initiative to review cultural change, leadership issues, and even human performance, under the area of “organizational effectiveness.”

PG&E developed a DCPP Five-year Business Plan to be sure all departments’ goals and plant goals have total alignment. Prior to the business plan, the plant and department goals and objectives did not have total alignment.

PG&E began discussions in July 1999 with four other similar, well-run nuclear stations (Callaway, Wolf Creek, South Texas and Comanche Peak) to explore shared cost savings and increased industry influence through alliances and to ultimately decide whether to form a joint nuclear operating organization called the Strategic Teaming and Resource Sharing (STARS) initiative. A STARS management structure was established and implementation teams created to begin on approved initiatives.

In previous reporting period the DCISC reviewed the following Organizational Effectiveness topics at one Public Meeting:

- Results of 2016 Operating Plan and Key Elements of 2017 Plan

The DCISC concluded in the last period that Organizational Effectiveness at DCPP continued satisfactorily.

4.14.2 Current Period Activities

During the current period, the DCISC reviewed Organizational Effectiveness at three Fact-finding Meetings and one Public Meeting. The following topics were
Management Observation Program (Volume II, Exhibit D.1, Section 3.8)

DCPP management, down to the first line supervisor or foreman, performs observations of first line workers, or individual contributors, in the plant during work in progress. The purpose is to evaluate worker performance and to impart supervision’s expectations, especially human performance and worker safety practices. The observations are meant to be non-intrusive and non-threatening, which requires a soft, friendly approach. Results of observations are entered into a plant database for trending. DCPP states that the purpose of observations, or “time in the field, engagement and coaching,” is that “Leaders, by commitment and example, inspire, motivate, and align our organization to achieve safe and reliable operation.” DCPP has developed an application which runs on a smart phone for streamlining the process of recording directly to an observation database. Facilitative leadership techniques, as opposed to command and control principles, are employed in the effort to empower individuals and get good employee engagement.

DCPP Station Policy, “Time in the Field/Engagement and Coaching,” dated January 24, 2017 delineates the expectations for management observations. Each Tuesday morning is set aside for Time in the Field. The time is to be used for actual time in the field and documenting observations. Training, “How to Do Observations in the Field,” is provided to all supervision. Occasionally craft and other individual contributors perform or participate in observations.

When there is a human performance event, the responsible department manager initiates an “observation blitz” as soon as practical but no later than two days following the event. Department PICOS (Performance Improvement Coordinators) gather and analyze the data during and following the observation blitz and report to the respective management within 24 hours. Management then recommends/takes actions to prevent recurrence. This information as well as information from all other aspects of Performance Improvement (i.e., Corrective Action Program, Benchmarking, Self-Assessments, Operating Experience, etc.) rolls up into the Integrated Performance Monitoring Process Report, which is available to management.

The DCPP Time in the Field/Engagement and Coaching Program, a prescriptive observation program, appears satisfactory for providing management expectations on human performance and worker safety...
practices to workers as well as collecting worker input.

Employee Concerns Program (Volume II, Exhibit D.4, Section 3.7)

The Employee Concerns Program (ECP) group consisted of two investigators and a manager. The group’s purpose was to be an independent and impartial investigator of concerns raised by employees. The group formed an alternative avenue for employees who for any reason did not wish to report concerns directly to supervisors or managers. The group reported directly to the Chief Nuclear Officer (CNO) and met periodically with the CNO when warranted by the results of a formal investigation.

The two procedures governing the ECP (OM3.ID3, Employee Concerns Program, and OM3.NQ1, Employee Concerns Investigations and Reporting) contained extensive guidance on implementing the program to providing all employees an ability to raise quality or safety concerns without fear of retaliation. Confidentiality of any reporting individual’s identity is assured, unless precluded by lawful requests for information from the NRC or a court. There is also means for reporting concerns anonymously via hotline or drop box; typically, there have not been many anonymous concerns submitted. The previous 2016 NRC inspection noted no deficiencies in administration of the ECP.

The ECP group participates in the exit interview process for six-months-plus employees leaving DCPP to ensure that they had the opportunity to express any safety concerns. The ECP group investigates concerns referred to PG&E from the NRC as a part of its program for processing allegations of wrongdoing or safety issues and concerns received. Industry statistics on the NRC’s processing of allegations showed that the numbers of allegations received for DCPP were typical for the industry and had declined in recent years.

To date at the time of the meeting in 2017, the ECP had investigated 30 concerns and performed one formal investigation. This was slightly lower number than that for 2016: 42 concerns, and 4 formal investigations. These numbers were less than most previous years, during which the group typically investigated 50 – 80 concerns. In general, some of the concerns were technical in nature, but the majority involved leadership or communications issues. There have been no concerns regarding the Joint Proposal or Employee Retention Plan.

DCPP’s separate Differing Professional Opinions (DPOs) Program provides a formal process for resolving differences in technical opinions between employees/supervision over issues possibly affecting nuclear safety or licensing. The DPO process has not been frequently used, with only one DPO case having been processed in the last three years.

The DCPP Employee Concerns Program appeared appropriate for receiving and investigating employee concerns in a confidential manner. During
2017, as in past years, there have been no significant concerns regarding nuclear safety.

Results of 2017 Operating Plan and Key Elements of 2018 Plan (Volume II, Exhibit B.6)

The following is a summary of DCPP’s presentation on this topic at DCISC’s February 2018 Public Meeting: The DCPP Operating Plan was designed to formulate strategy on how the plant will operate in the future and to obtain alignment from the employees who are all considered team members. Safety was at the forefront and the strategies embodied in these concepts and described in the “OUR TEAM” motto, which were intended to pursue and achieve operational excellence. The OUR TEAM concepts were:

Three nuclear tactical focus areas:

- O – Outage and online reliability improvements;
- U – Use of human performance tools and performance improvement processes; and
- R – Reinvigoring employee engagement.

Four nuclear strategic focus areas:

- T – Transfer and retain critical knowledge;
- E – Enhance Facilities;
- A – Achieve a better work-life balance; and
- M – Maintain safe, reliable and affordable operations.

Regarding outage and online reliability improvements, including preparation for the 1R20 and 2R20 refueling outages, preparations were thorough and included use of human performance tools and performance improvement processes by supervisors in the field to leverage leadership. The 1R20 outage was of a longer duration due to planned replacement of baffle former bolts and installation of a permanent reactor cavity seal. The Corrective Action Program (CAP) continued to provide a venue for the timely identification and resolution of issues and bridging strategies are put in place until issues involving safety are resolved. The use of human performance tools resulted in 2017 being a very safe year with no recordable injuries and both units operating reliably. Reinvigoration of employee engagement was addressed through the DCPP Excellence Plan, the Premier Survey, which provides feedback from employees, and implementation of an action plan to address and communicate resolution of concerns raised by employees.

Tactical considerations for the Operating Plan involved transfer and retention of critical knowledge through workforce retention planning and succession planning.
for critical positions. Plant facilities had been enhanced including completion of Building 113 to house the plant’s Fitness for Duty and Fire Departments, remodeling Building 102 for Mechanical Maintenance, and relocating the Fix It Now Team to Building 104. Efforts to achieve a work-life balance through continuous improvement and prevention of operational challenges was continuing and this also involves risk awareness and mitigation.

Safety and human performance data showed that there were no industrial safety accidents and no human performance station clock resets during 2017. Plant reliability and outage performance data showed a goal for the Equipment Reliability Index, which is used to gauge the health of equipment to ensure safe and reliable operations, of ≥ 90 with 99.0 achieved; an Online Reliability Loss Factor goal of ≤ 0.52% with 0.22% achieved; and a refueling outage duration goal of ≤ 75 days with the 1R20 outage completing in 61 days. The plant performance index and NRC metrics reflected a goal of ≥ 89.1 for the Reliability and Safety Indicator Index, made up of 11 sub-components, with performance achieved of 93.5, and both DCPP units had been returned to Column 1 on the NRC Action Matrix with no cross-cutting issues identified. In 2017, a capacity factor of 91.5% and a lost workday case count of zero was achieved.

2018 Operating Plan (Volume II, Exhibit D.8, Section 3.5)

DCPP’s 2018 Operating Plan’s purpose was to provide a roadmap for the organization and a strategy to align staff to work collectively toward PG&E’s overall goal to provide safe, reliable, affordable and clean energy to its customers. For 2018, the Operating Plan was separated for the nuclear division of the company from the other generation divisions. However, all parts of the company shared common Mission, Vision and Culture statements. The six key focus areas for the 2018 Operating Plan in nuclear were:

- Safety
- Reliability
- Affordability
- Risk, Compliance and Ethics
- People
- Regulatory, External, Strategy

In each of the above focus areas, the plan detailed key work and initiatives as well as key metrics to measure success. Highlights of the 2018 Operating Plan included initiatives to:

- Improve behaviors to standards to prevent personnel and nuclear safety events
- Improve engagement in the use of Performance Improvement processes
- Efficiently perform the right work at the right time
- Implement a workforce management analysis
- Implement actions required by the Joint Proposal

Station Alignment Workshops would be held to make employees knowledgeable of the Operating Plan such that they would work and make decisions in alignment with the Operating Plan.

The 2018 Operating Plan contained appropriate focus areas with initiatives and key metrics. The DCISC should continue to monitor implementation of the Operating Plan and its progress against metrics in future meetings.

4.14.3 Conclusions and Recommendations

Conclusions:
The DCPP Time in the Field/Engagement and Coaching Program, a prescriptive observation program, appeared satisfactory for providing management expectations on human performance and worker safety practices to workers as well as collecting worker input. The DCPP Employee Concerns Program appeared appropriate for receiving and investigating employee concerns in a confidential manner. During 2017, as in past years, there were no significant employee concerns regarding nuclear safety. DCPP successfully accomplished most of the objectives contained in its 2017 Operating Plan. The 2018 Operating Plan contained appropriate focus areas with initiatives and key metrics successfully accomplished most of the objectives contained in its 2017 Operating Plan. The 2018 Operating Plan contained appropriate focus areas with initiatives and key metrics.

Recommendations:
None
4.15 System and Equipment Performance/Problems

4.15.1 Overview and Previous Activities

During past periods, the DCISC had reviewed the performance and problems of DCPP equipment and systems as well as the actions taken by PG&E to resolve them.

During the previous period (July 1, 2016—June 30, 2017), the DCISC reviewed the following items:

- Process Protection System Digital Upgrade
- Auxiliary Feedwater System
- Residual Heat Removal System
- 230kV System & Voltage Stability
- Condensate System & Water Chemistry
- Auxiliary Saltwater System
- Control Room Ventilation System

The DCISC performed the following system/component reviews and/or walk downs with DCPP System/Component Engineers in the previous period:

- Process Protection System Digital Upgrade
- Auxiliary Feedwater System
- Residual Heat Removal System
- 230kV System & Voltage Stability
- Condensate System & Water Chemistry
- Auxiliary Saltwater System
- Control Room Ventilation System

In the previous period (2016–2017), the DCISC concluded that DCPP has dealt effectively with most equipment and system problems and is focused on improving system health. DCPP’s Plant Health Committee has
been improved to focus more on system/component health and meets more frequently, and overall system health has improved. DCPP has improved its performance with Safety System Functional Failures.

4.15.2 Current Period Activities

The DCISC reviewed the following system and equipment issues during the current reporting period:

1. Control Room Ventilation System
2. Containment In-Service Inspection
3. NRC IN 2017-4 High Arcing in Aluminum
4. Nitrogen Leak in Containment

The DCISC performed the following system/component reviews and walk downs with DCPP System Engineers:

1. DC Power System (D.1, 3.6)
2. Plant Health Committee (D.1, 3.7)
3. Radwaste Process Systems (D.2, 3.3)
4. Plant Health Committee (D.3, 3.1)
5. Auxiliary Salt Water System Health (D.3, 3.11)
6. Plant Protection System Review (D.5, 3.6)
7. EDG Health (D.6, 3.4)
8. 230 & 500kV System Health (D.6, 3.7)
9. Radiation Monitoring System (D.7, 3.3)
10. 4kV System Review (D.9, 3.5)
12. Large Transformers (D.10, 3.10)

4.15.2.1 DCISC Reviews Of System And Equipment Performance And Problems

Control Room Ventilation System (Volume II, Exhibit D.9, Section 3.7 and Volume II, Exhibit D.1, Section 3.5)

The DCPP Control Room Ventilation System (CRVS) consists of the following three systems:

1. Control Room HVAC System (CRHVAC)
2. Control Room Pressurization System (CRPS)
3. Plant Process Computer (PPC) Room Air Conditioning System

The CRHVAC consists of two independent trains for each unit. The CRPS is composed of one train for each unit. These two systems are interconnected mechanically and operationally and are intended to be operational during all plant operating modes. The PPC Room Air Conditioning System serves only to cool the Plant Process Computer room.

The CRHVAC and CRPS operate in one of the following modes:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CRVS “normal” mode (CRNV)</td>
</tr>
<tr>
<td>2</td>
<td>CRVS smoke removal mode to remove smoke in the Control Room</td>
</tr>
<tr>
<td>3</td>
<td>CRVS 100% air recirculation with 27% passing through high efficiency particulate air (HEPA) filtration, and manual zone isolation is used in the event of a toxic chemical spill outside the Control Room when personnel sense a problematic odor or smell.</td>
</tr>
<tr>
<td>4</td>
<td>CRVS pressurization mode (CRPS) to counteract the detected presence of radiation at the Control Room air intake or a Containment Isolation signal. The system can detect radiation at various air intake locations and select the unaffected intake.</td>
</tr>
</tbody>
</table>

The initial DCISC review was prompted by its receipt from the station of a January 24, 2013 PG&E Licensee Event Report (LER) to the NRC discussing a long term inadequacy in the ability of the Control Room Ventilation Systems (CRVS) to control air in-leakage into the Control Room in postulated post-accident situations when the atmosphere could contain radionuclides.

The “long term” aspect of this design issue was documented during an NRC Integrated Inspection during the first quarter of 2012 when the NRC noted that PG&E had incorrectly confirmed in April 2005 that the required control room habitability testing had demonstrated that the main control room did not have any unfiltered in-leakage when the test was performed in the most limiting configuration for operator dose. This Integrated Inspection Report also stated that the NRC had identified in September 2011 that the control room in-leakage test results had been greater than both the values reported to the NRC in response to the 2003 NRC Generic Letter 2003-01, “Control Room Habitability,” and the values assumed in the design basis radiological analyses. Also, NRC inspectors had identified that PG&E had not performed the trace gas in-leakage testing in the most limiting configuration for operator dose consistent with Regulatory Guide 1.197, “Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors.” In response to these notifications, PG&E took the steps necessary to resolve this issue.
DCPP has been working the following two remaining issues:

1. The Control Room Air Conditioning System needed upgrading due to a long history of reliability issues due to design, age and corrosion. Design of the new system has been funded and is in progress. Unit 1 design was completed in 2016, and Unit 2 design is expected in 2018.

2. DCPP developed a new CRE (Control Room Envelope) radiation dose analysis using the “Alternate Source Term” to restore dose margins. The analysis, submitted to the NRC in June 2015 along with a License Amendment Request (LAR), will make unnecessary any major physical changes to the CRVS. NRC provided approval in mid-2017, and this has become the new licensing basis. Part of this effort was to add a shielding wall to the Control Room Briefing Room. Additionally, radiation monitor set points were changed for earlier CRVS switchover to pressurization mode.

3. Planned modifications include the following:
   a. Upgrade exhaust ducts to Class 1
   b. Install HEPA (high efficiency, particulate, absolute) filter in Technical Support Center vent
   c. Move a Unit 2 flow switch to address an equipment qualification issue

DCPP performed its most recent tracer test of the CRE in January 2016. This test confirmed the assumed CRVS air in-leakage rates.

With the AST analysis complete DCPP also completed its CRVS modifications, setpoint changes, and procedure (Operations, Maintenance, Chemistry, Emergency Preparedness, Engineering, and Learning Services). This resolves all of the outstanding issues with the CRVS.

**DCPP has completed all actions to resolve the long-term issues with its Control Room Ventilation System (CRVS). The DCISC Fact-finding Team recommends that the DCISC consider the issues closed and remove the CRVS as a special issue from the Open Items List but retain it on the list of systems regularly reviewed by the DCISC.**

**Containment In-Service Inspection (Volume II, Exhibit D.2, Section 3.2)**

The functions of the Containment Structure Exterior (CSE) and Containment Structure – Steel Liner (CSL) are to protect the public, environment, and plant personnel from the uncontrolled release of radioactivity to the environment under normal and postulated accident conditions and to protect the Reactor Coolant System (RCS) from external missiles.
The CSE consists of

- A 14 foot-6 inch thick, 153 foot diameter reinforced base mat
- A 3 foot-8 inch thick, 140 foot inside diameter and 142 foot high reinforced concrete cylindrical wall
- A 2 foot-6 inch thick, 140 foot inside diameter reinforced concrete hemispherical dome roof

The CSL consists of

- A 3/4 inch thick mild carbon steel plate placed on top of the CSE base mat
- A 3/8 inch thick mild carbon steel plate covering the inside surface of the Containment shell
- Penetration sleeves and local reinforcement of the liner around penetration openings
- Anchorage system of the liner to concrete

The above Containment System has a design pressure of 47 psig (pounds per square inch gauge) at 271 degrees F. It is designed for the 7.5 magnitude Hosgri Earthquake acceleration spectrum peak of 0.75g. Other design loads arise from wind, pipe rupture, jet impingement, and missile impacts.

The Containment System is subject to the following tests/inspections:

- Visual inspection of Containment concrete surfaces as per Title 10 of the U.S. Code of Federal Regulations (10CFR50), Appendix J and American Society of Mechanical Engineers (ASME) Section XI Code. This 100% inspection is performed every five years. The most recent prior inspections were performed in 2014 for Unit 1 and in 2015 for Unit 2 with satisfactory results for both units.
- Visual inspection of the steel liner plate inside the Containment as per 10CFR50, Appendix J and ASME Section XI Code. These inspections are performed every 3-1/3 years on a 10-year cycle.
- Containment Integrated Leak Rate Tests (ILRTs) as per 10CFR50, Appendix J. This test is performed every 10 years. The most recent ILRTs were conducted in April 2008 during Outage 2R14 and 2009 during Outage 1R15. There have been no indications or problems found in these inspections/tests.

DCPP has procedures for each of the above tests/inspections.

DCPP performed its most recent Containment steel liner inspection during Refueling Outage 1R20 (April – June 2017). No repairs were required, and DCPP
has never had to make repairs of the Containment steel liner. The inspections were performed by trained and certified inspectors.

DCPP’s inspection report concluded the following:

*No reportable conditions or indications were observed during this exam that affect the structural integrity or leak tightness of the containment liner.*

**DCPP Unit 1 Containment steel liner successfully passed its visual inspection performed in accordance with 10CFR50, Appendix J, and the American Society of Mechanical Engineers (ASME) Code Section XI. There were no reportable conditions or indications that affect the structural integrity or leak tightness of the liner.**

**NRC Information Notice 2017-4, High Energy Arcing Faults in Electrical Equipment Containing Aluminum Components (Volume II, Exhibit D.4, Section 3.8)**

In May 2002 DCPP reported to the NRC that Unit 1 had tripped due to a 12kV electrical fault resulting in a loss of power to the non-vital 4kV buses. A Notice of Unusual Event was declared by DCPP due to a fire in the 12kV ductwork and switchgear room and for loss of a 4160V vital power source. DCPP reviewed and discussed with the DCISC the sequence of events, cause, corrective actions, lessons learned and conclusions from the event.

The cause was overheating in the center phase aluminum bar connection to a 12kV bus. An overheated PVC boot created smoke and was consumed. A phase-to-phase arc from the center to the southern bus bar occurred across all three phases. The cause of overheating was inconsistent thickness of silvering on the splice plates. This particular bus is heavily loaded and has mainly large loads. Connections may have operated in excess of capacity.

Corrective actions included replacing all four 12kV buses from the transformer into the 12kV Switchgear Room using copper (versus the original aluminum) and increasing the current capacity the bus will carry. The remaining unaffected connections were verified to be satisfactory.

Similar events involving aluminum connections were reported at several other plants, prompting NRC to issue the Information Notice in 2017. No action was required by DCPP because they had resolved the issue back in 2000. The California Energy Commission had received the 2017 Information Notice and wished to discuss it when meeting with DCISC Member Dr. Lam in early November.

**The NRC Information Notice 2017-4, “High Energy Arcing Faults in Electrical Equipment Containing Aluminum Components,” was an item the California Energy Commission wished to discuss with DCISC Member Dr.**
Lam at their November 2017 meeting. DCPP had satisfactorily addressed this issue back in 2000, and with this October 2017 Fact-finding Meeting, Dr. Lam was up-to-date on the issue.

Nitrogen Leak in Containment Event (Volume II, Exhibit D.8, Section 3.4)

On July 28, 2017, with DCPP Unit 2 operating at 100 percent power, an Alert notification was declared due to low oxygen levels inside the containment. The cause of the low oxygen level was a nitrogen leak inside the containment. The nitrogen source was isolated, the containment atmosphere was restored to normal conditions, and the Alert was terminated. During an investigation of the nitrogen leak inside the containment, pressurizer relief valve RV-355 was found to be leaking. The leak caused the pressure in the back up nitrogen accumulator supply to PORV PCV-455C to decrease to a level that made the PORV inoperable. Based on a review of trend data for nitrogen usage in the containment, it was conservatively assumed that RV-355 had been degraded since December 1, 2016, rendering the PORV inoperable for a period longer than permitted by Technical Specifications.

The event was reported to the NRC under Licensee Event Report (LER) 2-2017-001. In the LER, DCPP reported that it had assessed the Unit 2 risk significance of the inoperability of PCV-455C using Probabilistic Risk Assessment and the Significance Determination Process. The assessment concluded that the PORV would be available for the most risk significant functions. An incremental conditional core damage frequency associated with this event was estimated to be less than 1.0E-06 per year. Subsequently, the NRC reviewed the event and assessed its significance. The NRC found the event to be a self-revealing, non-cited violation of Technical Specifications. The NRC concluded the finding was of low safety significance (Green) and had no cross-cutting aspects.

In October 2017, DCPP completed a Root Cause Evaluation (RCE) of the event. The RCE concluded that station personnel inadequately evaluated and failed to elevate the priority of work to repair a nitrogen system leak which resulted in delayed actions to resolve the issue, impact to PCV-455C operability, and ultimately in the Alert declaration. Numerous corrective actions were recommended in the RCE and have been implemented at the station. They include elevating the priority of work for any gaseous leaks from unidentified sources, adding additional requirements to procedures governing Shift Forman and Daily Review Team reviews of abnormal plant conditions, and adding additional requirements to procedures governing investigations and tracking of emerging issues.

As a result of this event, procedures were changed to require weekly, rather than quarterly, sampling of the Containment atmosphere. Additionally, an earlier warning threshold has been established to trigger investigations and corrective actions at a level prior to exceeding criteria that would require declaration of an
Alert. Lastly, DCPP is considering initiating revisions to the Emergency Plan to incorporate lessons learned from the event.

DCPP identified the cause of the July 2017 event in which a nitrogen leak in Containment resulted in the declaration of an Alert. Appropriate corrective actions have been initiated and appear to be effective.

4.15.2.2 DCISC Reviews of DCPP Systems/Components

DC Power System (Volume II, Exhibit D.1, Section 3.6)

The battery-powered DCPP DC Power System (DCPS) is a 125 and 150 Volt Direct Current (VDC) system designed to provide power for operation and control of equipment during all modes of plant operation. The batteries are kept charged with dedicated battery chargers. The DCPS consists of two subsystems, which are isolated from each other:

1. Vital 125 VDC
2. Non-vital 125/150 VDC

The Vital DCPS is redundant with three separate trains, i.e., a single active or passive failure will not prevent the system from performing its safety functions. Though physically separate, the trains can be manually cross connected. The redundancy permits a single train to be out of service for a pre-determined length of time to perform periodic inspection, maintenance, and testing of major components. The system is capable of providing emergency DC power from the vital batteries for a minimum of two hours during a design basis accident coincident with a loss of battery chargers. It can perform its function during the following events:

- Loss of main generator
- Loss of off-site power
- Degraded off-site power
- Loss of battery chargers
- Loss or start failure of Emergency Diesel Generators

The Vital DCPS is designed to operate before, during, and after a Design Earthquake, Double Design Earthquake, or a Hosgri Earthquake. It can be operated from either the Main Control Room or the Hot Shutdown Panel.

The DCISC FFT reviewed the DCPS Health Reports. The systems for both Units 1 and 2 were rated Green overall, i.e. Healthy. The Health Reports also grade the systems on a variety of performance related categories including: Critical Component Failures and Critical Equipment Clock Resets, Causes of Unplanned
Entries into Limiting Conditions of Operation, Deficiencies Resulting in Unit Capacity Reduction, Causes of Unit Trips, and Prompt Operability Assessments. All of the performance related categories, except one category for both Units and a second category for Unit 2, were rated Green.

The one category in both Units that was not Green was “Aging Issues Affecting Reliability.” This pertains to an aging issue for molded case circuit breakers, i.e. not battery cells. The System Health Reports for both units indicate that two of the three such breakers for Unit 1 and one of the three breakers for Unit 2 have already been replaced. The three remaining breakers were replaced during refueling outages 2R18, 1R19, and 2R19.

The second category that was rated White (needs improvement) for Unit 2 was a “Margin Issue.” That is, Battery 27 has been found to have excessive sediment. A new Battery 27 was installed in October 2009 during 2R15.

The DCISC Fact-finding Team accompanied the System Engineer on a tour of the Unit 1 DC Power System. The group observed the vital and non-vital battery rooms and switchgear rooms. The system appeared to be in working order, and the areas of the plant visited were clean and orderly.

The DCPP Direct Current Power Systems are rated Green, i.e., Healthy with several issues that are being worked. The System Engineer appeared knowledgeable and proactive about his system. The system was in good working order, and the areas of the plant visited were clean and orderly.

Plant Health Committee (PHC) (Volume II, Exhibit D.1, Section 3.7 and Exhibit D.3, Section 3.1)

The PHC is governed by DCPP Procedure OM4.ID16, “Plant Health Committee” and is a management team responsible for:

- Continual review of system and program health issues
- Routinely monitoring the status of plant health issues on the plant health issues list for action status and completion
- Routinely monitoring the status of the system health tactical list
- Review and approval of action plans to address plant health issues that originated from system health reports, maintenance rule, operator workarounds, program health reports, emergent issues, and others deemed important to monitor
- Reviewing and approving action plans to resolve degraded, unanalyzed and non-conforming conditions
- Review and monitoring of plant health issue plans that are presented to the PHC
Performing Preventative Maintenance Oversight Committee functions
- Annual approval of system, component, and program long range plans
- Quarterly review and monitoring of the Top Margin Issues list
- Approving and authorizing the PHC budget for the solution to plant health issues

The membership of the PHC Core Team, which is the Decision Making (i.e. voting) group of the PHC, is as follows:
- Plant Health Committee Chairman (currently the Station Director)
- Engineering Director
- Operations Director
- Nuclear Work Management Director
- Maintenance Director
- Strategic Projects Director

The PHC is also supplemented by a group of Supporting (non-voting) Members from other various station departments.

The meeting was chaired by the Operations Director and Facilitated by Mark Baker, Supervisor of Nuclear Engineering. The meeting was conducted with efficiency, and the agenda was covered as scheduled. A strong emphasis was placed on plant safety and reliability throughout the discussion. One representative from the Operations shift was present, and his participation was strongly encouraged by the Chair, which was the case.

The agenda for both meeting included the following standard items:
- Safety/Human Performance Message
- Facilitative Leadership Minute
- Verify Quorum
- Introduce Operations Personnel
- Review Purpose and Desired Outcomes
- Review and Approve Minutes from Previous Meeting
- Review of Action Items

The technical agendas for the two meetings included the following:
- Reliability Update: Anchor Darling Valve BWROG
Vital Inverter Input Breaker Failure to Latch
Unit 1 High Pressure Turbine Blade Cracking
Walk-in Item on Non-conforming Condition Regarding Technical Specifications for Heat Flux Hot Channel Factor, FQ(z)

The July 26 and September 6, 2017 DCPP Plant Health Committee meetings were performed efficiently and effectively with clear and concise system and equipment reports, good participation and discussion by members, and clear actions and assignments.

Radwaste Process Systems (Volume II, Exhibit D.2, Section 3.3)

The purpose of the Liquid Radwaste System (LRWS) is to collect radioactive liquid wastes from various sources and, prior to discharge, process the waste to reduce the radioactivity to environmentally acceptable levels. Except for equipment in Containment, DCPP Units 1 and 2 share a common collection and processing equipment.

The LRWS is comprised of the following mechanical subsystems:

- Closed Drains Subsystem
- Open Drains Subsystem
- Equipment Drain Subsystem
- Floor Drain Subsystem
- Demineralizer Regenerant Subsystem
- Chemical Drain Subsystem
- Laundry and Hot Shower Subsystem
- Processed Waste Subsystem
- Liquid Radwaste Processing Subsystem
- Radwaste Discharge Filtration Subsystem
- Waste Concentrator Subsystem
- Other miscellaneous subsystems

Major sources of liquid waste to the LRWS include the following:

- Reactor Coolant Drain Tanks (RCDT)
- Containment Sumps
- Demineralizer Overflows
- Steam Generator Blowdown
- Laundry and Hot Shower Drain Tanks
Post-LOCA Sample System
- Resin Sample system
- Residual Heat Removal Pump Sumps
- Auxiliary Building Sumps
- Radwaste Filters

The system processes approximately one million gallons of liquid per year. This is a major reduction since 2000 and again in 2005 due to improved plant operation and improved LRWS operation. Collected liquids are stored in tanks and processed by filtration and/or ion exchange and recycled or sampled and discharged through the Auxiliary Salt Water (ASW) System into the Pacific Ocean. The ASW discharge is provided with a radiation monitor-controlled valve to assure liquid releases are below prescribed levels. Industry top quartile is 14 mCi (millicuries) or less per year. Use of a vendor filtration skid and Zinc addition has reduced particulates to produce the lower activity discharges. DCPP Liquid Radwaste discharges for 2017 are below its year-to-date goal (20 vs. 27 mCi) and appear to be on-target to be well below the year-end 35 mCi goal.

Regarding solid Radwaste, DCPP has minimized the generation of Class B/C waste. DCPP sends its Class A LLW (Low Level Waste) (lowest radioactivity and half-life less than 5 years) to a licensed disposal site in Utah, its B/C LLW (higher radioactivity) currently to Andrews Texas; DCPP’s old Steam Generators and Reactor Vessel Heads will be stored on-site for the foreseeable future. Solidified resins and cartridge filters in concrete containers, both B and C LLW, will be stored on-site for the life of the plant or until shielded shipping casks can be reserved for transport to a licensed disposal site. DCPP’s solid waste volumes are consistently well below those of similar industry nuclear power plants.

**DCPP’s Liquid and Solid Radwaste Processing Systems are effective in minimizing the volumes and radioactivity levels discharged or sent to licensed storage facilities.**

**Auxiliary Salt Water System Health (Volume II, Exhibit D.3, Section 3.11)**

The ASW System is a safety-related, Design Class 1 System. It provides the heat sink required for the safe shutdown of the plant. The system in each unit provides cooling water from the Pacific Ocean (the Ultimate Heat Sink) to the Component Cooling Water (CCW) heat exchangers, through which CCW is pumped and, in turn, serves to remove heat from various plant systems. In the event of an accident involving a significant loss of reactor coolant, the ASW System is relied upon to function so that the CCW System can cool the Residual Heat Removal system and Containment Spray System, which, in turn, cool the nuclear fuel in the reactor and the containment, respectively. There are two ASW Pumps for each unit, and each pump can supply sufficient cooling water through each of two...
redundant trains to either of the two CCW heat exchangers for each unit. In addition, an ASW cross-tie exists between Units 1 and 2 so that the standby ASW Pump from one unit can supply ocean water to either CCW heat exchanger of the other unit. This cross tie is modeled in the PRA for DCPP.

The ASW System also serves as a major element of the post-Fukushima FLEX strategy. As the Ultimate Heat Sink providing ocean-cooling water for normal and accident shutdowns, ASW must be functional following beyond-design-basis events, including loss of all electric power. DCPP has procured four Diesel-driven Emergency ASW Pumps, two per unit, which are designed to take suction from the ocean and be tied into the ASW with portable piping.

Auxiliary Saltwater System Health is rated as Green (Healthy) for both Units 1 and 2. Each Unit is also rated on the following additional Performance Categories: Reliability, Maintenance Rule Compliance, Material/Equipment Condition and Corrective Actions, Operations Concerns, and Performance Monitoring. All of those performance categories were also rated as Green (Healthy) for both Units 1 and 2. In the performance category of Material/Equipment Condition and Corrective Actions, both Units were rated as Yellow, or Deficient, in the performance subcategory of “Degraded/Non-conforming Condition.” The degraded condition related to recurring corrosion on the ASW Pump packing studs. When the studs were replaced with a more corrosion resistant material, the ASW Pump packing glands began to corrode. Evaluations are ongoing to identify a more suitable material for the packing studs.

In the performance category of Operations Concerns, both Units were rated as Yellow, or Deficient, in the performance subcategory of “Operability Issues in the Past 180 days.” This long-standing issue stems from high ocean (i.e. Ultimate Heat Sink) temperatures of greater than 64 degrees F that were experienced during the summer and fall of 2014, with a peak temperature of 68.2 degrees F being reached on October 15, 2014. Inlet temperatures above 64 degrees F require that the Unit operate with two Component Cooling Water Heat Exchangers in service in order to guarantee that adequate cooling is provided to the safety related equipment that is being served by the Component Cooling Water System. The Technical Specification Basis limit for continued operation, even in that configuration, is 70 degrees F, above which the system design has not been validated and operations would be outside the current licensing basis. A technical vendor has been engaged to perform a revised calculation to demonstrate that plant Technical Specifications could be adjusted to use a higher ocean inlet temperature limit while continuing to preserve the required margin of safety.

The Auxiliary Saltwater Systems continue to be given close attention by the DCPP staff, and the systems in both Units continue to be rated as “Healthy.” An issue regarding the potential for ocean water operating temperatures above the original design and licensing basis limits is still being evaluated. The Intake Structure area appeared clean and well
Plant Protection System Review (Volume II, Exhibit D.5, Section 3.6)

The Eagle 21 Plant Protection System (PPS) is part of the original Westinghouse Nuclear Steam Supply System (NSSS), which includes the Reactor Coolant System (RCS). The PPS consists of four separate independent full function protection sets, which provide trip and actuation signals to the Solid State Protection System (SSPS) for use by the Reactor Trip System (RTS) and Engineered Safety Features Actuation System (ESFAS). Output signals of the PPS parameters (temperature, pressure, level, neutron flux, and flow) are provided to the Main Control Room for indication and recording, to the Plant Process Computer for monitoring, and to the Main Annunciator System, for alarming. The PPS also provides input sensor signals to various plant control systems. These signals are electrically isolated from the PPS and are not processed by the PPS instrumentation (with the exception of RCS Delta-T and Tavg channels). The PPS also provides isolated signals to the Anticipated Trip Without Scram (ATWS) Mitigation System Actuation Circuitry (AMSAC) and other such control systems as the Control Rod Control System and Digital Feedwater Control System. Each protection set is physically and electrically separated from the other three sets. The PPS was updated in the mid-1990s.

DCPP had submitted a License Amendment Request (LAR) to the NRC for an upgraded PPS but has now decided to keep the current system in light of the proposed early plant shutdown in 2025 in the Joint Proposal. The current system has been operating reliably, and service and spare parts are readily available. It is expected to operate reliably through 2025. This November 2017 Fact-finding review concentrated on the current system performance.

The PPS health is Green – good – and there are no significant issues. DCPP is a member of the Westinghouse Owners’ Group (WOG) on Eagle 21 and stays current including attending WOG meetings twice per year. DCPP performs full train tests and calibrations each six months, and the system has built-in testing capability which provides regular performance reports.

The PPS is subject to full DCPP Cyber Security Program requirements and has no connections outside the plant.

The DCPP Eagle 21 Plant Protection System is in good (Green) health with no significant issues. The system operates reliably enough and support and parts are readily available such that DCPP has decided not to upgrade it due to the early plant shutdown as per the Joint Proposal. The DCISC believes this is satisfactory.

Emergency Diesel Generator (EDG) Health (Volume II, Exhibit D.6, Section 3.4)

The EDGs are safety-related pieces of equipment whose functions are as follows:
Twenty-eighth Annual Report, Volume 1, Topic 4.15, System and Equipment Performance/Problems

- To furnish sufficient electric power to mitigate a design basis accident in one unit and safely bring the other unit to cold shutdown when both the 230kV and 500kV offsite power sources are unavailable.
- To act as a backup source of power to enable the reactor to continue to produce power for 72 hours whenever there is no accident condition, but one of the two offsite power sources is inoperable.
- To furnish power sufficient for an emergency shutdown of the plant whenever the offsite power sources are not available.

The EDG fuel oil supply system has enough fuel capacity to provide seven days of onsite power generation in order to operate: (a) the minimum required Engineering Safety Features (ESF) equipment following a design basis loss-of-coolant accident (LOCA) for one unit, and the equipment in the second unit is in either the hot or cold shutdown condition, or (b) when the equipment for both units is in either the hot or cold shutdown condition. Each nuclear operating unit is supported by three EDGs dedicated to the respective unit; however, the EDGs can be cross-connected to the other unit. Each diesel-generator set is provided with two 100% capacity starting air trains, with each train having two starting air motors.

Unit 1 was in White health with the following issues challenging system health:

- Sustained high winds could impact the ability of the EDG radiators to adequately cool the jacket water and engine compartment components. This affects only Unit 1 and is being evaluated. A Prompt Operability Assessment has been written to permit continued operation with compensatory actions until this issue is resolved. It is currently expected that a calculation revision will resolve this concern.
- Fuel Priming Solenoid Valves have insufficient voltage ratings. This has resulted in Operations performing component walkdowns once per shift until the valves can be replaced.
- Adverse trends identified with Fuel Oil Transfer Pump start and stop level switches.
- Recurring failures of Air Start Pressure Control Valves (PCVs).

Unit 2 was in White health with the following issues challenging system health:

- Adverse trend on Fuel Oil Booster Pump failures.
- Adverse trends identified with Fuel Oil Transfer Pump start and stop level switches.
- Recurring failures of Air Start Pressure Control Valves (PCVs).

In the opinion of the Fact-finding Team, reasonable action plans were in place for
all of the above issues. Additionally, it was noted in the System Health Reports that corrective actions have been implemented and effectiveness monitoring is in progress for numerous past issues, including:

- Correction of an adverse trend in Digital Start Timer performance.
- Resolution of an issue regarding high delta-T on exciter field leads in excitation cabinets.
- Resolution of problems with spurious actuations of Fuel Oil Day Tanks level alarms.
- Replacement of Fuel Priming Solenoid Valves on Unit 2 to resolve concerns with insufficient voltage ratings.

The DCISC FFT reviewed the DCPP EDG Reliability Improvement Plan, which was initially issued in April 2016 and updated in July 2017. The goals of this plan are to achieve “zero equipment failures,” which will improve reliability. The goals were planned to be achieved through a combination of more targeted maintenance at the appropriate intervals, implementation of overdue design changes for known deficiencies, increasing critical spare parts stocking levels, changing when and how EDG maintenance is performed, and enhancing operating and maintenance procedures. In the opinion of the Fact-finding Team, the plan continued to appear impressive, and the DCISC should continue to review it about every twelve months. During its future reviews, the DCISC should confirm that items on the Reliability Improvement Plan are not inappropriately being cancelled due to spending reductions in response to the Joint Proposal for DCPP to cease operations at the expiration of its current operating license.

DCPP has resolved many significant issues with its Emergency Diesel Generators (EDGs) and reports the health of Unit 1 as Green and Unit 2 as White. Additionally, DCPP has implemented an impressive EDG Reliability Improvement Plan, the implementation of which the DCISC should review again in about one year. During its future reviews, the DCISC should confirm that capital project items on the Reliability Improvement Plan are not inappropriately being cancelled due to spending reductions in response to the Joint Proposal. Regarding a Repair Parts Evaluation (RPE) performed related to the EDG, the Fact-finding Team concluded that the evaluation appeared appropriate but the DCISC should review the RPE process during a future Fact-finding Meeting.

**230 & 500kV System Health (Volume II, Exhibit D.6, Section 3.7)**

The Fact-finding Team first inquired into the status of the stability of the overall PG&E Transmission System. PG&E reported that its overall Transmission System was generally very stable with occasional temporary line outages most often induced by lightning strikes or fires near power lines. Typically, fires or lightning do not damage the power line but do sometimes initiate protective relay
actuations. A major solar project had recently been completed and connected to the Transmission System on the far side of the Morro Bay substation on the transmission line connecting Morro Bay to the Midway substation. The project was required to install robust breaker-and-a-half interconnections with the Transmission System to ensure that no single component fault could take out other components in the system. With two solar projects now installed on the far side of the Morro Bay substation from DCPP, there have continued to be no issues with fluctuations in grid frequency or voltage attributable to the operation of energy facilities. PG&E was still concerned about the long-term effects that additional renewable energy facilities may have on the stability of the Transmission System.

The 500kV system health on both units was rated at healthy or “Green”. The only notable equipment issue on Unit 1 was a hot connection on the neutral connection of C Main Bank Transformer. Temperature monitoring has established that the trend is stable, and repairs are planned to be performed during the next unit shutdown, possibly in the first half of 2018. On Unit 2, the only notable issue was the poor reliability of the winding and temperature switch connectors on the C Main Bank Transformer, which had caused multiple cooling fan and pump trips. Repairs are planned to be performed in the upcoming 2R20 Refueling Outage. A proposed project to replace three motor-operated disconnect switches with spring-loaded automatic breakers, which would allow the 500kV System to remain available following a main generator trip without the need to manually switch to 230kV power, was on hold in light of the pending Joint Proposal for DCPP to cease operations at the end of its current license.

Regarding the status of the 230kV Switchyard, the System Engineers reported that DCPP had completed all projects to replace the existing aging components such as switches and relays. Currently, there were no plans to replace the breakers which were old but in good shape. Plans to add Static Volt-Ampere Reactive (VAR) Compensators for improved voltage regulation than was available with the current capacitor banks were still moving forward for implementation in 2019. However, the decision had been made to move the location of the new Static VAR Compensators to the Mesa Switchyard southeast of DCPP due to space constraints in the DCPP 230kV Switchyard. The proposal to perform a full 230kV switchyard renovation including adding SF6 gas breakers and converting the switchyard to a breaker-and-a-half arrangement was on hold in light of the pending Joint Proposal for DCPP to cease operations at the end of its current license.

The Offsite Power System connecting DCPP to the Transmission System has remained stable following the addition of recent renewable energy projects in the area. The DCISC should continue to review the stability of the Transmission System annually. DCPP’s 230kV and 500kV Switchyards are in good health, and multiple projects to replace aging equipment have been successfully completed. Some projects for switchyard and system upgrades have been placed on hold in light of the pending Joint Proposal
for DCPP to cease operations at the end of its current license.

Radiation Monitoring System (Volume II, Exhibit D.7, Section 3.3)

The DCPP Radiation Monitoring System (RMS) consists of 101 channels of radiation detectors and associated electronic components, and wiring located all around the plant. The system components come primarily from four manufacturers. The system ranges in age from the 1970s to the 1990s and consists of both analog and digital components. Although there is a good supply of spare parts for many components, there have been enough maintenance, reliability and availability problems for DCPP to develop a long-range radiation monitoring strategy. DCPP believes the performance of the system is currently acceptable, and the system is rated Satisfactory (White). Following earlier corrective actions, both the reliability and availability improved noticeably in the fourth quarter of 2013 and were very good during 2014 and subsequent years.

The DCPP Radiation Monitoring System Long Range Strategy for the current licensing period consists of three major points:

1. Continue to maintain and improve existing equipment
2. Modify and replace selected equipment in accordance with the Long Range Plan
3. Plan for an entire system asset replacement concurrent with the plant relicensing period.

These upgrades were to have been installed through 2023; however, because of the capital review process associated with the Joint Proposal (and decision not to pursue license extension), these upgrades were cancelled. In this fact-finding meeting the DCISC was interested in assessing the viability of the current system to operate up to 2025, when the plant would cease operation.

Along with the above review was another to determine the availability of spare parts. There appear to be adequate spare parts from the original manufacturers (several of which have been bought up by other major suppliers), other nuclear plants which are upgrading their RMSSs or shutting down and then have old system parts available, and from third party suppliers who have found a market in these systems. DCPP believes that the existing RMS is reliable enough, that DCPP Maintenance is competent enough, and spare parts available enough to proceed with the current system through 2025 and beyond. The RMS is included in the Maintenance Rule (MR), which has been beneficial in maintaining good system health.

Although system health reports are no longer generated for the RMS, the latest one, June 2017, showed White (satisfactory) health with a plan to improve that using the MR. DCPP plans to complete the MR action items in 2018.
DCPP plans to keep its current Radiation Monitoring System instead of making major upgrades to it. This is due to the Joint Proposal decision to not pursue license extension and the corresponding capital projects review to reduce capital spending. More importantly, DCPP indicated that with availability of spare parts and with good maintenance practices, DCPP believes the system will operate satisfactorily even without the upgrades until 2025 when DCPP will cease operations.

4kV System Review (Volume II, Exhibit D.9, Section 3.5)

Each Operating Unit at DCPP is equipped with a 4kV Electric Power System. The systems provide power for the operation and control of “vital” and some “non-vital” electric equipment during all modes of plant operation. Vital equipment is equipment that is necessary for the safe shut down and cooling of the reactor. Each 4kV vital system can access power from DCPP’s 500kV switchyard, the 230kV switchyard, the corresponding Main Generator, or onsite Emergency Diesel Generators (EDGs). During normal operation, the 4kV system in each Unit receives its electric power from the Main Generator through the Auxiliary Transformer. Upon loss of normal power to any of the 4kV buses in one Unit, the corresponding EDG will automatically start and the normal electric feeder breaker to that bus will open. The backup supply via the 230kV system will automatically align to supply power to the Bus. If the 230kV system is also unavailable, the 4kV bus will be aligned to the running EDG. The System Engineer reviewed the system design with the DCISC FFT using the system electrical single line diagram.

The 4kV System health was rated “White, needs improvement” due to the potential for a High Energy Line Break (HELB) steam intrusion into the Vital 4kV Switchgear Rooms, creating a 100% relative humidity atmosphere, which could exceed the ratings of the components within the Switchgear. A Prompt Operability Assessment was performed and testing of the 4kV Switchgear electrical components for acceptable operation at 100% relative humidity concluded that all safety-related components inside the Switchgear Room would have been operable. A bridging strategy was to close selected fire dampers as a compensatory action to eliminate a harsh Turbine Building HELB environment from entering the 4kV Switchgear Room. The permanent resolution is a design change to make this compensatory action permanent. The system health will improve to “Green” or “healthy” upon completion of the design change, expected to be completed by the end of June 2018. This appeared satisfactory to the DCISC FFT.

The DCISC FFT toured the major components of the Unit 2 4kV Electrical System, including the outdoor 230- and 500-kV lines from off-site and associated transformers, an Emergency Diesel Generator room, and system Switchgear Rooms. The systems and components appeared to be in good condition, and the plant areas were clean and orderly.

The DCISC Fact-finding Team concluded that the DCPP 4kV Electrical
Systems were well-designed, operable, in good (and improving) health, and physically in proper condition in the plant. The System Engineer appeared knowledgeable and pro-active about the system.

Spent Fuel Pool Systems (Volume II, Exhibit D.10, Section 3.8)

Each of the two operating Units at DCPP has its own Spent Fuel Pool and SFP Cooling System. Each SFP is an interim storage facility for fuel assemblies that have completed their useful cycles of producing power. When the spent fuel assembly is removed from the reactor, it continues to produce heat due to radioactive decay, which diminishes over time. When a spent fuel assembly’s heat production diminishes to an acceptable level, the assembly may then be transferred from the SFP into dry cask storage. Because the fuel assemblies in the SFP continue to produce heat and radiation, it is important to maintain the water level in the SFPs and to keep it cooled and shielded.

The SFP Cooling System maintains water level in the SFP and transfers decay heat from the SFP to the Component Cooling Water (CCW) System. Each pool has two 100 percent capacity cooling water pumps provided with Class 1E electric power and one 100 percent capacity heat exchanger that is cooled by CCW which is then in turn cooled by the Auxiliary Salt Water System and the Pacific Ocean. The SFP is designed to provide a minimum of 23 feet of water over the tops of the spent fuel assemblies. Each SFP has instruments that use floats to provide a high-level and low-level alarm locally and in the Control Room.

Regarding the NRC Order and the NEI guideline regarding post-Fukushima SFP level instrumentation at DCPP, independent and wide-range level instruments using guided-wave technology had been installed in each unit’s SFP along with a separate digital display for each instrument located in two diverse areas that would be accessible at ground level following a severe accident. A final phase of the project, which was not required for compliance, remained to be completed. That remaining project phase would provide remote displays for the new wide range SFP level instruments inside the DCPP Control Room.

Overall system health was very good with no major issues. Upcoming major activities related to the SFP included the need to perform routine inspections and maintenance for the SFP Heat Exchangers. As each unit had only one Heat Exchanger in its SFP Cooling System, a complete system outage is required to perform Heat Exchanger maintenance. For Unit 2, it was currently planned to remove the SFP Cooling System from service to perform Heat Exchanger maintenance near the end of the Unit 2 operating cycle, when decay heat levels in the SFP would be at their lowest levels.

The SFP was originally designed with multiple possible sources of makeup water, including the Refueling Water Storage Tank (normal supply), the Condensate Storage Tank, and the Fire Water System. As a part of the Flexible Response
(FLEX) modifications performed after the Fukushima accident, a point of connection for FLEX equipment was selected in the SFP Cooling System and designated in FLEX implementing procedures. The FLEX connection would allow FLEX equipment to pump water from any source (typically the Raw Water Storage Ponds) to the SFP. The selected connection point for FLEX equipment was valve number 8771B, and the connection can be accomplished by removing the bonnet from the valve and installing a hose connection flange.

The DCISC Fact-finding Team then toured the Unit 1 SFP areas and observed the general condition of the SFP and Cooling Systems. Additionally, the Fact-finding Team saw the recently installed wide-range level instrumentation along with the FLEX equipment connection point. Overall, the SFP and Cooling Systems appeared in excellent condition, and the level instruments and FLEX connection point were confirmed to be installed as expected.

**DCPP’s Spent Fuel Pool (SFP) Cooling Systems are in good health with no major outstanding issues. Modifications have been completed to comply with NRC orders regarding SFP Level Instrumentation.**

**Large Transformers (Volume II, Exhibit D.10, Section 3.10)**

All of the major transformers at DCPP were currently in good health. One of the best indicators of good health of transformer internals was the results of Combustible Gas Measurements made of oil samples taken from the transformers. Those measurements for all DCPP major transformers, including Main Transformers, Auxiliary Transformers, and Start-up Transformers, found the units to be in ‘Condition 1’, a normal monitoring status. Currently, it was forecasted that the health of all major transformers was sufficient to support plant operations through the end of the current operating license in 2025. Regarding any recent problems with high voltage flashovers, DCPP reported that corrective actions to clean and replace insulators appear to be effective as there have been no flashovers since 2013.

Work that was recently completed on large transformers during the Refueling Outage 2R20 (in February-March of 2018) included:

1. Replacement of Startup Transformer Circuit Switcher 211-1
2. Upgrades to the 500kV Capacitive Coupled Voltage Transformers
3. Upgrades to the Unit 2 C Phase Main Transformer Winding and Oil Temperature Switches

Regarding possible effects geomagnetic disturbances could have on major transformers, DCPP responded that the DCPP transformers were generally thought not to be very susceptible to such disturbances because most of the high voltage lines in the area have a north-south orientation and are thereby less vulnerable to...
Induced voltages from geomagnetic forces. To date, DCPP has not observed any noticeable effects on its transformers from geomagnetic disturbances.

**DCPP’s Large Transformers are in good health overall. Transformer and insulator maintenance activities completed over the last few years appear to have been effective in addressing problems.**

### 4.15.3 Conclusions and Recommendations

**Conclusions:**

DCPP has dealt effectively with most equipment and system problems and is focused on improving system health. DCPP’s Plant Health Committee has been improved to focus more on system/component health and meets more frequently, and overall system health has improved.

**Recommendations:**

None
28th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2017—June 30, 2018

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28th Annual Report, Volume I, 4.16 Steam Generator Performance

4.16 Steam Generator Performance

4.16.1 Overview and Previous Activities

Steam Generator (SG) tube reliability is important to operational safety because the SG tubes are part of the Reactor Coolant System (RCS) boundary. The nuclear industry has experienced substantial problems with a variety of mechanisms that can cause the SG tubes to deteriorate. The most notable of these is stress corrosion cracking. To address these issues DCPP engaged in a major capital project of replacing all 8 DCPP steam generators: four in Unit 2 were replaced during refueling outage 2R14 (February—April 2008), and four in Unit 1 were replaced during refueling outage 1R15, (January—April 2009).

Steam Generator performance was not reviewed specifically during the previous period (0). However, the DCISC reviewed the results of two refueling outages in which there were no problems found with the Steam Generators.

The DCISC concluded the following during the previous reporting period:

**Although the DCISC did not specifically review Steam Generator performance, it concluded that the performance was satisfactory in its reviews of secondary water chemistry and refueling outage results.**

4.16.2 Current Period Activities

The following Steam Generator items were reviewed during the DCISC 2017–2018 reporting period:

- Steam Generator Health

**Steam Generator Health (Volume II, Exhibit D.2, Section 3.5)**

The four DCPP SGs per unit were replaced in outages 2R14 (Unit 2) in 2008 and 1R15 (Unit 1) in 2009 and have been performing as expected. One of the most important SG parameters is the integrity of the 4444 0.75-inch diameter Alloy 690 tubes in each SG. The tubes serve as the pressure boundary between the Reactor Coolant and the Main Steam and Feedwater Systems. Visual and Eddy Current Testing (ECT) inspections of 100% of the tubes have been performed in refueling outages 2R15 and 1R16 with only one tube in each unit showing minor indications...
of cracks. Inspections of 100% of the tubes in outage 2R18 resulted in 15 tubes showing minor indications. After evaluation, all were left in place. The next inspections were required to be in 1R19 and 2R21 (September to December 2019).

DCPP performed eddy current testing inspections of the DCPP Unit 1 Steam Generators during Refueling Outage 1R19 in October 2015. These were the second in-service inspections since the SG replacements in 2009, after the first inspections in Outage 1R16 in 2010. Eight tubes were plugged in 1R19 due to tube-to-tube structure wear: one in SG 1-1, five in SG 1-2, two in SG1-3, and none in SG 1-4. No tubes required removal or in-situ testing. Other inspections were as follows:

- Proximity Indications – no degradation was detected
- Channel Head Inspections – no areas of defects or unusual discolorations were noted
- Secondary Side Integrity
  - Pre-Sludge Lance Visual Inspection – there were no indications of wear
  - Sludge Lancing – six pounds of sludge were removed from the tops of the tubesheets of the four SGs. This was an insignificant amount.
  - FOSAR (Foreign Object Search and Removal) Exam – one small wire (0.007 inch diameter and 0.6 inch long) was discovered in the post-sludge-lance exam. The wire was removed.
  - Foreign Material in Sludge Lance Filter Strainer – some small amounts of debris of small dimension and insignificant mass were found.

Tube wear continues to be a non-relevant tube degradation mechanism for the DCPP SGs.

DCPP’s Condition Monitoring Assessments, required following each outage SG inspection, had the following conclusions:

The condition monitoring (CM) assessment concluded that, based on the results of the 1R19 inspections, none of the SG performance criteria were exceeded since the last ECT inspection in 1R16, that is, the three cycle operating period between the start of the Unit 1 Cycle 17 and the end of Unit 1 Cycle 19. The operational assessment (OA) concludes that there is reasonable assurance that operation of the DCPP Unit 1 SGs until the next scheduled ECT inspection in 1R22, three operating cycles, in 2020 will not cause any of the SG performance criteria to be exceeded.

The DCPP Steam Generators (SGs) have been performing as expected
since their replacement in 2008 and 2009. The most important SG parameter, tube integrity, has been shown to meet all criteria as a result of visual inspection and Eddy Current testing.

4.16.3 Conclusions and Recommendations

Conclusions:

The DCPP Steam Generators (SGs) have been performing as expected since their replacement in 2008 and 2009. The most important SG parameter, tube integrity, has been shown to meet all criteria as a result of visual inspection and Eddy Current testing.

Recommendations:

None
4.17 Outage Management

4.17.1 Overview and Previous Activities

The DCISC monitors DCPP’s outage plans, actions, and results in the following ways:

- Reviews of outage safety evaluations and plans
- Regular fact-finding meetings to discuss planned major modifications, inspections, maintenance and activities
- Regular reports from PG&E at DCISC Public Meetings on outage plans and outage performance, noting any special situations or problems affecting safety
- Visits to DCPP during outages to monitor the Outage Coordination Center, Control Room and activities of interest
- Reviews of documentation and reports of outage activities such as steam generator tube inspections, major equipment problems, and events affecting safety

Since the DCISC began review of this subject in 1990, outage management performance has steadily improved. DCPP continues to actively manage and track Outage Duration, Collective Radiation Exposure, and Personnel Safety incurred during the conduct of Unit outages, as shown below:

<table>
<thead>
<tr>
<th>Outage</th>
<th>Outage Duration (days)</th>
<th>Collective Radiation Exposure (person-Rem)</th>
<th>Personnel Safety (recordable injuries)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit 1</td>
<td>Unit 2</td>
<td>Unit 1</td>
</tr>
<tr>
<td>R13</td>
<td>41</td>
<td>39</td>
<td>116</td>
</tr>
<tr>
<td>R14</td>
<td>30</td>
<td>69*</td>
<td>103</td>
</tr>
<tr>
<td>R15</td>
<td>58*</td>
<td>38</td>
<td>247*</td>
</tr>
<tr>
<td>R16</td>
<td>42</td>
<td>36</td>
<td>123</td>
</tr>
<tr>
<td>R17</td>
<td>55**</td>
<td>48**</td>
<td>41</td>
</tr>
<tr>
<td>R18</td>
<td>32</td>
<td>32</td>
<td>30</td>
</tr>
</tbody>
</table>
During the previous reporting period, the DCISC reviewed the following topics related to outage management at five Fact-finding Meetings and one Public Meeting:

- Plans for Outage 1R20
- Non-Containment Outage Work Tour
- Containment Outage Work Tour
- Containment Equipment Hatch Closure
- Outage Schedule Update

The DCISC concluded in the previous period that DCPP’s 1R20 Outage Safety Plan and Safety Schedule appeared comprehensive and effective to prevent the plant safety level from dropping below acceptable safety standards. DCPP 1R20 Outage work proceeded in a controlled, professional manner with careful pre-planning and management. The DCISC tour of DCPP Containment was well planned and executed, permitting the DCISC Fact-finding Team to observe practically all outage work in progress while achieving very low radiation dose. The DCPP Containment Equipment Hatch Closure Team performed their work within the required time, moving swiftly but methodically and safely. performed two generally successful refueling outages, and there have been five consecutive outages with no recordable injuries. In 1R19, collective radiation exposure to personnel was higher than planned due to addition of unplanned work and to elevated levels of cobalt 60. In 2R19, two in-service inspection ultrasonic tests revealed questionable indications; however, no American Society of Mechanical Engineers Code defect criteria were exceeded.

### 4.17.2 Current Period Activities

During the current period, the DCISC reviewed Outage Management at four Fact-finding Meetings and two Public Meetings. The following topics were reviewed:

- Outage 1R20 Performance
- Quality Verification Assessment of Outage 1R20 Seismically Induced System Interactions
- Non-Containment Outage Tour
- Containment Outage Tour
Outage 2R20 Performance

Outage 1R20 Performance (Volume II, Exhibit B.3)

The following is a summary of DCPP’s presentation on this topic at DCISC’s October 2017 Public Meeting: The 20th refueling outage for Unit 1 (1R20) commenced at midnight on April 23, 2017, and was completed 61 days later on June 23, 2017. The significant scope of work accomplished during 1R20 was:

- Permanent cavity seal installation
- Baffle-former bolt inspection and replacement
- Control rod guide cards inspection and swap
- Reactor Vessel cold leg nozzle ultrasonic inspections
- Containment Fan Cooler Unit (CFCU) 1-5 cooling coil replacement
- CFCU 1-1 and 1-2 motor overhaul
- Emergency Diesel Generator (EDG) 1-3 major Maintenance Outage Window
- Low Pressure turbine "B" replaced
- High Pressure turbine inspection and replacement of some turbine blades
- Feed Water Pump 1-1 turbine overhaul
- 500 kV breaker 632 replacement as part of PG&E’s upgrade of its switchyards
- 230 kV dead end standoff insulators from the Turbine Building replaced
- NFPA-805 modifications

Significant positive accomplishments during 1R20 were:

- Outage Vertical Slice schedule reviews utilized to identify “pinch points” on the schedule.
- Use of the Emerging Issues Process to define problems and identify solutions.
- Vendor performance by Westinghouse for the control rod guide cards, baffle-former bolt replacement, permanent reactor cavity seals and refueling and by Siemens for the turbine generator work.
- Line ownership of As Low as Reasonably Achievable (ALARA) efforts to reduce dose.

Outage lessons learned during 1R20 were:

- Refueling equipment performance which delayed core off load and reload.
Greater than the usual number of late scaffolding support requests.

Emergency Diesel Generator (EDG) 1-3 Maintenance Outage Window execution delays due to the need for personnel on other critical path activities.

The goals set and results achieved for 1R20 as follows:

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious Near Miss Events</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Nuclear Safety Events</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Site Clock resets</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Outage duration (Days)</td>
<td>75</td>
<td>61</td>
</tr>
<tr>
<td>ALARA (Person Rem)</td>
<td>55</td>
<td>44.9</td>
</tr>
<tr>
<td>Power Ascension (Days)</td>
<td>5</td>
<td>4.1</td>
</tr>
</tbody>
</table>

1R20 was completed with no recordable injuries and this performance represents the sixth consecutive DCPP refueling outage without a recordable injury. During 1R20, DCPP brought in 1,301 temporary workers to assist in outage-related work activities and a number of DCPP employees took on tasks unrelated to their usual assignments.

Quality Verification Assessment of Outage 1R20 Seismically Induced System Interactions (Volume II, Exhibit D.7, Section 3.4)

Station performance with respect to Seismically Induced Systems Interaction is governed by procedure AD4.ID3, “SISI Housekeeping Activities.” The procedure specifically notes that SISI applies to any of the following:

- Transient equipment being brought into the plant
- Component parts of systems, structures, or components being brought into the plant
- Non-design change alterations of systems, structures, or components

The objective of the SISI Housekeeping Program is to ensure that safe-shutdown systems, structures, and components, as well as certain accident-mitigating systems, will function properly during and following an earthquake. The procedure’s intent is to ensure that needed components and equipment will not be impacted during an earthquake by improperly positioned or restrained transient equipment or alterations made to systems, structures, or components.

SISI performance and health had degraded significantly (from Green to Red performance) early in Outage 1R20 with the three following events occurring in March 2017:
1. A scaffold was found erected in the CCW Heat Exchanger Room by a contractor without the procedurally-required SISI review. An engineering review determined that the violation would not result in a SISI problem.

2. An uninspected scaffold was identified; however, engineering review determined there was no SISI problem.

3. A required SISI walkdown was missed.

Other outage problems, e.g., improperly restrained items, were found and documented with Corrective Action Program Notifications. Causes for these problems were generally procedural (e.g., missed transient item reviews, failure to perform walkdowns, etc.) rather than actual physical SISI interaction problems. The immediate corrective action was to perform an “observation blitz” to determine the extent of condition and to address SISI requirements in all pre-outage orientation meetings and selected pre-job briefs.

QV’s assessment of Outage 1R20 SISI, dated July 19, 2017, reported a Finding of “...inconsistent understanding of AD4.ID3 ["SISI Housekeeping Activities"] resulted in storage of transient equipment that was not in accordance with site requirements.” The report included a Recommendation to “Clarify SISIP procedural requirements.” QV performed a walkdown of Outage 1R20 SISIP in August 2017. The walkdown found that all SISIP requirements were met, including scaffolding.

Procedure AD4.ID3 was updated as Revision 15 on October 11, 2017 with the following changes to SISI housekeeping standards:

- Added additional standards for transient equipment over 200 pounds and rope restraint sizing.
- Added additional standards for transient equipment movements and instruction for handling transient equipment movement.

DCPP Quality Verification issued a Finding on the Seismic Induced System Interaction Program (SISIP) that inconsistent understanding of the SISIP procedure resulted in storage of transient equipment that was not in accordance with site requirements and also issued a Recommendation that procedural requirements be clarified. This was performed with a procedure revision. This appeared satisfactory to the DCISC Fact-finding Team.

Non-Containment Tour Outage Work Tour (Volume II, Exhibit D.8, Section 3.3)

This tour included the following Unit 2 plant areas and components during the 2R20 Outage:

1. Outage Control Center
2. Turbine Building, with work in progress on the Main Generator Exciter
In the Outage Control Center, the team observed that planning and coordinating activities were being managed in a controlled and professional manner. During the tour, the Fact-finding Team also observed several areas of preparation for the Containment Integrated Leak Rate Test (ILRT). The ILRT is a test required to be performed every ten years by NRC regulation 10CFR50, Appendix J. The ILRT requires the entire Containment to be pressurized to a peak containment internal pressure equivalent to the design basis accident as specified in the plant’s technical specifications, approximately 45 psig at DCPP. The team observed the setup and preliminary testing of the temporary data collection system used for the test, which was located in the Auxiliary Building penetration area. Additionally, the Team observed the setup of approximately 16 temporary air compressors and dryers that were required to supply the large volumes of air needed to pressurize the Containment. Following the meeting, the team confirmed that the ILRT was satisfactorily completed without any major issues.

DCPP 2R20 Outage work was proceeding in a controlled, professional manner with careful pre-planning and management.

Containment Outage Work Tour (Volume II, Exhibit D.8, Section 3.6)

A tour of the Unit 2 Containment and Containment outage work was performed. The tour was possible because the Containment was open for major maintenance and other work during the 2R20 Outage. This tour included the following Containment levels and components:

1. Refueling Deck – Refueling Canal, Reactor Head, and Containment Fans
2. Mid Level – Reactor Loop Rooms and Seal Table
3. Lower Level – Accumulators, Containment Recirculation Sump Strainers, and Various Storage Areas.

The group observed preparations being made to begin the tensioning of the Reactor Head studs. Also, the installation of temporary instrumentation in preparation for the ILRT was noted. Most other work in the Containment consisted of removal of equipment, tools, and scaffolding in preparation for Containment closeout. Upon exiting the area, dosimetry indicated that the individuals had received less than 1.0 mrem dose, which indicated that the radiological environment that was very clean.

The DCISC tour of DCPP Containment was well planned and executed, permitting the DCISC Fact-finding Team to observe outage work in progress while achieving a
very low radiation dose. Containment areas appeared to be well maintained, and closeout activities were proceeding in an organized manner.

**Outage 2R20 Performance (Volume II, Exhibit D.9, Section 3.2, and Exhibit B.12)**

Outage 2R20 began on February 11, 2018 and ended on March 22, 2018. Significant work included the following:

- Reactor coolant pump 2-4 motor overhaul (rotor/stator)
- Reactor Control Cluster Assembly guide tube swaps
- Thimble tube replacements
- Residual Heat Removal (RHR) pump suction structural weld overlay
- Namco position switch modification
- 500kV output breaker 632 replacement
- 230kV switch 211-2 overhaul
- 480V vital bus F breaker replacements
- High Pressure (HP) Turbine rotor blade replacements
- Feedwater Pump 2-2 turbine overhaul
- Auxiliary Saltwater 1-1 Pump/motor replacement
- Intake traveling screen overhauls

DCPP considered the following activities to have gone well:

- Containment Integrated Leak Rate Test
- RHR Pump suction structural weld overlay
- HP Turbine blade replacement
- Line ownership of radiation dose
- Vendor performance (Westinghouse/Siemens)
- Outage Scope Review Team
- Use of Microsoft OneNote for Outage Control Center and Maintenance turnovers
- Fuel handling equipment reliability

There were the following significant emergent issues:

- Reactor Coolant Pump motor failed to trip
- Condenser salt water leak on the east condenser
- Reactor vessel stud hole damage
Centrifugal Charging Pump 2-1 discharge line weld indication
Main Generator/Stator Cooling Water gas leakage

The goals set and results achieved for 2R20 as follows:

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious Near Miss Events</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nuclear Safety Events</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Site Clock resets</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Outage duration (Days)</td>
<td>40</td>
<td>39</td>
</tr>
<tr>
<td>ALARA (Person Rem)</td>
<td>27</td>
<td>24.1</td>
</tr>
<tr>
<td>Power Ascension (Days)</td>
<td>5</td>
<td>4.4</td>
</tr>
</tbody>
</table>

During 2R20, a defense-in-depth outage safety strategy was maintained to ensure key safety functions were satisfied and very few changes were required to the outage safety schedule, which is the mark of a good plan. Higher risk and infrequently performed test and evolutions performed during 2R20 including:

- Vital bus transfer and engineered safeguards testing
- Performance of heavy lifts over reactor core
- Draining to lowered reactor coolant inventory for reactor disassembly and reassembly
- Draining to reduced reactor coolant inventory for vacuum refill of the reactor coolant with 230kV power unavailable
- Integrated Leak Rate Test of Containment
- Initial criticality of the new reactor core

DCPP reported fuel inspection results and steam generator inspection review included no fuel defects identified and no significant fuel findings; the steam generators were not inspected nor were inspections required. Follow up items from the outage include electrical maintenance preparation of work packages and execution, Operations staffing strategy to ensure the necessary persons and crews are available for certain evolutions, and reactor cavity clarity. Upon refill of the reactor cavity, the clarity of the water was not sufficient to start moving fuel into the core. DCPP reported there was nothing different from past outages in the source of the water and the issue, which was rectified using chemicals and filtration, is suspected to be chemical in nature and may be related to a localized pH difference which caused a crud burst of some kind. DCPP encountered a similar issue some years ago and the issue has occurred at other plants.

The DCISC Fact-finding Team concluded that DCPP performance in Refueling Outage 2R20 was excellent as it met or exceeded all goals.
4.17.3 Conclusions and Recommendations

Conclusions:

DCPP Performance in Refueling Outages 1R20 and 2R20 was excellent as it met or exceeded most goals. DCPP Quality Verification issued a Finding on the Seismic Induced System Interaction Program and a recommendation for improvement in this area was implemented via procedure revisions. DCISC tours of 2R20 work areas found that the areas appeared to be well maintained and activities were proceeding in an organized manner.

Recommendations:

None
4.18 Plant Safety-Security Interface

(Note: because of the sensitive nature of nuclear plant security, only limited information can be presented in this public report.)

4.18.1 Overview and Previous Activities

The DCISC has previously reviewed plant security in fact-finding meetings by reviewing security performance measures and by reviewing plant audits and NRC inspections of the Security Program. Additionally, there have been overviews of the Security Program in DCISC public meetings.

The DCISC reviews and NRC inspects these measures. The DCISC monitors and assesses current security measures and expected modifications to determine whether there may be negative effects on plant safety during normal operation and maintenance and emergency response during off-normal conditions.

The DCISC’s interest and scope of review was limited to the effects of Security-related barriers and procedures on nuclear and operational safety rather than Security itself. The DCISC reviewed the following DCPP safety-security interface during the current period:

- Safety/Security Interface (Volume II, Exhibit D.1, Section 3.4)

**The DCISC concluded in the previous reporting period that the DCPP Safety/Security Interface Program appears to be implemented effectively. The accidental or negligent discharge of weapons in a way that could affect nuclear safety at DCPP does not appear to be a concern.**

4.18.2 Current Period Activities

The DCISC reviewed the following the DCPP security-related item during the current period:

**Cyber Security Update (Volume II, Exhibit D.1, Section 3.13 and Exhibit D.10, Section 3.7)**

providing implementation guidance, and the Nuclear Energy Institute (NEI) issued NEI 08-09, “Cyber Security Plan Template.” These documents established guidance for acceptable cyber security plans utilizing the defense-in-depth strategy.

DCPP submitted its Cyber Security Plan and implementation schedule to NRC in a License Amendment Request (LAR) on April 4, 2011. Two projects have been initiated to implement the plan: 1. Cyber Security Program Implementation, and 2. Plan Data Network Isolation.

In 2013 NRC issued a cyber security enforcement discretion order, and the Nuclear Energy Institute (NEI) issued its related clarification/guidance document for various levels of system significance. The NRC is currently reviewing the NEI document.

The NRC performed an inspection in 2014 on DCPP’s progress in addressing the cyber security rules. The findings and deficiencies were documented in the inspection report, and actions to address them were identified as Milestones 1-7, primarily identifying Critical Digital Assets and enhancing cyber security processes, which have been completed by DCPP. Applicable sections of Milestone 8 (Full implementation of DCPP Cyber Security Plan for all SSEP functions to be achieved) is currently being implemented.

DCPP completed its implementation of the full Cybersecurity Program prior to the NRC required due date of December 31, 2017. The overall program and its roles of people and procedures are managed in accordance with the DCPP Cybersecurity Program Document.

DCPP’s current Procedure CF2.ID11, "Cyber Security Assessment of Critical Digital Assets" spells out the requirements for cyber security assessments of critical systems and critical digital assets. Instructions for maintenance of the cyber security defensive strategy for a system or application and its specific defensive model are included in the system specific System Configuration Management Plan, as applicable. The defensive model for a system takes into account the physical security of the plant and the physical security and defensive strategy of any interconnected systems.

An NRC pilot inspection was completed in May of 2017, with no significant issues, and a full NRC inspection for the Cybersecurity Program was scheduled for March 2019. DCPP had been heavily engaged with the NRC and industry groups during implementation and planned to continue to stay engaged with those groups as future revisions were considered to the guidelines.

The NRC-required Cybersecurity Program did not cover PG&E’s Utility Data Network (UDN), which is the principal network used by DCPP employees for administrative functions. Security for the UDN is implemented by a different
department, and that security is also strong and being continually improved. Some plant management software, such as electronic logs used by operators (eSOMS) or work management systems (SAP), are located on the UDN.

Another key feature of the Cybersecurity Program is the isolation of networks connected to CDAs from the UDN and other external networks. Such isolation was achieved by the installation of multiple firewalls and data diodes. Data diodes are hardware devices, which are designed to limit data flow to a single direction, e.g., a data diode would allow a CDA to send data out to a user but would not allow any data to be sent in to a CDA. As data diodes use hardware to prevent intrusion and cannot be defeated by malicious software such as viruses or worms, they provide an extremely secure boundary between plant systems and outside threats.

**DCPP has completed implementation of its Cybersecurity Program to meet all current NRC requirements. The program appears to be well designed and implemented, and the program is transitioning to become a permanent, ongoing station program. The DCISC will continue to review the Cybersecurity Program every two to three years.**

4.18.3 Conclusions and Recommendations

**Conclusions:**

DCPP has completed implementation of its Cybersecurity Program to meet all current NRC requirements. The program appears to be well designed and implemented, and the program is transitioning to become a permanent, ongoing station program. The DCISC should continue to review the Cybersecurity Program every two to three years.

**Recommendations:**

None
4.19 Independent Spent Fuel Storage Installation (ISFSI)

4.19.1 Overview and Previous Activities

This section of the report describes DCISC reviews of the DCPP Independent Spent Fuel Storage Installation (ISFSI). The history of spent fuel storage at DCPP has dictated a number of changes to its approach to this matter over the years. During plant construction, the expectation for the management of used nuclear fuel was that it would be stored for a short period on site, then sent off-site to be reprocessed and reused. Accordingly, the DCPP's expectation was that there would only be the need for storing a modest amount of used fuel on site at any time, and the Spent Fuel Pools were each arranged to accommodate 270 fuel assemblies.

As time passed, the reprocessing option did not materialize because of a change in national policy, and the impact of the accompanying uncertainty regarding the increasing used fuel inventory on site, in turn, led to the need to expand the used fuel storage capacities to 1,324 assemblies in each pool. However, national policy on this topic later became directed at the development of a national used fuel storage facility at Yucca Mountain, Nevada, which was mandated to begin receiving spent fuel in 1998. Recognizing that DCPP would indeed be able to have its used fuel shipped offsite, PG&E returned the Spent Fuel Pools again to their original capacities of 270 assemblies in each pool.

In the ensuing years, the recognition that the future of Yucca Mountain as a repository for used nuclear fuel was in jeopardy and that the future of off-site storage of used nuclear fuel was uncertain, DCPP again expanded its used nuclear fuel storage capacity to 1,324 assemblies for each pool, which are their current capacities. Also, a separate Independent Spent Fuel Storage Installation (ISFSI) was constructed on site for the dry storage of used fuel, and the ISFSI began receiving used fuel in 2009.

The DCISC reviewed the following ISFSI-related topics at three Fact-finding Meetings during the previous period:

- ISFSI Fuel Loading
- Multi-purpose Canister Inspections and Corrosion Issues
The DCISC concluded in the last period that the specific DCPP spent fuel loading requirements for casks in the Independent Spent Fuel Storage Installation (ISFSI) have been changed to a single loading requirement based on a maximum of 28.7kW of heat which should simplify loading of the casks and preserve cask limits. DCPP is continuing to participate in an industry initiative to determine the impact of atmospheric chlorides on the corrosion rate of ISFSI MPCs. Recent inspections revealed that there are no immediate concerns with canister corrosion; however, low temperatures and other conditions that could cause such corrosion have been found to be present on the lower surfaces of the MPCs. The DCISC should continue to follow DCPP’s efforts in analyzing and responding to this potential problem. The 2016 ISFSI cask loading campaign was successfully completed. An issue with cask overpack thread stud engagement was appropriately resolved. DCPP will be submitting a request for license renewal for the ISFSI in 2022, two years before its scheduled expiration in 2024. Acceleration of the movement of spent fuel to dry storage at the ISFSI will be considered as required by the Joint Proposal and as a part of the decommissioning planning process. Such acceleration could require changes to the current DCPP or ISFSI licenses.

4.19.2 Current Period Activities

During the current period, the DCISC reviewed the ISFSI at three Fact-finding Meetings and two Public Meetings. The following topics were reviewed:

- Independent Spent Fuel Storage Installation (ISFSI) and Loading Campaigns
- Spent Fuel Storage Technical Issues
- Spent Fuel Inspections after Transfer to the ISFSI
- Handling and Disposal of Damaged Spent Fuel

Independent Spent Fuel Storage Installation (ISFSI) and Loading Campaigns (Volume II, Exhibit D.1, Section 3.10; Exhibit D.2, Section 3.10; and Exhibit D.4, Section 3.4)

During the previous (2016) ISFSI loading campaign, 12 casks were successfully loaded with 32 spent fuel assemblies each and moved to the ISFSI. The campaign brought the total of loaded casks at the ISFSI to 49. Plans for the near-term cask loading campaigns call for loading and moving nine casks in 2018, and eight casks each in 2020 and 2022. Procurement of casks for the 2018 campaign had begun. The campaigns were scheduled such as to fall into years where the station planned only one refueling outage during the year.
DCPP has stored no damaged fuel in the ISFSI to date. In the Spent Fuel Pool (SFP) there is one failed fuel canister which has a capacity of up to 64 damaged fuel rods and currently contains several damaged rods. Additionally, there are some assemblies stored in the SFP with damaged rods; however, those damaged rods have decayed sufficiently so as to not cause any problems. Up to two failed fuel canisters are permitted per ISFSI cask.

The current license for the DCPP ISFSI was obtained as a site-specific license under 10 CFR Part 72 and issued by the NRC in 2004. The 20-year license expires in 2024 and licensees are required to submit any desired renewals within 24 months prior to expiration, such that DCPP would be submitting a request for license renewal for the ISFSI in 2022.

The Joint Proposal for DCPP directs operations to cease at the end of its current operating licenses in 2024 for Unit 1 and 2025 for Unit 2. This included a requirement that PG&E prepare a plan for expedited post-shutdown transfer of spent fuel to dry cask storage as promptly as is technically feasible using the plans of San Onofre Nuclear Generating Station as a benchmark for comparison. This activity would be a part of overall decommissioning planning process, for which PG&E was just beginning to assemble the staff to begin work. The current ISFSI pads contain enough space for storage of all the spent fuel that would be present at the end of the licenses both in terms of physical space and total fuel burnup concentration as allowed by the ISFSI license.

The current facility licensing requirements for the Spent Fuel Pool contain significant constraints for maintaining assemblies in the Spent Fuel Pool, including technical specification requirements for minimum durations that spent fuel be stored in the pool before moving to dry cask storage. Additionally, there are requirements for the mixing of older and newer spent fuel assemblies in the pool to maintain thermal inertia requirements that are assumed in analyses used to meet the NRC requirements for responding to security events involving large fires or explosions (the ‘B.5.b’ program). In addition, the ISFSI license contains requirements for the mixing of older and new spent fuel assemblies in individual storage casks to minimize the radiation dose surrounding the casks. With the current requirements considered it could take approximately 12 years after the cessation of operations for all spent fuel assemblies to be offloaded from the pool to the ISFSI. As a part of the requirements in the Joint Proposal PG&E will review what actions and associated licensing changes could be made to accelerate the spent fuel offload from the pool to dry storage casks.

**DCPP continues to manage its spent fuel satisfactorily in both the Spent Fuel Pool (SFP) and the Independent Spent Fuel Storage Installation (ISFSI).** DCPP has stored no damaged fuel in the ISFSI to date and is permitted to place up to two damaged spent fuel assemblies per ISFSI cask. As part of its decommissioning activities, DCPP is investigating accelerated movement of spent fuel from the SFP to the ISFSI.
Spent Fuel Storage Technical Issues (Volume II, Exhibit B.3)

The following is a summary of DCPP’s presentation on this topic at DCISC’s October 2017 Public Meeting: Fuel is stored in sealed MPCs and the MPCs are placed in a steel and concrete over pack for radiation shielding and protection. At DCPP for reasons of seismic safety, the over packs are bolted to an eight-foot thick steel reinforced concrete pad, and DCPP is the only facility that utilizes this type of arrangement for its MPCs. The over pack is comprised of two steel vessels with concrete between them to provide shielding. The MPC with the over pack weighs approximately 175 tons while the weight of an MPC and a transportation-type package is approximately 125 tons. The ISFSI can hold all fuel produced from the plant’s 40-year license and was built in modules, with 7 pads each of which holds up to 20 casks. Currently, three pads are in operation holding a total of 49 casks. Each MPC holds 32 fuel assemblies. DCPP completed pads 3 through 7 in 2014 when it was determined that the centralized spent fuel repository planned for Yucca Mountain, Nevada, would not be available in the foreseeable future.

To date, no stress corrosion cracking has been identified on any MPC in the U.S. Activities at DCPP related to the potential for corrosion cracking include the Electric Power Research Institute (EPRI) publication of the DCPP ISFSI MPC Inspection Report in August 2016 (EPRI Report). DCPP volunteered to participate in the EPRI inspection study which did identify the presence of chloride crystals on the exterior surface of an MPC but found no corrosion. Some initial MPC material lots were more susceptible to external corrosion, including locations around welds which have the potential for higher stresses which, combined with the presence of chloride and moisture, can create a corrosive environment. At present, there is insufficient chloride concentration to initiate corrosion and no corrosion was found during inspection of MPCs. The stainless steel material used to fabricate the MPCs has changed from A304 stainless steel to A304L stainless with a lower carbon content to A316L stainless which is used today to provide even better protection from chloride induced stress corrosion cracking (CISCC).

The Holtec Hi-Star System used at PG&E’s HBPP for storage and potentially for transportation consists of a welded MPC containing fuel with top and bottom lids bolted in place. The over pack is constructed of steel vessels with an internal neutron shield. The Hi-Star System uses lead instead of concrete in the interstitial space between the vessel walls and this results in a smaller, lighter MPC than those used at DCPP. The Holtec Hi-Storm System used at DCPP consists of inner and outer steel vessels 1” thick with 26” of high density concrete used for shielding. The Hi-Storm System uses passive cooling and is seismically anchored for use at DCPP. The weight of the Hi-Storm System does not lend itself to being able to be transported and a Hi-Star storage container or another transportation container would be used to move the MPC for shipment off site.

The Joint Proposal to retire DCPP requires PG&E to conduct an evaluation of
optimizing the time that spent fuel remains in the SFPs in wet storage. Two studies are currently evaluating the options which include saving older fuel assemblies to mix with recently discharged fuel assemblies and possibly thereby shortening the duration of decommissioning. This is due to the fact that recently discharged fuel from the last few operational cycles will be hotter and the mix of older fuel within an MPC should enable recently discharged fuel to be taken out of the SFPs sooner. The SFPs were essentially at their minimum inventories following the last refueling outage and another spent fuel loading campaign was planned for summer 2018 for 8 casks. After the 2018 loading campaign, a decision will be made as to whether to continue with the two additional planned loading campaigns in order to be able to have the last discharged fuel cool to the point where it can be off loaded to dry cask storage within a time line of 2033 or 2034.

To date all fuel transferred from the SFPs to the ISFSI has been undamaged and there is presently no fuel in either SFP which must be considered as failed fuel for purposes of dry cask storage. DCPP’s license for the ISFSI provides for a number of failed fuel assemblies to be stored and located in separate containers within an MPC but to date that license provision has not been required. The facility presently has the capability to open an MPC as this was part of the NRC’s licensing requirements and a demonstration of this capability was required to obtain the license for the ISFSI.

**Spent Fuel Inspections after Transfer to the ISFSI (Volume II, Exhibit D.6, Section 3.1)**

After a period of storage in the Spent Fuel Pools (SFPs) to allow for decay heat to be reduced, the process for handling Spent Fuel starts with a transfer of assemblies into a stainless steel Multi-Purpose Canister (MPC), which has been lowered into the SFP. A lid is placed on the MPC, the MPC is removed from the SFP, and the lid is seal welded onto the MPC. The interior of the MPC, containing the fuel assemblies, is then completely drained and purged with dry helium until all moisture is removed. The MPC is placed in a Transfer Cask, the Transfer Cask lid is installed, and the loaded Transfer Cask is lifted and placed onto the Cask Transporter for transport to the Cask Transfer Facility (CTF). The Transporter then transports the Transfer Cask approximately one mile over site roads to the CTF, which is located adjacent to the ISFSI. At the CTF, the Cask Transporter positions the Transfer Cask above an empty concrete and steel Holtec International Storage Module (HI-STORM) that has been previously placed in a below-grade vault at the CTF. The MPC is lowered from the transfer cask into the HI-STORM and the Transfer Cask is lifted above the HI-STORM so the HI-STORM lid can be installed. The Cask Transporter is then used to lift the HI-STORM out of the CTF and transport it to its designated storage location on the ISFSI storage pad, where it is anchored in place.

The HI-STORM has screened vents in its bottom and top to allow natural convection air flow upward around the outside of the stainless steel MPC to carry
away decay heat being produced by the nuclear fuel. In general, the MPCs and HI-STORMs are intended not to require any maintenance until such time as the Spent Fuel is transferred from the ISFSI to an off-site storage facility at a future date. Recently, concerns have arisen that the MPCs could undergo Chloride-induced Stress Corrosion Cracking (CSCC) to such an extent that a crack could develop. The potential for CSCC is being followed closely by DCPP and the DCISC. Efforts are under way to develop inspection and monitoring techniques to confirm that the MPCs remain fully intact, and to understand if and how radioactive material in the casks might be released if a through-wall crack occurs. These efforts have been reviewed by the DCISC during past Fact-finding Meetings when it concluded that the issue is of concern, but there were no immediate concerns with canister corrosion and that DCPP was addressing the longer-term issue.

In mid-2017, the Electric Power Research Institute (EPRI) issued several new guidelines, one of which was “Aging Management Guidance to Address Potential Chloride-Induced Stress Corrosion Cracking of Welded Stainless Steel Canisters.” The document provides detailed guidance for developing a formal aging management program for Spent Fuel canisters, such as the MPCs at DCPP. Additionally, EPRI was continuing its efforts to develop inspection techniques and equipment and issued a new guideline titled “Inspection and Delivery System Development and Field Trials for Dry Canister Storage System Evaluation.” As a part of activities associated with NRC license renewal for the ISFSI, due in 2024, DCPP will be required to provide a plan for MPC inspections for review and approval by the NRC.

There are several options available for such inspections or repackaging after SFP decommissioning. As discussed above, the DCPP ISFSI installation includes an area for transferring the MPC from the cask transporter to the HI-STORM, the CTF area. The existing Cask Transporter and the CTF could be used to remove the MPC from the HI-STORM and allow a 100% inspection of the surface of the MPC, if needed. Additionally, the MPC vendor is currently reviewing the possibility of making available for installation an intermediate overpack for the MPC should one be needed. Such an overpack would consist of a metal cylinder that could be placed around the MPC between it and the HI-STORM. Although an overpack would occupy the interstitial space between the MPC and the HI-STORM that is currently relied upon for cooling the MPC, the lower amounts of decay heat that would be present at such time in the future would not require as much cooling as was required by the original design. Such an overpack could serve a number of functions such as allowing leak testing of an MPC on a routine basis or providing another barrier to contain leakage from a defective canister. None of these options had yet been analyzed in detail, but they represented the fact that options do exist that could be considered for detailed inspections or repairs to an MPC should they be necessary in the future even if the SFPs are no longer available.

The HI-STAR Transportation Cask is engineered to store spent nuclear fuel in the vertical orientation and to transport it horizontally, and it contains an innermost
shell that acts as a pressure vessel and containment boundary in its own right. The Transportation Cask does not rely on the leak tightness of the MPC cask to assure containment of the radioactive materials during transport. A review of the publicly-available Safety Analysis Report for the HI-STAR Cask confirmed this statement. The Transportation Cask itself is required to be leak tested both prior to and after transport. As a result, any defects that might affect MPC integrity would not prevent the MPC and its spent fuel from being transported off site for future storage. Provision of the Transportation Cask and its transfer from the site to an offsite storage or disposal facility is the responsibility of the U. S. Department of Energy.

Industry efforts are ongoing to further characterize the possible radiological consequences of a release of radionuclides from a cask should a through-wall crack actually occur. In general, such cracks would have small apertures. Although the consensus of the industry is that such releases and their consequences would be small, more study is needed to fully quantify the effects. In 2017, EPRI completed a study titled, “Dry Cask Storage Welded Stainless Steel Canister Breach Consequence Analysis Scoping Study,” which provided recommendations for additional research needed and described potential approaches for developing a consequence analysis for a scenario in which CSCC grows through the wall of a dry cask storage system canister. It is anticipated that EPRI will soon move forward with developing such a detailed study of the consequences.

**DCPP is continuing to participate in industry initiatives to address the issue of possible corrosion of Multi-Purpose Canisters (MPCs) stored at the Independent Spent Fuel Storage Installation (ISFSI). As a part of ISFSI relicensing, DCPP will need to develop an aging management plan to include MPC inspections, and the DCISC should continue to follow work in the area closely. The Cask Transfer Facility located at the ISFSI provides options for more detailed inspections or repairs to an MPC should such be necessary in the future after the Spent Fuel Pools are no longer available.**

**Handling and Disposal of Damaged Spent Fuel (Volume II, Exhibit B.6)**

The following is a summary of DCPP’s presentation on this topic at DCISC’s February 2018 Public Meeting: Unit-1 has operated since Cycle 4 without indications of fuel damage in the Reactor Coolant System (RCS). Unit-2 has operated since Cycle 16 without indications of fuel damage in the RCS. Damaged fuel can take two basic forms: damage to the fuel cladding which results in the release of radionuclides to the RCS; or damage to the fuel assembly that requires the use of special handling tools. Fuel which has greater than a “pinhole” leak is required to be stored in a special container. Damaged fuel as experienced at DCPP poses no impact to nuclear safety, no spent fuel pool criticality issues or thermal hydraulic concerns. Storage and handling of damaged fuel is conducted in accordance with NRC requirements.
The typical mechanisms which cause fuel cladding damage as follows:

- Debris Fretting - wear due to contact with foreign material (debris).
- Grid-to-Rod Fretting - normally caused by fuel rod vibration
- Corrosion – due to hydriding
- Other Mechanisms - include fabrication issues caused by a bad weld or fuel handling issues due to crane operation or otherwise.

Vacuum can sipping inspection of Unit-1 fuel from the first core revealed tiny defects in two fuel assemblies and in preparation for dry cask storage the presence of xenon, krypton or radon revealed six additional assemblies with pinhole leaks. Presently for Unit-1 there are eight assemblies for which work has not been performed to address these defects and these assemblies can still be placed into multipurpose canisters and go into dry cask storage. No fuel pins have been removed from any Unit-1 assemblies while Unit-2 has had approximately fourteen assemblies where identified leakers were found due to baffle jetting damage from Cycle 1, with all but four of the baffle jetting damaged assemblies being reconstituted by replacement of the damaged pins with steel rods. DCPP presently has a fuel rod storage container for the reconstituted fuel rods in wet storage in the spent fuel pool.

Disposition of damaged spent fuel assemblies typically includes reconstituting fuel assemblies with the leaking pins removed and placed into a special container for damaged spent fuel, with the reconstituted assembly then able to be treated the same as an undamaged fuel assembly. The damaged rods can be identified using ultrasonic testing. Once placed into a fuel container the fuel can be handled using normal methods and processes for disposal of damaged fuel. Fuel damage can be mitigated with the use of special containers and once in a special container, the damaged fuel can be stored in dry fuel storage. To date no such assemblies have been loaded for dry cask storage and all remain within the spent fuel pools.

**4.19.3 Conclusions and Recommendations**

**Conclusions:**

**DCPP continues to manage its spent fuel satisfactorily in both the Spent Fuel Pool (SFP) and the Independent Spent Fuel Storage Installation (ISFSI). As part of its decommissioning activities, DCPP is investigating accelerated movement of spent fuel from the SFP to the ISFSI. DCPP is continuing to participate in industry initiatives to address the issue of possible corrosion of Multi-Purpose Canisters (MPCs) stored at the Independent Spent Fuel Storage Installation (ISFSI). As a part of ISFSI relicensing, DCPP will need to develop an aging management plan to include MPC inspections. The Cask Transfer Facility located at the ISFSI provides options for more**
detailed inspections or repairs to an MPC should such be necessary in the future after the SFPs are no longer available.

Recommendations:

None
Earthquakes and Tsunamis

4.20.1 Overview and Previous Activities

This section of the report provides updates on recent seismic events, tsunamis or related matters that could affect DCPP.

In previous reports the DCISC has reviewed with PG&E earthquakes occurring in California in the vicinity of DCPP as well as seismic designs, analyses, and activities related to DCPP. This has included updates to PG&E’s Long Term Seismic Program which is an NRC license condition requiring PG&E to monitor and evaluate seismic events world-wide which could potentially affect DCPP design.

In the previous period the DCISC reviewed the following activities:

- Seismic PRA
- Tsunami Hazard
- Local Intense Precipitation & Tsunamis
- Probabilistic Seismic Fragilities
- Seismically Induced Seismic Interactions

In the previous reporting period the DCISC concluded that DCPP is proceeding satisfactorily with its analyses on seismic, intense precipitation, tsunami and seismic interaction issues. The DCISC will continue to follow the progress of this important work.

In the previous operating the DCISC made the following recommendation:

Recommendation:

PG&E should perform additional study of submarine landslide-induced tsunami hazards at DCPP and its environs.

Basis for Recommendation:

The DCISC believes that a probabilistic analysis would provide the
annual frequency of various tsunami “sizes” at the DCPP site, including estimates of the various uncertainties. Here the word “size” might have one of several meanings, including tsunami maximum height, tsunami run-up, tsunami volume (related to its force on structures), or other possible endpoints. The DCISC endorses developing an estimate (or a useful upper bound) on the annual frequency of a tsunami-caused core-damage accident at DCPP. Such a Core-damage Frequency (CDF) estimate could be used by decision-makers and the public to understand whether the overall CDF risk from tsunamis is (or is not) an important contributor to the total CDF from all accidents at DCPP. Developing a probabilistic “understanding” does not, in the DCISC’s view, necessarily mean performing a full-blown quantitative probabilistic analysis of the tsunami hazard. Instead, it might involve something less, such as a demonstrably conservative bounding analysis of the annual probabilities of various tsunami “sizes,” or an analysis that aims for a realistic probabilistic description but might have very large uncertainties, if that is the best that can be accomplished. Perhaps the desired upper-bound CDF estimate would be easier to develop in a defensible way than a quantified realistic CDF.

Consistent with and as part of the peer reviewed seismic probabilistic risk assessment requirements (that will be submitted to the NRC), PG&E has conservatively assessed a bounding risk assessment of potential seismically induced tsunamis creating waves larger than 14m and 26m. To assess the significance of the generation of a tsunami wave coincident with an earthquake that impacts DCPP, a sensitivity calculation was performed. This sensitivity shows that inclusion of a conditional tsunami has an insignificant impact on the risk to the seismic core damage frequency or seismic large early release frequency. The DCISC concluded this response was satisfactory.

4.20.2 Current Period Activities

The DCISC reviewed the following items during the current reporting period:

- Local Intense Precipitation Analysis
- Tsunami Hazard Analysis
- NRC Evaluation of DCPP Tsunamis (D.7, 3.6 and B.6)
- Workplace Seismic Safety (D.10, 3.2)
- Seismic PRA & Tsunami Hazard Results

Local Intense Precipitation Analysis (Volume II, Exhibit D.3, Section 3.7)

After the 2011 nuclear accident at Fukushima in Japan, NRC made an industry-wide information request in a 50.54(f) letter of March 2012 that, among other
issues, covered risk from external flooding. In response, PG&E performed an external-flooding analysis and submitted it to the NRC. That submittal identified the potential that an Local Intense Precipitation (LIP) event could give rise to unusually large flooding arising in Diablo Creek within the plant site. That flooding could, under some circumstances, produce floodwaters that would enter into the lower areas of the turbine building and the auxiliary building. DCPP implemented some interim safety measures, including a plan to deploy sandbags to protect against intrusion in some of the identified locations. The sandbags were then pre-deployed close to the potentially affected locations for ready access.

The above was, as noted, an interim measure. The NRC guidance suggested that one approach to a permanent resolution could be to develop a probabilistic analysis that could support the argument (if true) that the likelihood of the underlying LIP event, combined with its consequences in the plant, would present only a very minor likelihood of a core-damage accident. In response, the DCPP team performed the initial phases of such an analysis.

In this new submittal, DCPP concluded that the flooding resulting from the postulated LIP event is already covered (that is, bounded deterministically) by provisions in the plant for coping with certain design-basis internal flooding scenarios. Specifically, the design-basis flooding scenario for this region of the plant is an internal flood resulting from failure of the circulating-water-system piping. The plant design incorporates provisions (drains, flow paths, etc.) that are already capable of mitigating such an internal flood, if it were to occur, in a passive matter, relying on no active components nor on any human actions.

The DCPP analysis of the effects of potential severe Local Intense Precipitation demonstrates that those effects can be accommodated by the existing plant design as it sits. Therefore, the plant states that the risks from those LIP scenarios are acceptable. The DCISC concurs, and this issue can be closed.

The DCPP team reported that in May the DCPP seismic PRA (SPRA) analysis had been subjected to an outside peer review by a team of experts, as part of its program to assure that their SPRA was in conformance with the ASME-ANS PRA Standard. These PRA peer reviews generally result in a few Findings and Observations (F&Os), and this peer review was no exception. It is necessary that each F&O be resolved before the PRA (in this case, the SPRA) can be submitted to the NRC for its acceptance. After NRC acceptance, the PRA can then be used in regulatory applications.

DCPP’s initial analysis examined tsunamis caused by offshore landslide events, meaning "nearby" landslides, which in turn are caused by nearby earthquakes. No other tsunami scenarios were examined in this analysis. However, it has been understood and accepted for some time that these scenarios probably represent the largest tsunami risk to the plant. (Tsunamis arising at great distances, such as
from Alaska or Japan or Chile, which comprise the current design-basis tsunamis in their Safety Analysis Report, have always been understood to be unimportant contributors to overall plant risk. This understanding remains true today.) The DCPP analysis included the following elements:

1. The analysis works out the likelihood per year of a tsunami going high enough onshore to reach 44 feet (so as to inundate the snorkel-air-intakes), and separately the likelihood per year that a tsunami will reach the 85-foot level at plant grade.

2. The analysis then works out likelihood of a tsunami of 44 feet (or of 85 feet), conditional on the earthquake of each given "size." The analysis assumes that every earthquake greater than about magnitude 6 produces an offshore landslide. The spectrum of landslide sizes is then taken from the earlier PG&E analysis.

3. Next, the DCPP team worked out the likelihood of a core-damage accident conditional on the tsunami getting to 44 feet (or 85 feet.) This is the so-called Conditional Core Damage Probability (CCDP) analysis.

4. The combination of the likelihood of an earthquake-generated tsunami getting to 44 feet [see (1) above] and the CCDP [see (3) above] provides a number for Core Damage Frequency (CDF).

5. The CDF number has broad uncertainties, at least a factor of plus or minus 10 and perhaps a factor of plus or minus 30.

6. The analysis team then works out the CDF for the following scenario, which does not involve a tsunami, but only an earthquake: (i) a large earthquake damages the same equipment that the tsunami would damage in the above analysis; (ii) the conditional probability CCDP is worked out for the core damage accident that arises if that equipment is damaged.

7. There is no credit in this analysis for FLEX equipment.

8. The end-points of these two analyses are the same - either the earthquake-caused tsunami damages the equipment, or the earthquake damages it directly.

9. The ratio of these two results is the “CDF ratio”. There is broad uncertainty, but the CDF ratio is about a factor of 1000 to 10,000, depending on how large a "size" the earthquake is, with the tsunami-caused scenarios being 1000 to 10,000 times less likely to cause core-damage CDF than the direct CDF from the earthquake all by itself.

10. The CDF from the earthquake itself (no tsunami) is simply one part of the larger seismic PRA, which produces CDF numbers in the range around 10-5 per year. These CDF numbers are broadly "acceptable" to the NRC.

The preliminary analysis of risk from tsunamis caused by offshore landslide events presented to the DCISC Fact-finding Team indicates a low probability of plant damage. The DCISC also reviewed the final version of
This preliminary analysis when it had been completed.

NRC Evaluation of DCPP Tsunamis (Volume II, Exhibit D.7, Section 3.6 and Exhibit B.6)

In March 2012 the NRC issued an information request requiring (in part) operating reactor licensees to reevaluate flood-causing mechanisms using present-day methodologies and guidance. In March 2015 DCPP submitted its Flood Hazard Reevaluation Report (FHRR) which found only one potential flooding hazard which might exceed the current licensing basis, that being locally intense precipitation. However, this flood hazard was subsequently found to fall within the plant’s current licensing basis. Nuclear power plants were required by the NRC to reanalyze not only locally intense precipitation but also tsunamis, flooding from streams or rivers, and dam failure among other possible natural hazards.

The NRC Staff Assessment of the tsunami hazard addressed the flooding hazard from tsunamis. The DCPP FHRR for tsunamis reported a 32' 8" tsunami hazard at the plant site. DCPP’s current licensing basis accounts for a 34' 9" tsunami at the Auxiliary Saltwater System (ASW) Intake structure with the ASW snorkels located at 48' 5" and the plant itself at 87' 9". The submarine mass landslide, which occurred off of Goleta, California, was used as a proxy and represented the Controlling Submarine Mass Failure in this analysis which produced the postulated tsunami of 32' 8".

The Taylor Engineering analysis used different computer modeling and evaluated different tsunami-generating sources for earthquake generation from both distant and local sources, as well as for distant and local submarine landslides including a Goleta-type near-site slide. The Taylor Engineering analysis used slightly different sea level assumptions regarding tidal effects and long-term sea level rise. The NRC reviewed the Taylor Engineering analysis results, which also concluded that the Goleta proxy submarine local landslide was the controlling failure but Taylor Engineering found a Goleta-type postulated failure produced a 47' 7" tsunami at ASW Intake Structure.

The NRC review addressed the difference between the Taylor Engineering analysis results (47' 7") against the DCPP analysis results (32' 8") which were both based upon an abstraction of Goleta slide complex data and used computer modeling techniques to move the slide to different locations near the plant for numerical modeling purposes. The Taylor Engineering study assumed a very conservative, thicker, slide taking place over a smaller area thereby producing a more focused tsunami. Taylor Engineering performed a parametric study evaluating 50 different source locations, which DCPP was not required to perform. The Taylor Engineering analysis determined that a Goleta-type event has a recurrence interval of once every 100,000 years (or 10^-5 per year).

The NRC concluded DCPP’s analysis relied on peer-reviewed information and
methods and that the analysis used by DCPP employed relevant regulatory criteria based on present-day methodologies and guidance. The NRC further concluded the DCPP analysis was conservative in its use of the Goleta slide complex at proxy locations. Further, the NRC found that the independent analysis by Taylor Engineering provided additional context to assure that the site could withstand an even more conservative scenario. In summary, the NRC concluded DCPP’s analyses met the requirements established by the NRC and the NRC’s effort to reevaluate the hazards from external flooding at DCPP is now closed.

4.20.3 Conclusions and Recommendations

Conclusions:

The Nuclear Regulatory Commission in its December 17, 2017 final “Staff Assessment (SA) of the FHRR (Flood Hazard Reevaluation Report) concluded that DCPP’s analyses “...are an appropriate representation of the reevaluated tsunami hazard at the Diablo Canyon site.” This concludes NRC’s review of the DCPP flood hazard.

Recommendations:

None
4.21 Fire Protection

4.21.1 Overview and Previous Activities

Fire protection requirements are contained in NRC’s regulations in 10CFR50.48 and 10CFR50 Appendix R. These regulations specify the minimum requirements for safe shutdown systems and equipment, fire hazards analysis, prevention, detection and mitigation, fire brigades and training, emergency lighting, fire barrier and penetration qualifications, and fire doors. PG&E has committed to implementing these requirements, utilizing interpretations and deviations approved by NRC. Recently, NRC regulations have been modified to allow licensees to substitute a probabilistic-risk based program under industry standard NFPA-805 for the requirements of Appendix R. The NRC periodically performs inspections of the DCPP fire protection program implementation.

The DCISC looked into the following aspects of DCPP fire protection at four Fact-finding Meetings in the previous reporting period:

- Fire Doors
- NFPA 805 Program Implementation Status and Remote Hot Shutdown Panels
- Fire Protection Program and System Health

The DCISC concluded in the previous period that DCPP continues to make good progress in the repair or replacement of its impaired fire and Equipment Control Guideline doors. DCPP is proceeding satisfactorily on its implementation of National Fire Protection Association (NFPA) Standard 805. DCPP’s procedures and process for transferring control to the Remote Hot Shutdown Panel and maintaining control of unit from the panel in the event of a need to evacuate the Control Room appear to be sound. The level of attention to DCPP’s Fire Protection Program and Systems has increased significantly, and numerous improvements have been accomplished. DCPP has aggressively moved to improve the control of transient combustible materials at the station.

4.21.2 Current Period Activities
During the current period, the DCISC reviewed Fire Protection at three Fact-finding Meetings and one Public Meeting. The following topics were reviewed:

- Fire Doors
- NFPA-805 Program

Fire Doors (Volume II, Exhibit D.1, Section 3.2, and Exhibit D.5, Section 3.8)

DCPP has the following numbers of doors in the Power Block:

- 967 total ECG Equipment Control Guideline* (ECG) and Non-ECG doors
- 414 ECG doors, including 280 fire, 83 HVAC (ventilation system), 26 HELB (high energy line break), and four combination flood and fire doors
- 148 doors with security functions

*Equipment Control Guidelines are similar to Technical Specifications in that they specify requirements for items, although ECGs do not require NRC approval for changes.

Door impairments include problematic hinges, handles, skin failures, locks, closers, etc. Plant doors typically experience tens of thousands of openings and closings per year. A top-rated fire door typically costs about $5000 itself and an additional $90,000 - $100,000 to install, including engineering analyses, compensatory actions while the door is being installed, and PG&E corporate cost burden.

After a slow start on repairing or replacing impaired doors, which were subject to compensatory actions such as fire watches, a new “Power Block Door Project” was presented in July 15, 2014 to the Project Review Committee for funding. This Project included replacement of all 94 doors in the Power Block because they had outlived their useful life, i.e., they had degraded to the point where they can no longer be repaired to meet the design safety function. (Note that later, in 2016, DCPP decided to repair as many doors as possible). The Project Review Committee, in its July 15, 2014 meeting, approved including the 2015 Power Block Project scope in the DCPP Five Year Plan and funding for an additional four years in the future. DCPP is looking more at door repair than replacement to speed up fixes and to keep costs down. Approximately one-half of impaired doors will be repaired and one-half replaced. The Fix It Now Team is the primary organization assigned to repair and replace doors. DCPP reported that there were no impaired fire doors, (although the number varies from time-to-time) and that it had reduced to zero the number of roving fire watches used for compensatory actions for impaired fire doors. This was good performance.

**DCPP is moving ahead satisfactorily with its impaired fire door repair/replacement program and is focusing more on repairs than replacements. This should permit them to correct more doors within given**
budget, human resource, and time constraints. DCPP reported that it has reduced to zero the number of impaired fire doors and the number of roving fire watches used for compensatory actions for impaired fire doors. This was good performance.

National Fire Protection Association (NFPA) 805 Program (Volume II, Exhibit D.3, Section 3.3 and Exhibit B.3)

The NFPA-805 Program is an alternative approach to the NRC Fire Protection Program regulations for nuclear plants that is endorsed by the NRC and incorporated into Federal Regulations as 10 CFR 50.48(c). The NRC offered each operating nuclear power plant a choice as to whether to make the transition to the new regulations or to remain regulated according to existing NRC fire regulations, 10 CFR 50, Appendix R. About half of the U.S. nuclear plants, including DCPP, chose to make the transition, which has been a multi-year process. DCPP received a License Amendment and the NRC’s Final Safety Evaluation in April 2016, which approved DCPP’s programmatic move to NFPA-805. DCPP had until 365 days from that date (until April 15, 2017) in which to update all training, procedures, etc., and until the 1R20 and 2R20 Refueling Outages to implement the required physical modifications.

DCPP completed transitioning Fire Protection Program management, implementing procedures, and training required to comply with the NFPA-805 based license amendment. At the end of 2017, DCPP had successfully completed installing all of the required physical modifications for NFPA-805 for Unit 1, including two modifications that were completed during Refueling Outage 1R20: the installation of an incipient fire detection system and of upgrades to the Remote Hot Shutdown Panel. The installation of an incipient fire detection system on Unit 2 remained as the final required modification to be completed, and that modification was completed during Refueling Outage 2R20 in the spring of 2018. DCPP completed all Fire Protection Engineering Evaluations (FPEEs) for Unit 1 by the end of September 2017 and implemented the self-approval process for Unit 1 by the end of November 2017. Following 2R20, Unit 2 underwent a similar evaluation and the implementation process was completed by the end of June 2018. The DCPP Fire Probabilistic Risk Assessment (PRA) had been frozen until the self-approval process was implemented, after which the Fire PRA will be fully updated.

The advantages of a transition to NFPA-805 regulations included:

- Plant risk from fire reduced by ~40%.
- Use of risk informed-performance based methodology to determine how best to make corrective and preventative modifications.
- Effective implementation of changes to the plant.
- A state-of-the-art PRA that can be used to further improve safety and make other changes to the plant with risk aversion without the need to...
submit a license amendment request.

The largest challenge had been the cost of the transition to the NFPA-805 program, which totaled approximately $100 million total to complete. Additionally, there were issues identified just prior to the implementation date regarding the design basis calculations for some containment penetration seals that were unclear. This issue was identified during reviews conducted by a new integrated engineering services provider. Ultimately, documentation was located which demonstrated that the performance of the seals was functionally equivalent to the design assumptions used when applying for the license amendment from the NRC, and that basis would be included in the appropriate FPEEs.

**DCPP had satisfactorily completed its implementation of NFPA-805, with the NRC-approved exception of one remaining Unit 2 modification (incipient fire detection) to be completed in the next outage. DCPP was working to implement the self-approval process for Unit 1 and planed to complete that work by November 2017. The DCPP should next review this issue in late 2018 following implementation of the Unit 2 self-approval process, which was planned for June 2018.**

### 4.21.3 Conclusions and Recommendations

**Conclusions:**

DCPP is making good progress in repairing and/or replacing its impaired fire doors. At one point, DCPP reported that it had reduced to zero the number of impaired fire doors and the number of roving fire watches used for compensatory actions for impaired fire doors. DCPP has satisfactorily completed its implementation of NFPA-805.

**Recommendations:**

None
4.22 Learning and Development Programs

4.22.1 Overview and Previous Activities

The focus of this Section is on formal environments created to transfer specific knowledge and skills to individuals within the organization for their individual development. Organizational Development is included in Section 4.14 “Organizational Effectiveness and Development.”

The DCISC reviewed the following Learning and Development topics at three Fact-finding Meetings during the previous reporting period:

- FLEX Training
- Observe Operator Training on Storm Procedures
- Observation of Operations Continuing Training Session

The DCISC concluded in the previous reporting period that DCPP’s FLEX training for operators has begun and is ongoing. DCPP’s licensed operator continuing training on Storm Season and Intake Management appeared satisfactory. The Continuing Training session referred to as a Human Performance Dynamic Learning Activity was useful for improving the use of Human Performance tools by Operators. The activity was well conducted by the station Human Performance Lead and other members of the Training staff.

4.22.2 Current Period Activities

During the current period, the DCISC reviewed Learning and Development Programs at one Fact-finding Meeting. The following topic was reviewed:

- Observe FLEX Training for Licensed Operators

Observe FLEX Training for Licensed Operators (Volume II, Exhibit D.5, Section 3.2)

The training observed in the meeting was for the following FLEX support guides:

DCPP FLEX Support Guideline FSG 05, “Initial Assessment and FLEX Equipment Staging,” providing actions for the initial assessment of plant equipment and system status, and for staging FLEX equipment in preparation for use in plant recovery.

DCPP FLEX Support Guideline FSG 43, “Staging FLEX Equipment,” used to direct staging of FLEX equipment at the applicable staging areas.

The Flex Support Guidelines (FSGs) included the following major steps:

1. Scope
2. Symptoms or Entry Conditions
3. Instructions
4. Ensure Security Response
5. Extending Coping Time of Vital 125Vdc Power During ELAP
6. Deploy FLEX 480Vac/275kW Diesel Generator and Load Center
7. Deploy FLEX 480Vac Power to Battery Charger
8. Place in Service FLEX 480Vac/275kW Diesel Generator and Load Center
9. Place in Service FLEX 480Vac Power to Battery Charger
10. Deploying FLEX 480Vac Power to Alternate Feed
11. Auxiliary Building and Fuel Handling Building Initial Assessment
12. Turbine Building and Control Area Initial Assessment
13. Outside Area Initial Assessment
14. Staging and Deployment Status Control
15. ERCS [Emergency Reactor Coolant System] Pump Electrical Equipment Staging (SGs) [Steam Generators] Available on Unit 1 or 2)
16. Unit 1 EAFW [Emergency Auxiliary Feedwater] Equipment Staging (SGs Available on Unit 1)
17. Unit 2 EAFW Equipment Staging (SGs Available on Unit 2)
18. Emergency RWR [Raw Water Reservoir] Pump Staging (Units 1 & 2)
19. Emergency Battery Charger and Communication Equipment Staging (Units 1 & 2)

These steps were discussed in an interactive fashion with good class participation. The training guides included many detailed steps with good diagrams and
graphics. Following the classroom session, the participants were instructed to perform walkdowns on their own following the included “In Plant Walkdown Guide.”

The DCISC Fact-finding Team observed DCPP FLEX Training for Licensed Operators, and concluded that the training, training materials, and instructor were satisfactory.

4.22.3 Conclusions and Recommendations

Conclusions:

DCPP FLEX training, training materials, and instruction for Licensed Operators were satisfactory.

Recommendations:

None
4.23 Beyond Design Basis Events

4.23.1 Overview and Previous Activities

The purpose of the section is to describe the DCISC’s review of “Beyond design basis events,” such as occurred at the Japanese Fukushima Daiichi nuclear plant in March 2011. The DCISC reviewed the following topics during the previous reporting period:

- Emergency Auxiliary Salt Water Pump Flow Test

The DCPP Emergency Auxiliary Saltwater (EASW) Pump test was successfully performed with no debris buildup blocking flow. The DCISC believes this test was important in showing that the EASW system can operate without blockage from kelp and other potential debris.

4.23.2 Current Period Activities

During the current period, the DCISC reviewed the following:

- Use of FLEX Equipment to Reduce Plant Risk
- Overview of FLEX Training

Use of FLEX Equipment to Reduce Plant Risk (Volume II, Exhibit D.1, Section 3.12)

The DCISC reviewed DCPP’s use FLEX equipment during Refueling Outage 1R20. This is the only routine use of FLEX planned by DCPP to date. The plant is considering other applications to reduce plant safety risk by use of FLEX equipment.

DCPP plans FLEX demonstration drills on October 9 and November 9, 2017. The drills will include a simulated loss of all AC power. NRC plans its FLEX Implementation Inspection to begin November 14, 2017.

Overview of FLEX Training
DCPP operator training includes the Flex Support Guidelines (FSGs), and training has been provided to Operations personnel since March 2012, upon issuance of NRC Order EA 12049. Simulator training for licensed operators includes beyond design basis events, which would result in an extended loss of offsite and AC power. Equipment demonstrations have been conducted in conjunction with FLEX field training including setting up and running the FLEX equipment. Walkdowns were conducted within the plant and also at the FLEX storage facilities, the staging areas where equipment would be placed for use and at the system connection points where systems and equipment associated with FLEX would be tied-in to plant systems. Virtual reality training software has also been developed and used for what Mr. Simpson described as scenario-based applications.

Web-based training for all station personnel has been conducted which has a generic approach to FLEX related topics. The Emergency Response Organization (ERO) has held a number of FLEX training sessions and specific web-based applications are available for ERO training purposes. FLEX drills have been held with the entire ERO including involving Fire Department personnel who are qualified on heavy equipment operation. FLEX oriented training has been provided for a few hundred persons in the Maintenance and technical organizations and consists principally of classroom training. Approximately 200 persons assigned to the four ERO response teams have received FLEX training.

Simulator Facility has had all the FSGs added to the Simulator’s database in order to be capable of simulating the types of failure associated with loss of AC power. During a DCISC fact-finding observation of FLEX training, there was a significant security component and Security organization response is an integral part of the FSGs. FLEX equipment includes internal battery powered lighting and he stated that some scenarios for loss of AC power continue to rely on DC power which is wired throughout the plant. FLEX training includes coping with what might be a considerable amount of debris created by a beyond design basis accident and this is incorporated within the FSGs in terms of meeting the challenge to get equipment from the storage facilities to the staging locations and the Fire Department is also well equipped to provide ready access through downed fencing, etc. FLEX refresher training will be conducted every four years as a minimum requirement, but training will also be conducted as conditions and other evolutions afford opportunities.

4.23.3 Conclusions and Recommendations

Conclusions:

DCPP has successfully implemented its FLEX program of portable equipment and quick-connect connections to mitigate Fukushima-like events which result in loss of AC power and cooling water. The plant is using FLEX in one application during refueling outages to reduce plant safety risk and is considering other similar applications. The
DCISC will review new applications for FLEX equipment when they are identified. FLEX training appeared satisfactory.

Recommendations:
None
4.24 Joint Proposal and Decommissioning

4.24.1 Overview and Previous Activities

On June 21, 2016, PG&E announced a Joint Proposal with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Works Local 1245, Coalition of California Utility Employees, and the Alliance for Nuclear Responsibility to retire DCPP at the expiration of the current operating licenses. On August 11, 2016, PG&E filed an Application with the California Public Utilities Commission (CPUC) for approval of the retirement of DCPP, implementation of the Joint Proposal, and for recovery of associated costs through proposed ratemaking. Under the Joint Proposal, PG&E will continue to operate DCPP at current levels through the current license periods. If the Application is approved by the CPUC, PG&E would retire Unit 1 in 2024 and Unit 2 in 2025.

In the previous period, the DCISC reviewed the following topics related to the Joint Proposal and Decommissioning Program at five Fact-finding Meetings and three Public Meetings:

- Joint Proposal
- DCPP Excellence Plan
- Long-term Capital Project Planning Under the Joint Proposal
- Joint Proposal and Decommissioning Status

The DCISC concluded in the previous reporting period that the DCPP Joint Proposal to end DCPP operation in 2025 is beginning to work its way through the California Public Utilities Commission hearing process. PG&E expects to have the final CPUC decision in late 2017. PG&E is using the DCPP Excellence Plan to track and implement the high-level actions necessary to support the retirement of Diablo Canyon at the expiration of its current NRC operating licenses under the Joint Proposal. DCPP has formed a Project Review Working Group using experienced staff from Operations, Engineering, and Work Control to perform an initial review of the entire portfolio for future capital projects in light of the Joint
Proposal. DCPP’s plan for decommissioning has begun with the process of developing its decommissioning organization which will determine what type of decommissioning to use and a detailed cost estimate. The DCISC should follow closely the progress of the Joint Proposal, the DCPP Excellence Plan, and DCPP’s decommissioning planning through regular updates during both Fact-finding Meetings and Public Meetings.

4.24.2 Current Period Activities

During the current period, the DCISC reviewed the Joint Proposal and Decommissioning Program at four Fact-finding Meetings and three Public Meetings. The following topics were reviewed:

- Decommissioning Process and Initial Planning
- Joint Proposal and Employee Retention Program
- Capital Project Planning

Decommissioning Process and Initial Planning (Volume II, Exhibit B.3, and Exhibit D.8, Section 3.7)

In May 2017 the CPUC issued a decision on PG&E’s Nuclear Decommissioning Cost Triennial Proceeding (NDCTP), a proceeding which is before the CPUC every three years as a rate case to assess the requirement to fund the full decommissioning of the facility. PG&E did not receive the increase it sought in the 2017 NDCTP and decommissioning funding remains approved in the amount of $2.4 billion which can be contrasted with the $4.4 billion approved for decommissioning the San Onofre Nuclear Generating Station (SONGS).

PG&E’s efforts and activities to date concerning DCPP decommissioning were as follows:

- All staff positions (24) filled. The sole job of the decommissioning project staff at present is to properly inform the next NDCTP filing as to cost.
- Informing 2018/19 NDCTP, with the first filing with the CPUC due in 2018 or 2019
- All bundles for requests for proposals for decommissioning-related work have been issued to vendors with experience in nuclear plant decommissioning.

The key regulatory project milestones were as follows:

- Issuance of the Proposed Decision on the Joint Proposal
- Subsequent CPUC Hearing will be held on the Final Decision on the Joint Proposal
○ Establishing the Diablo Community Engagement Pane
○ 2018/19 Filing of the NDCTP, with possible approval late 2020.

Other issues to be addressed will include the future uses of the land, the possible repurposing of assets, as well as transportation of materials through the community. PG&E has worked through issues with those regulatory bodies in the past and realizes that efforts to obtain these permits will be multiyear and efforts must begin soon if PG&E wishes to commence active decommissioning right after cessation of operations.

DCPP established a panel to receive applications and select people to become members of the Diablo Canyon Decommissioning Engagement Panel. The mission and purpose of the Decommissioning Engagement Panel was to review information and provide direct input on behalf of the local community to PG&E on Diablo Canyon Power Plant decommissioning plans and activities. Applications were received, and the panel met in April to make final selections for the Decommissioning Engagement Panel. The first meeting was held in May. The current Decommissioning Fund would provide adequate funding in order to complete a full cost estimate for decommissioning the facility. The cost estimating work was estimated to be completed by 2019, and its cost would be covered by the Decommissioning Fund as the NRC regulations allowed up to 3% (approximately $37 million) of the fund to be expended for pre-planning activities that might be completed before operations cease in 2024. The Decommissioning Fund was only intended to cover the cost for decommissioning of the radiologically-active portions of the facility and was never intended to cover a return of the site to a full “green field” status. As a result, DCPP was working to lay out a strategy to file with the California Public Utilities Commission (CPUC) for approval for a means for setting aside additional funding for non-radiological decommissioning activities. DCPP hoped to make such a filing within the next two years. Any such additional funds would be pass-through costs and neutral to PG&E’s revenue. As a part of the funding strategy, agreements would need to be reached and approvals obtained regarding any portions of the facility that might not be returned to green field status, such as leaving the Intake Breakwater or office support building external to the power block. The ultimate status of those facilities would significantly affect the total cost of decommissioning. A large amount of additional costs beyond those allowed to be drawn from the Decommissioning Fund, possibly up to $80 million, would be needed to obtain the necessary state and local permits prior to the start of decommissioning activities.

Regarding plans for the disposal of low level radioactive waste, it was anticipated that new contracts for such disposal would be obtained given the large amount of waste that would be generated. Additionally, DCPP was reviewing the requirements of a state executive order which required that all waste from nuclear power plants be disposed outside of the state of California. DCPP desired to investigate the possibility of modifying the requirements such that some amounts of non-radiological wastes could be disposed or reused on site. An example of such
a use that could be pursued would be using non-radiological concrete and stone waste as a road bed for improving the north access road to the site to allow future public access from that direction.

As a part of License Action Requests to be filed with the NRC, there would be defined milestones which would allow reductions of portions of the Part 50 requirements until such time that the Part 50 license could be fully terminated. After all requirements were met to terminate the Part 50 license, only the Part 72 license would remain until all fuel was removed from the site.

DCPP’s plan for decommissioning continued to be developed. Current activities included establishing the DCPP Decommissioning Engagement Panel, preparing a detailed cost estimate, and obtaining the necessary funds for decommissioning to a green field site.

Joint Proposal and Employee Retention Programs (Volume II, Exhibit D.4, Section 3.2; Exhibit B.3; Exhibit D.8, Section 3.9; and Exhibit B.12)

Under the Joint Proposal, PG&E has committed to continuing the safe operation of DCPP and to provide resources and assistance to transitioning workers. To continue safe operations under the Joint Proposal, it will be critical to retain existing employees who are highly qualified, and PG&E has committed to provide a retention program and severance payments upon completion of employment.

On January 11, 2018, the CPUC issued a Decision approving the Joint Proposal. The decision, while supporting the retirement of DCPP, did not include all funding requested by PG&E for retention and retraining of DCPP employees nor did the final decision approve the Community Impact Mitigation Program which would have provided $85 million for the local communities to offset the impact of DCPP closure. The CPUC did not accept that it possessed the legal authority to fund the Community Impact Program. The loss of the full retention program and Community Impact Program could be addressed through legislation or through a request for a rehearing of the Decision or by acceptance of the Decision as issued, or by some combination thereof.

The original Joint Proposal called for an Employee Retention Program that would pay employees a 25% over base pay incentive per year in two tranches, the first of four years and the second of three years. In late 2016, approximately 86% of DCPP employees had signed Retention Agreements to accept the proposed 25% incentive and committing to remain as employees through the end of 2020. The first incentive payment was planned to be made prior to the end of 2017. However, the payment was not made as planned due to the fact that the CPUC had not approved the Joint Proposal prior to the end of 2017.

The final decision by the CPUC reduced the annual incentive payment to 15% per year but retained the basic structure of two tranches of four and three years each.
Because of the changes ordered by the CPUC, the previous Retention Agreements signed by employees were no longer considered valid. All employees were presented with the option to sign new Retention Agreements covering the same period ending at the end of 2020. Employees who signed were paid an initial 15% payment covering 2017 within 60 days and a second payment for 2018 by the end of August 2018. The acceptance rates for the new Retention Agreements appeared to be similar to the acceptance rates under the original Retention Agreements. Although the initial indications appeared to show that the reduced incentive amounts under the CPUC decision had not affected the Tier 1 tranche acceptance rate, concerns remained retention rates under the Tier 2 tranche might not be as successful given the reduced incentive amounts.

DCPP was in the process of reviewing plans and options for when to circulate the Tier 2 Retention Agreements to employees for their consideration. Although the Tier 2 Retention Agreements would not actually be needed before mid-2020, there were advantages in the planning of staffing to be gained by not waiting until late in the period before offering the Tier 2 Retention Agreements for employee review and acceptance. DCPP was also working to ensure that the station continued to be an environment where employees were pleased to work, as well as working to line up assistance for employees to receive to help find new employment after the cessation of operations at DCPP.

The CPUC reduced funding for the program by 40%, that is, by reducing the financial incentive to remain employed at DCPP from 25% of an employee’s salary to 15%. DCPP found it to be comparable with those offered by DCPP’s peers in a decommissioning context within the nuclear industry. State Senator Monning, whose district includes the San Luis Obispo area, introduced SB 1090 which would provide legislative redress of CPUC reduction, and SB 1090 had passed out of the State Senate and was pending before the Assembly for committee assignment.

PG&E’s new offer, extended in accordance with the CPUC Decision, resulted in a 1% difference in the number of employees accepting the incentive. DCPP reported 277 positions had been filled at DCPP both internally and externally since the Joint Proposal was announced with 94% of those employees in those positions electing to participate and to accept the incentive. The 133 persons who elected not to sign retention agreements represented a number aligned within the annual average of plant turnover in personnel, and 58% of the 133 persons who declined to participate were now fully eligible to retire.

DCPP appears to be appropriately managing Employee Retention Programs, taking into account the requirements of the Joint Proposal as modified by the CPUC. The DCISC should continue to monitor the effectiveness of the Employee Retention Programs and staffing plans to ensure that possible losses of personnel do not impact plant safety.

Capital Projects Planning (Volume II, Exhibit D.7, Section 3.9, and Exhibit B.12)
A Project Review Working Group (PRWG) was formed using experienced staff from Operations, Engineering, and Work Control. The PRWG had completed its review of the entire portfolio for future capital projects, which was subject to further review by the Executive Oversight Board of the Excellence Plan.

Each project was reviewed for importance using the following screening questions:

- Regulatory?
- Reliability?
- Bridging Strategy?
- Corrective Maintenance?
- Core Damage Frequency?
- Plant transient (Reactor Trip, Safeguards Initiation)?
- Enterprise Risk?
- Financial impact due to extended down power?
- Unmitigated Single Point Vulnerability?
- Plant vulnerability we cannot monitor or detect?
- Reduction of Regulatory Margin?
- Impact to Station/Industry/Regulatory Metrics?
- Enhancing the Decommissioning Project?

The resulting project portfolio was then divided into three categories:

1. Required by Regulatory Commitments (must-do projects)
2. Recommended and Prioritized (should-do projects according to priority)
3. Not Recommended (projects that should not be completed)

Category 1 (Required) included a total of 14 projects such as those related to spent fuel storage, Generic Safety Issue 191 (recirculation sump debris clogging), and the License Basis Verification Project. Category 3 (Not Recommended) included projects such as Containment Cooling Coil replacements and a new road for the 500kV switchyard. Regarding Category 2 (Recommended and Prioritized) projects, all projects currently are funded and the list was envisioned to be used as a tool in decision-making should funding become limited in the future. Examples of projects in Category 2 and with low priorities included upgrades to the Radioactive Effluent Management System, 230kV bushing replacements, and Diesel Fuel Oil Transfer Pump replacements.

There were two major projects of interest to the DCISC, the Unit 2 Main Generator Stator replacement and the Eagle 21 Plant Protection System upgrade. The
Generator Stator was on the Recommended and Prioritized list and is currently funded and planned for replacement in 2R21 in 2019. The Eagle 21 upgrade, which was cancelled, is a very expensive project and one that could not be completed for several years. The proposed change was intended to improve reliability and was not intended to improve nuclear safety. Replacement parts for the existing system are expected to remain available from the original vendor for the remaining period of the DCPP operating licenses.

There was a total of 45 capital projects cancelled using the above process. Some significant examples were as follows:

- Replace Control Room Condenser
- Replace Eagle 21 Plant Protection System
- Upgrade Radiation Monitoring System
- Replace 12kV Bus D, E, F, and U Relays
- Upgrade Fuel Handling System
- Replace Main Generator Output Breaker
- Replace Pressurizer Heaters
- Replace Containment Fan Cooler Unit Cooling Coils

Projects required by regulation were retained as well projects recommended in order to maintain safety and reliability. About a third of the projects submitted for review were cancelled. The review and assessment by the Project Review Working Group is now a part of future project review and the group meets on a routine basis for that purpose and to advise the Plant Health Prioritization Committee which is involved in making final decisions on capital spending.

DCPP continues to implement projects – examples include the baffle-former bolt inspection and replacement for Unit-1, the cavity seal replacement for Unit-1, and the control rod guide card inspection and replacement for both units as examples of completed projects. Future projects to be undertaken include the stator re-stack for Unit-2 during 2R21, the main annunciator replacement for both units in 1R22 and 2R22, and replacement of air compressors and plant air dryers.

The DCISC reviewed each cancelled project to ascertain its importance in maintaining nuclear safety and plant reliability. None had a significant impact on these attributes.

The DCPP review process and selection of capital projects to be cancelled with regard to the Joint Proposal 2025 plant shutdown were comprehensive, hence they appeared to be satisfactory in maintaining plant safety and reliability.
4.24.3 Conclusions and Recommendations

Conclusions:

DCPP’s plan for decommissioning continues to be developed. Current activities include establishing the DCPP Decommissioning Engagement Panel, preparing a detailed cost estimate, and obtaining the necessary funds for decommissioning to a green field site. DCPP appears to be appropriately managing Employee Retention Programs, taking into account the requirements of the Joint Proposal as modified by the CPUC. The review process and selection of capital projects to be cancelled with regard to the Joint Proposal 2025 plant shutdown were comprehensive and appeared to be satisfactory in maintaining plant safety and reliability.

Recommendations:

None
The Diablo Canyon Independent Safety Committee (DCISC) was established as one of the terms of a settlement agreement entered into by the Division of Ratepayer Advocates (DRA) of the California Public Utilities Commission (CPUC), the Attorney General (AG) for the State of California, and Pacific Gas and Electric Company (PG&E). The settlement agreement, dated June 24, 1988, was intended to cover the operation and revenue requirements associated with the two units of PG&E’s Diablo Canyon Nuclear Power Plant (Diablo Canyon) for the 30-year period following the commercial operation date of each unit. The agreement arose out of rate proceedings that had been pending before the CPUC for four years, and which included numerous hearings and pre-trial depositions. Just prior to the commencement of trial, the DRA, the AG and PG&E prepared and entered into the settlement agreement and submitted it to the CPUC for approval.

The agreement provided that:

“An Independent Safety Committee shall be established consisting of three members, one each appointed by the Governor of the State of California, the Attorney General and the Chairperson of the California Energy Commission (CEC), respectively, serving staggered three-year terms. The Committee shall review Diablo Canyon operations for the purpose of assessing the safety of operations and suggesting any recommendations for safe operations. Neither the Committee nor its members shall have any responsibility or authority for plant operations, and they shall have no authority to direct PG&E personnel. The Committee shall conform in all respects to applicable federal laws, regulations and Nuclear Regulatory Commission (NRC) policies.”

The agreement further provided that the DCISC shall have the right to receive certain operating reports and records of Diablo Canyon, and that the DCISC shall have the right to conduct an annual examination of the Diablo Canyon site and such other supplementary visits to the plant site as it may deem appropriate. The DCISC is to prepare an annual report and such interim reports as may be appropriate, which shall include any recommendations of the Committee.

The settlement agreement and its supplemental implementing agreement were referred to the CPUC for review and approval. Following hearings before a CPUC
Administrative Law Judge and the Commission itself, the CPUC, in December 1988, approved the settlement agreement, finding that it was reasonable and “in the public interest” and that the “Safety Committee will be a useful monitor of safe operation at Diablo Canyon”.

As required by the provisions of CPUC decisions and of Assembly Bill 1890 enacted by the California Legislature, which mandated electric utility rate restructuring and deregulation, PG&E filed an application which proposed a rate-making treatment for Diablo Canyon which would have priced the plant’s output at market rates by the end of 2001. On May 21, 1997, the CPUC issued Decision 97-05-088, which found that the DCISC remains a key element of monitoring the safe operation of Diablo Canyon. The Decision ordered that the DCISC remain in existence under the terms and conditions of the settlement agreement (Decision 88-12-083, Appendix C, Attachment A) until further order of the Commission.

On May 27, 2004, the CPUC issued Decision 04-05-055, the Test Year 2003 General Rate Case, setting the Utility’s revenue requirements for its electric generation operations. In Decision 04-05-055 the CPUC also: 1) adopted a Stipulation between the DCISC, PG&E, the Office of Ratepayer Advocates (formerly the "DRA"), The Utility Reform Network, the CEC and the San Luis Obispo Mothers for Peace which provided for the DCISC’s continued existence and funding through PG&E’s cost-of-service rates, at the funding levels established by Decision 97-05-088; 2) changed the nomination procedures for DCISC membership to eliminate from the process the participation of PG&E and the Dean of Engineering at the University of California at Berkeley; 3) modified qualification requirements for DCISC membership; and 4) added a new requirement for public outreach in the San Luis Obispo community to the DCISC’s mandate.

On January 25, 2007, the CPUC issued Decision 07-01-028. The CPUC had previously adopted new practices and expectations for the DCISC without concurrently restating the Committee’s charter to reflect the changes. In its Decision, the CPUC granted the DCISC application for authority to restate its charter including the incorporation into the Restated Charter of several terms, conditions, changes, and clarifications necessitated by, and previously authorized by, the CPUC which govern the composition, responsibilities and operations of the Committee. In its Decision, the CPUC found the Restated Charter to be in the public’s interest as it reflects the latest authority and obligations of the DCISC. The Committee’s application was unopposed.

On June 21, 2016, PG&E announced a Joint Proposal with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Works Local 1245, Coalition of California Utility Employees, and the Alliance for Nuclear Responsibility to retire Diablo Canyon at the expiration of the current operating licenses and to abandon license renewal activities for both units.
On August 11, 2016, PG&E filed Application 16-08-006 (Application) with the California Public Utilities Commission (CPUC) for approval of Joint Proposal. In part, in its Application PG&E sought authorization from the CPUC to retire Diablo Canyon by the end of its current operating licenses from the NRC and to recover in rates $352.1 million in costs for an Employee Retention Program and $85 million for a Community Impacts Mitigation Program to help offset the closure of Diablo Canyon on San Luis Obispo County local entities.

On January 16, 2018, the CPUC issued Decision 18-01-022. In part, Decision 18-01-022 approved PG&E's proposal to retire Diablo Canyon by 2025; approved $211.3 million of the $352.1 million sought by PG&E for the Employee Retention Program; and found the request for the Community Impacts Mitigation Program should be addressed to the legislature.

On February 12, 2018, California State Senator William Monning introduced Senate Bill No. 1090 (SB 1090) to add Section 712.7 to the California Public Utilities Code to require the CPUC to approve full funding for the Employee Retention Program and the Community Impacts Mitigation Program as proposed by PG&E in its Application and require the CPUC to ensure that the Integrated Resource Planning Procurement proceedings avoid any increase in emissions of GHG as a result of the retirement of Diablo Canyon.

On May 22, 2018, the DCISC held a public meeting in Berkeley, California, and approved a letter commenting on Senate Bill 1090 with reference only to the employee retention program. In its letter to Senator Monning's office the DCISC expressed its belief that that the Employee Retention Program should not be cut as severely as required by Decision 18-01-022.

On May 29, 2018, SB 1090 was passed by the California Senate on a vote of 31 in favor and 4 against. Subsequent to the end of period covered by this Annual Report, on August 20, 2018, SB 1090 was passed by the California Assembly on a vote of 67 in favor and 1 against and on September 19, 2018, the legislation was signed by California Governor Edmund G. Brown Jr.

The first “Interim Report on Safety of Diablo Canyon Operations,” covering the period of January 1 through June 30, 1990, was adopted by the DCISC on June 6, 1991, and there have been twenty-seven annual reports since then. This twenty-eighth annual report covers the period July 1, 2017 - June 30, 2018, and was adopted by the DCISC at a public meeting in Avila Beach, CA on October 24, 2018.
A request for applications is publicly noticed by the CPUC. After receipt of the applications, a list of candidates is selected by the CPUC and provided to the appointing agencies. In accordance with the Restated Charter:

"The President of the CPCU shall review each application to assess the applicant’s qualifications, experience and background, including any conflict of interest and comment received from the public, and shall propose as candidates only persons with knowledge, background and experience in the field of nuclear power facilities and nuclear safety issues who demonstrate they have no conflict of interest."

In July 1989, when CPUC President G. Mitchell Wilk announced the initial list of nine candidates nominated for appointment to the DCISC, he noted that

"... an independent safety Committee clearly requires members who could demonstrate objectivity and independence. For this reason, none of the nominees has testified for PG&E or any other party before the CPUC or the Nuclear Regulatory Commission in any proceeding regarding Diablo Canyon."

The Restated Charter provides:

"No person shall serve as a member of the Committee if he or she has a prior history of supporting or opposing PG&E as a witness or intervener in nuclear licensing or CPUC proceedings associated with Diablo Canyon."

1.2.1 Robert J. Budnitz
1.2.2 Peter Lam
1.2.3 Per F. Peterson
1.2.4 Technical Consultants & Legal Counsel
On October 10, 2007, Robert J. Budnitz, Ph.D. was appointed by California Attorney General Edmund G. Brown Jr. to a term on the Committee expiring June 30, 2010. On April 15, 2010, Attorney General Brown announced the reappointment of Dr. Budnitz to a second three-year term on the Committee commencing July 1, 2010 through June 30, 2013. On June 27, 2013, the CPUC ratified its President’s selection of Dr. Budnitz as one of two candidates for appointment by Attorney General Kamala Harris to serve a three-year term on the DCISC for the period July 1, 2013 to June 30, 2016. During that period, Dr. Budnitz continued to serve as a member of the Committee pending his reappointment or replacement. On July 7, 2016, Attorney General Harris announced the reappointment of Dr. Budnitz to serve a three-year term on the Committee commencing July 1, 2016 through June 30, 2019.

Dr. Robert J. Budnitz has been involved with nuclear-reactor safety and radioactive-waste safety for many years. In March 2017 he retired from the scientific staff at the University of California’s Lawrence Berkeley National Laboratory, where he worked on nuclear power safety and security and radioactive-waste management. Since his formal retirement, he has continued to work on these same subjects through a one-person private consulting service. In February 2017 he was elected to the National Academy of Engineering. From 2002 to 2007 he was at the University of California’s Lawrence Livermore National Laboratory (LLNL), during which period he worked on a two-year special assignment (late 2002 to late 2004) in Washington to assist the Director of the Department of Energy’s (DOE’s) Office of Civilian Radioactive Waste Management to develop a new Science & Technology Program. Prior to joining LLNL in 2002, he ran a one-person consulting practice in Berkeley CA, for over two decades. In 1978–1980, he was a senior officer on the staff of the U.S. Nuclear Regulatory Commission, serving as Deputy Director and then Director of the NRC Office of Nuclear Regulatory Research. In this two-year period, Dr. Budnitz was responsible for formulating and guiding the large NRC research program that constituted over $200 million/year at that time. His responsibilities included assuring that all major areas of reactor-safety research, waste-management research, and fuel-cycle-safety research necessary to serve the mission of NRC were adequately supported. From 1967-1978, he was on the staff of the Lawrence Berkeley National Laboratory (LBNL), serving in 1975-1978 as Associate Director of LBNL and Head of LBNL’s Energy & Environment Division. During this period, the programs under
his direction were in a large mix of diverse areas relevant to DOE, including energy-efficiency, deep-geologic radioactive waste disposal, solar energy, geothermal energy, fusion energy, transportation technology, chemical-engineering for alternate fuels, environmental instrumentation, air-pollution phenomena, and energy policy analysis. He earned a Ph.D. in experimental physics from Harvard in 1968.

Dr. Budnitz served as the DCISC Vice-Chair for this report period, July 1, 2017 through June 30, 2018.
On June 3, 2009, Peter Lam, Ph.D., was appointed by Chair Karen Douglas, J.D., of the California Energy Commission (CEC) to a three-year term on the Committee commencing July 1, 2009 through June 30, 2012. On July 12, 2012, CEC Chair Robert B. Weisenmiller, Ph.D., announced his reappointment of Dr. Lam to a second three-year term on the Committee commencing July 1, 2012 through June 30, 2015. Dr. Lam was reappointed by Dr. Weisenmiller to third three-year term on the Committee commencing July 1, 2015 and ending on June 30, 2018, and subsequently on June 6, 2018, Dr. Weisenmiller announced Dr. Lam’s appointment to a fourth three-year term on the Committee beginning on July 1, 2018 and ending on June 30, 2021.

Dr. Peter Lam, Administrative Judge Emeritus of the U.S. Nuclear Regulatory Commission, is an international authority of nuclear reactor operating experience, and a leading expert on nuclear reactor safety and risk assessment. Dr. Lam is now the principal of EMM International, a consulting company with a group of experts in the nuclear industry. In his 18 years of public service as an Administrative Judge, Dr. Lam has presided over numerous public proceedings to decide technical issues of national and international significance involving the use of nuclear energy and materials. Judge Lam’s jurisdiction covered all 104 nuclear power plants, some 21,000 medical and material licensees, and nuclear waste storage in the United States. The ultimate resolution of these significant technical issues has contributed to the enhancement of nuclear reactor safety.

Prior to his judicial appointment 18 years ago, Dr. Lam had extensive technical and managerial experience in the nuclear energy business over a period of 20 years. He was a nuclear engineer at General Electric Company, participating in the design and analysis of boiling water reactor advanced fuels. Dr. Lam served as a program manager at Argonne National Laboratory, managing the research and development of advanced fast reactor metal fuels. He was a manager at Science Applications, Inc., and a consultant at NUS Corporation, both major consulting firms in the nuclear industry. Dr. Lam’s responsibilities there involved the management of probabilistic risk assessments of operating nuclear reactors. He managed a group of technical specialists in the U.S. Nuclear Regulatory Commission in the analysis and evaluation of nuclear reactor operating experience. Dr. Lam was also a visiting faculty member at California State University at San Jose, and at George Washington University.
Dr. Lam has published 71 technical papers and reports in national and international journals and in proprietary company publications, which focus on major issues in nuclear transport theory, nuclear reactor fuel design, nuclear reactor operating experience, and nuclear reactor safety. Judge Lam has also issued over 110 published judicial decisions related to some 50 cases of litigations. These judicial decisions resolve a wide range of technical and legal issues regarding nuclear reactor safety, nuclear waste disposal, and other civilian use of nuclear technology.

Dr. Lam has presented lectures at International Atomic Energy Agency (IAEA) international conferences in Austria, Korea, and Spain, on significant results in comprehensive analyses of nuclear reactor operating experience. He has chaired an IAEA working group to develop a technical treatise for the analysis and evaluation of operating experience of the world’s nuclear reactors. These activities contribute to the international exchange of important information to improve nuclear reactor safety.

Dr. Lam earned a Ph.D. and a M.S., both in nuclear engineering, from Stanford University in 1971, and 1968, respectively. He earned a B.S., in mechanical engineering, from Oregon State University in 1967. His four-year undergraduate study at Oregon State University and his four-year graduate study at Stanford University were fully funded by eight consecutive scholarships and fellowships.

Dr. Lam served as DCISC Chair during this report period, July 1, 2017 through June 30, 2018.

Per F. Peterson is the Floyd Professor of Nuclear Engineering at the University of California, Berkeley. Since July 2017 he has also served as the Chief Nuclear Officer for Kairos Power, a start-up company developing advanced reactor technology. He previously chaired the Nuclear Engineering department from 2000 to 2005 and from 2009 to 2012, and chaired the Energy and Resources Group at U.C. Berkeley from 1998 to 2000. He received his BS in Mechanical Engineering at the University of Nevada, Reno, in 1982. After working at Bechtel on high-level radioactive waste processing from 1982 to 1985, he received a MS degree in Mechanical Engineering at the University of California, Berkeley in 1986 and a Ph.D. in 1988. He was a JSPS Fellow at the Tokyo Institute of Technology from 1989 to 1990 and a National Science Foundation Presidential Young Investigator from 1990 to 1995. He is past chairman of the Thermal Hydraulics Division (1996–1997) and a Fellow (2002) of the American Nuclear Society, a recipient of the Fusion Power Associates Excellence in Fusion Engineering Award (1999), and has served as editor for three technical journals.

Prof. Peterson’s research in the 1990’s contributed to the development of the passive safety systems used in the GE ESBWR and Westinghouse AP-1000 reactor designs. Currently his research group focuses primarily on heat transfer, fluid mechanics, and regulation and licensing for high temperature reactors, principally designs that use liquid fluoride salts as coolants. He is author of over 110 archival journal articles and over 120 conference publications on these topics.

On January 29, 2010, U.S. Department of Energy Secretary Dr. Steven Chu appointed Prof. Peterson as a member of the Blue Ribbon Commission on
America’s Nuclear Future ("BRC"), established by President Obama to provide recommendations for solutions to manage the Nation’s spent fuel and high-level waste. He co-chaired the BRC’s Reactor and Fuel Cycle Technology Subcommittee with Senator Pete Domenici.  He has served as a member or chair of numerous advisory committees for the national laboratories and National Research Council. He participated in the development of the Generation IV Roadmap in 2002 as a member of the Evaluation Methodology Group, and has co-chaired its Proliferation Resistance and Physical Protection Working Group since 2002.
The Restated Charter provides the Committee may contract for services including the services of consultants and experts to assist the Committee in its safety review. The DCISC Members are assisted in their important work by technical consultants and legal counsel. For this report period those persons were:

**Technical Consultant:**

Mr. R. Ferman Wardell, a Registered Professional Engineer, holds both Bachelor and Master of Science degrees in Nuclear Engineering from North Carolina State University. He is a 53-year veteran of the nuclear power industry, having been directly involved in design, quality assurance, operation and nuclear safety oversight activities for Duke Energy Corporation’s seven nuclear units. He was formerly Executive Assistant to the Chairman and CEO at Duke Energy. Mr. Wardell has been a Consultant to the DCISC since 1992. In this capacity he participates in technical and programmatic reviews of the safety of Diablo Canyon nuclear operations, DCISC Public Meetings, and development of the DCISC Fact-finding reports and Annual Report. Mr. Wardell also serves as nuclear consultant to the minority owner of the North Anna Power Station, a nuclear plant in Virginia.

**Technical Consultant:**

Mr. Richard D. McWhorter, Jr., holds a Bachelor of Science in Mechanical Engineering from the United States Naval Academy. He is a 30-year veteran of the nuclear power industry. He served for ten years as a division officer and department head in the navy’s nuclear submarine program in which he was responsible for the operation of his submarine’s nuclear power plant. Mr. McWhorter then served the U. S. Nuclear Regulatory Commission for ten years first as an Operator Licensing Examiner and then as Senior Resident Inspector at North Anna Power Station. He then was employed for two years as a Systems Engineering Manager for Dominion Virginia Power at North Anna Power Station. For ten years, Mr. McWhorter was employed at Old Dominion Electric Cooperative where he served as Vice President of Operations and Asset Management. Mr. McWhorter has been a Consultant to the DCISC since 2016. In this capacity he participates in technical and programmatic reviews of the safety of Diablo Canyon nuclear operations, DCISC Public Meetings, and development of the DCISC Fact-finding reports and Annual Report.

**Legal Counsel:**
Robert R. Wellington, Esq. has been Legal Counsel for the DCISC since its organization in 1989. He is a graduate of Stanford University and the University of California (Hastings) Law School. For over 20 years his practice has been limited to representing several cities, regional wastewater and solid waste districts and other public agencies, including the DCISC. He advises the DCISC with regard to its legal and administrative matters.

Assistant Legal Counsel:

Robert Rathie, Esq. has been associated with the Committee through his work with the Wellington Law Offices since 1993. He obtained a bachelor’s degree in Social Science and History from Chico State University in 1972 and served for 15 years in the U.S. Merchant Marine as chief purser on board passenger and freight vessels in foreign trade. He received his Juris Doctor degree from Monterey College of Law in 1993. He is a member of the State Bar of California and the Monterey County Bar Association. He assists Mr. Wellington in advising the DCISC with regard to its legal, regulatory and administrative matters.
The DCISC held four public meetings on the following dates:

- October 18–19, 2017, Avila Beach CA Public Meeting
- February 7–8, 2018, Avila Beach CA Public Meeting and Public Plant Tour
- May 22, 2018, Berkeley, CA Public Meeting
- June 27–28, 2018, Avila Beach CA Public Meeting and Public Plant Tour

These are described in Section 2.0.
The DCISC Members and Consultants visit DCPP regularly to conduct fact-finding meetings and tour areas of the plant to review operational activities and inspect systems, equipment or structures which the Committee has under review or has interest. A record of these Fact-finding meetings is contained in Volume II, Exhibits D.1–D.11, and plant tours and inspections are listed in Exhibit E.

1.4.1 Inspections and Fact-finding meetings by Robert J. Budnitz

To DCPP on September 6–7, 2017, with Consultant McWhorter to: attend a meeting of the Plant Health Committee; receive an update on non-seismic Probabilistic Risk Assessment Programs; review the National Fire Protection Association (NFPA) 805 Program; assess Maintenance Department performance; review the Foreign Materials Exclusion Program; receive information concerning the Institute for Nuclear Power Operations (INPO) evaluation preparations; review the locally intense precipitation analysis and the tsunami hazard analysis; meet with the NRC Senior Resident Inspector, review and assess the Seismic Probabilistic Risk Assessment Program; receive information on Auxiliary Saltwater System health; and meet with the Vice-President, Technical Services.

To DCPP on November 14–15, 2017, with Consultant Wardell to: review auxiliary feedwater pump control valve periodic testing; receive information on FLEX training for licensed operators; meet with Performance Improvement Program coordinators; review results of the August 2017 INPO evaluation; meet with the NRC Senior Resident Inspector; review the Plant Protection System with the system engineer; meet with the DCPP Station Director; review the status of the fire doors; review the NRC 95001 inspection of a White Finding for the Residual Heat Removal System valve operation; and review a 2017 NRC inspection report for an event occurring in 2010.

To DCPP on March 7–8, 2018, with Consultant McWhorter to: meet with the NRC Senior Resident Inspector; review the Software Quality Assurance Program; tour and observe non-containment outage work; review a nitrogen leak in Containment; review the 2018 Operating Plan; tour and observe outage work in Containment; review decommissioning planning; review the Employee Retention Program; meet with the DCPP Vice-President Nuclear Generation and Chief Nuclear Officer; and review inclusion of human performance data into probabilistic risk
1.4.2 Inspections and Fact-finding meetings by Peter Lam

To **DCPP on August 9–10, 2017**, with Consultant Wardell to: meet with the NRC Senior Resident Inspector; review results of the Containment In-service Inspection; assess the radioactive waste processing systems; meet with the DCPP Vice-President Nuclear Generation and Chief Nuclear Office; review Steam Generator health; receive information on the equipment qualification process; review the Engineering Excellence Plan; observe the chemistry sampling process; review adequacy of operator staffing; and receive an update and information concerning the Independent Spent Fuel Storage Installation (ISFSI) loading campaigns.

To **DCPP on October 30–31, 2017**, with Consultant Wardell to: meet with the NRC Senior Resident Inspector; review the Joint Proposal to retire DCPP, staff retention and decommissioning status issues; review industry and NRC Plant Performance Indicators; review dry cask storage loading; meet with PG&E Vice President-Generation; review plant affordability; review the Employee Concerns Program; review NRC Information Notice 2017-4 regarding high energy arcing faults in electrical equipment containing aluminum components.

To **DCPP on January 17-18, 2018**, with Consultant Wardell to: observe operator rounds in the plant; meet with the NRC Senior Resident Inspector; review radiation monitoring systems; receive information on Quality Verification’s assessment of Outage 1R20; review information concerning Quality Assurance’s 2017 audits and 2018 audit plans; review the NRC’s evaluation report on DCPP tsunamis; assess the status of NRC regulatory issues; meet with the PG&E Vice President and Chief Nuclear Officer; receive information on the status of the Capital Projects Review process; and receive information concerning the status of the Equipment Reliability Process.

To **DCPP on April 17-18, 2018**, with Consultant Wardell to: meet with the NRC Senior Resident Inspector; meet with Senior Director Nuclear Services, receive an update on reactivity management; receive information on Quality Verification’s assessment #180090007 of work package reviews; review and walkdown the 4kV Power System with the system engineer; receive an update on the Boric Acid Corrosion Control Program; receive information on the status of issues with the Control Room Ventilation System; review results of Outage 2R20; receive an introduction to and report on the status of leadership engagement in Performance Improvement processes; observe non-licensed operator training and engineering training; observe a planned surveillance test; and review the status of on-line maintenance.

1.4.3 Inspections and Fact-finding meetings by Per F. Peterson

To **DCPP on July 25–26, 2017**, with Consultant Wardell to: meet with the NRC Senior Resident Inspector.
Resident Inspector; receive information on the status of the fire doors; review annual Radiological Release and Radiological Environmental Monitoring Reports; review the Control Room Ventilation System; receive a report on the Direct Current (DC) Power System; attend a meeting of the Plant Health Committee; review the Management Observation Program; assess nuclear fuel performance and review ISFSI operations; review DCPP Safety Culture; receive information concerning use of FLEX equipment to reduce plant risk; and to receive information on cyber security.

To DCPP on December 13–14, 2017, with Consultant McWhorter to: review inspection of spent fuel; meet with the NRC Senior Resident Inspector; receive information on increased radiation levels for Unit 1; assess Emergency Diesel Generator System health; observe a meeting of the Corrective Action Review Board; review performance of the Operations Department; review the health of the 230kV/500kV Switchyard and offsite power lines; review the use of portable electronic devices in the Power Block; receive information on the Electronic Work Management System; review management of data by the Performance Improvement Program; and meet with the DCPP Vice President Nuclear Generation and Chief Nuclear Officer.

To DCPP on May 2–3, 2018, with Consultants McWhorter to: meet with NRC Senior Resident Inspector; review and receive an update on workplace seismic safety; assess equipment data collection, trending and retention issues; review the system engineering programs; observe a meeting of the Corrective Action Review Board; review the Commercial Grade Dedication Program; review and receive information concerning the Cyber Security Program; review spent fuel systems; meet with the DCPP Senior Director, Nuclear Services; and review issues regarding large transformers.

1.4.4 Tours of DCPP by DCISC Members and Members of the Public During the Period July 1, 2017—June 30, 2018

The DCISC had historically performed a public tour of Diablo Canyon Power Plant each year with members of the public in conjunction only with the first meeting of a calendar year public meetings. For two years following the terrorist activities of September 11, 2001 because of tightened security at nuclear power plants, including DCPP no tours were offered. With its June 2004 public meeting, the Committee resumed conducting tours of DCPP with members of the public, offering a tour in conjunction with most of its public meetings since that time. The tours are noticed in advance in the local newspaper and on the DCISC’s website, and members of the public sign up in advance. During these tours, members of the public and the Committee Members and Consultants hold individual discussions concerning the DCISC, Diablo Canyon, and nuclear power. The tours have continued to be subscribed by members of the public are considered by the DCISC as an important aspect of its public outreach activities.

Public tours were conducted at the February 7 and June 13, 2018, Public Meetings,
with the DCISC Members, and DCISC Consultants. No tour was conducted in conjunction with the October 2017 public meeting and the Committee assessed the effectiveness and utility of its public tours at that meeting. The tours in February and June 2018 were attended by 23 and 32 members of the public respectively. The tours did not enter controlled/protected areas of the plant. The DCISC appreciates PG&E’s cooperation in facilitating these tours with members of the public and considers them to continue to be a valuable part of the DCISC’s public outreach to the local community and the public at large. These tours are described in Volume II, Exhibit E. The DCISC is presently continuing reviewing the effectiveness and efficacy of the public tours in furtherance of its public outreach efforts. While PG&E focuses its public tour program on the plant environs and public interest remains, the DCISC will continue to host public tours.
On November 13, 2017, DCISC Member Peter Lam and Assistant Legal Counsel Robert Rathie met in Sacramento, California, with California Energy Commission (CEC) Chair Dr. Robert B. Weisenmiller, his Chief of Staff Mr. Kevin Barker, CEC Executive Director Mr. Drew Bohan, and Senior Nuclear Policy Advisor Dr. Justin Cochran to discuss matters and the DCISC’s recent activities and inquiries including: the current Open Items List and the section of the List focused on spent fuel transfer and on response to the CEC’s 2017 Integrated Energy Policy Report (IEPR); Diablo Canyon’s efforts to address the “White Finding” by the NRC concerning the Emergency Core Cooling System limit switches and a non-concurrence determination by NRC staff; issues related to decommissioning including the DCISC’s assessment of the impact of the Proposed Decision to retire Diablo Canyon on the Employee Retention Plan and on the local community, including the efforts made by the DCISC to inform representatives of the CPUC, the entities appointing members of the DCISC, and other governmental and elected officials concerning Committee activities; the DCISC’s continuing role in reviewing emergency planning; and the possibility of a continued role for the DCISC once the plant stops producing electricity to review issues related to decommissioning and the CEC’s consideration of that matter as part of its 2018 IEPR; the DCISC’s review of Diablo Canyon capital project planning and the plant’s early efforts to develop a site-specific decommissioning plan.

The DCISC’s preference is to schedule annual meetings between its Members and the appointing entities and with the Commissioners or representatives of the California Public Utilities Commission to provide background on and information regarding current activities of the Committee.
On June 21, 2016 PG&E announced a Joint Proposal with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Works Local 1245, Coalition of California Utility Employees and the Alliance for Nuclear Responsibility to retire DCPP at the expiration of the current operating licenses.

The Joint Proposal sought PG&E’s continued operation of DCPP at present generation levels through the current NRC license periods with retirement of Unit-1 in 2024 and retirement of Unit-2 in 2025. The Joint Proposal provided for replacement of DCPP-generated power by 2,000 gigawatt hours of energy efficient power by the end of 2024 and for recovery by PG&E of its investment in DCPP including for prior (and now terminated) activities in furtherance of relicensing the plant.

To replace DCPP power, the Joint Proposal provided specific greenhouse gas-free procurement requirements beginning in 2018 and continuing through 2031. The Joint Proposal also provided for PG&E to implement retention and severance programs to retain existing employees through a retention incentive payment program of a 25% bonus to an employee’s salary per year in accordance with two tranches, and to provide resources and assistance to transitioning workers. The Joint Proposal also proposed that PG&E would continue to provide funding to the San Luis Obispo local community 2025 to replace lost tax revenue.

On August 11, 2016, PG&E filed Application 16-08-006 (“Application”) with the California Public Utilities Commission (CPUC) for approval of the retirement of DCPP, implementation of the Joint Proposal, and for recovery of associated costs through proposed ratemaking.

In summary, in its Application PG&E sought authorization from the CPUC to:

- Retire Diablo Canyon by the end of its current operating licenses from the NRC, that is, by November 2, 2024 for Unit-1 and by August 26, 2025 for Unit-2.
- Recover the full book value of both units by the time they cease operations.
- Conduct procurement activities in three separate tranches related to the replacement of power generated by Diablo Canyon with greenhouse gas (GHG)-free energy resources beginning in 2018 and continuing through 2031 (tranches two and three were subsequently withdrawn from the Application and a request made that the matter of replacement power be addressed in the CPUC’s Integrated Resource Planning proceedings).

- Recover $352.1 million in costs for an Employee Retention Program, to implement an employee severance program, and $11.3 million to retrain eligible Diablo Canyon employees.

- Continue to provide support to state and local authorities for emergency preparedness activities during decommissioning.

- Provide $85 million for a Community Impacts Mitigation Program to help offset property tax loss for San Luis Obispo County local entities.

- Recover $52.7 million in costs associated with license renewal activities; and an unspecified amount for cancelled capital projects.

On November 8, 2017, CPUC Administrative Law Judge Allen issued a Proposed Decision Approving the Retirement of DCPP. The Proposed Decision included denying PG&E’s request to recover in its rates the community impact funding proposed for the San Luis Obispo area and recommended consideration of electricity procurement to replace DCPP power should be addressed in the CPUC’s Integrated Resources Planning Procurement proceeding. The Proposed Decision did not include full funding for the Employee Retention program instead reducing the ratepayer-supported employee retention incentive payments from 25% to 15% per year.

On January 11, 2018, the CPUC voted unanimously to adopt Decision 18-01-022 approving PG&E’s Application to retire DCPP by 2025, approving PG&E’s recovery in its rates the costs associated with the retirement of the power plant; incurred for license renewal expenses; to retain DCPP employees until scheduling closing, and to retrain workers. The Decision, which was issued on January 16, 2018, in approving $211.3 million and not the $352.1 million sought by PG&E, did not approve full funding by the ratepayers for the Employee Retention program as proposed in PG&E’s its Application, directing, consistent with the Proposed Decision, that the ratepayer-supported employee retention incentive payments be reduced from 25% to 15% per year. The CPUC denied in its entirety PG&E’s request to recover in its rates the community impact funding provided to the San Luis Obispo area and determined that consideration of electricity procurement to replace DCPP power should be addressed in the CPUC’s Integrated Resources Planning Procurement proceeding. As of June 30, 2018, the CPUC Decision 18-01-022 is in effect, but is not yet final due to the pendency of an Application for Rehearing.

PG&E will continue preparation of a site-specific decommissioning plan including a
schedule for post-shutdown treatment of spent fuel and will engage in preparing cost estimates for upcoming Nuclear Decommissioning Cost Triennial Proceedings before the CPUC.

On February 12, 2018, State Senator William Monning introduced SB 1090. SB 1090 would require the CPUC to approve the full funding requested by PG&E in its Application for the community impact mitigation settlement and for the Employee Retention Program and would require the CPUC to ensure that the Integrated Resources Planning Procurement proceedings avoid any increase in emissions of greenhouse gases as the result of the retirement of DCPP.

On May 1, 2018 PG&E announced its formation of the Diablo Canyon Decommissioning Engagement Panel consisting of 11 members of the local community to provide community input to PG&E on topics including, but not necessarily limited to, the site-specific decommissioning plan; potential future uses of the site, facilities and lands; the economic impacts resulting from the closure of the power plant; emergency planning; used fuel storage; and the Nuclear Decommissioning Trust Triennial Proceedings. The Panel held its first meeting on May 30, 2018 and a second meeting on June 27, 2018.

On May 22, 2018, the DCISC held a public meeting in Berkeley, California, to consider approving a letter commenting on Senate Bill 1090 with reference only to the employee retention program. In its letter to Senator Monning’s office the DCISC expressed its belief that that the employee retention program should not be cut as severely as required by Decision 18-01-022. A copy of the letter to Senator Monning’s office is included with the Minutes of the May 22, 2018, public meeting in Volume II, Exhibit B.9 and Volume II, Exhibit G.2 Committee Correspondence.

On May 29, 2018, SB 1090 was passed by the California Senate on a vote of 31 in favor and 4 against. Subsequent to the end of period covered by this Annual Report, on August 20, 2018 SB 1090 was passed by the California Assembly on a vote of 67 in favor and 1 against and on September 19, 2018, the legislation was signed by California Governor Edmund G. Brown Jr.

During its public meetings in this report period, the DCISC, in response to requests from members of the public, discussed the issue of a continued role for the DCISC to review decommissioning activities after the power plant ceases to generate electricity.

The DCISC will continue to monitor and provide information to the public and to the Governor, the California Energy Commission, the California Attorney General, and to the CPUC on developments which may have an impact on safety of operations at DCPP as a result of the retirement of DCPP.
The Restated Charter provides that the DCISC shall have the right to receive on a regular basis specified operating reports and records of Diablo Canyon, as well as such other reports pertinent to safety as may be produced in the course of operations and may be requested by the Committee. Thousands of PG&E and Nuclear Regulatory Commission documents (relating to both historical and current operations) have been provided to the DCISC. Document lists are shown in Volume II, Exhibit A.
DCISC Activities and meetings are documented for public information in several ways as described below. Documents are available at the Reference Department at the California Polytechnic University (Cal Poly) R.F. Kennedy Library in San Luis Obispo, CA.

The DCISC’s Annual Report, covering the period July 1 through June 30, is a comprehensive description of Committee activities throughout the period. The report is published in two volumes and in a compact disk format and is made available on the Committee website and is provided to local San Luis Obispo City and County public libraries and interested persons.

Minutes of each public meeting are contained in the Annual Report in Exhibits B.3, B.6, and B.9.

Reports of DCISC visits to the Diablo Canyon Nuclear Power Plant (DCPP) are contained in the Annual Report in Exhibits D.1 through D.9.

DCISC public meetings are webcast in real time and cablecast over the San Luis Obispo local government access television channel, Channel 21, and are available at all times through indexed, archived streaming video at the link provided on the Committee’s website to www.slo-span.org.

The DCISC issues press releases before and, on occasion, after its public meetings concerning topics it believes to be of particular interest.
Telephone calls, e-mails and other correspondence have been received by the DCISC Legal Counsel’s office with questions, concerns, information and requests for information. During this reporting period, 45 calls and 38 e-mails were received from individuals. The breakdown of these calls and e-mails is as follows:

<table>
<thead>
<tr>
<th>Number of Calls</th>
<th>Number of E-mails</th>
<th>Reason for Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23</td>
<td>DCPP issues or nuclear information requests</td>
</tr>
<tr>
<td>44</td>
<td>15</td>
<td>Other (administrative, document requests, tour requests and miscellaneous)</td>
</tr>
</tbody>
</table>

When requested, answers, responses or documents were provided either during the call, a return call, or by a letter, email or documents from the Committee. The DCISC Telephone/Correspondence Log which provides a memorandum of contacts initiated by members of the public, citizen or public interest groups, the media or similar organizations is included as Exhibit G.1 and correspondence with the public is included with Exhibit G.2.

The Committee maintains a California toll-free telephone number (800-439-4688), an E-mail address (dcsafety@dcisc.org) and a site on the worldwide web at www.dcisc.org for receiving questions, concerns or information to and from the public. The DCISC has developed an information pamphlet and an informational video describing the Committee and its function (see Volume II, Exhibit 1). The pamphlet is provided to attendees at DCISC public meetings and plant tours and the informational video is used in connection with the public tours and on the Committee’s website.
28th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2017—June 30, 2018
Preface | Executive Summary
Volume I TOC | Volume II TOC | PG&E Response | Contact the DCISC


The DCISC maintains a frequently updated web page on the worldwide web. Since the DCISC established its web page and presence on the internet in 1999 the Committee’s goal has been to provide a convenient and accessible forum for interested members of the public to learn about the Committee, its history, background and role in safety oversight at DCPP; its current members and consultants; Volumes I and II of the Committee’s latest Annual Report; previous annual reports; the current schedule of future DCISC public meetings and public tours, along with an interactive map to the PG&E Energy Education Center; and the legal notice and agenda for the Committee’s next public meeting, which is posted on the website prior to the meeting. Changing the file names from “html” to “php” has made it possible to quickly make changes to both the site navigation and standard features such as the wording for the public tours and the interactive maps.

The web page also provides visitors with an opportunity to download or print pages from the DCISC web site and offers a convenient email link to permit interested persons to communicate directly with the Committee and to receive an expedited response to questions and concerns. When the Annual Report is finalized, the entire report is published on the website and is also published and distributed to local public libraries and interested persons on compact disk. The website also includes a link to the Committee’s Recommendations made in its Annual Reports to PG&E from the 2000/2001 to the 2013/2014 annual report periods.

The DCISC’s site on the worldwide web has been further developed with the addition of links to the State Water Resources Control Board’s Special Studies Final Report of the Independent Third Party (Bechtel Power Corporation) Final Technologies Assessment for the Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling System for the Diablo Canyon Power Plant (Bechtel Final Assessment) including the Addendum (Bechtel Addendum), the DCISC’s September 5, 2013 Evaluation of the Bechtel Final Assessment and the DCISC’s October 17, 2014 Preliminary Evaluation of the Bechtel Addendum. The website continues to provide access to videos concerning the replacement of Diablo Canyon’s steam generators and spent fuel storage project in a convenient and accessible forum for interested members of the public.
The Committee continues to post the agendas for all its public meetings on the website, as well as general information about the Committee, its members and consultants. A list of useful links is included to topics of interest to the general public, to PG&E’s website for information concerning Diablo Canyon Power Plant, to the NRC and to the International Atomic Energy Agency for agency and industry-related information and to an indexed webcast of streaming video of its past public meetings through electronic archives and to the public meetings in real time when they are in session.

The website also provides access to a convenient glossary of nuclear power terms and a list of acronyms in common use in the industry. Both Volumes of this Annual Report are available on the website in fully-linked php-text format, as is an animated depiction of the operation of a pressurized water nuclear reactor such as those in operation at Diablo Canyon.

During the DCISC’s October 19–20, 2016 public meeting, the live-streaming video of the meetings was accessed by visitors 36 times. The live streaming video feed of the DCISC’s February 8–9, 2017 public meeting was similarly accessed 26 times. During the DCISC’s public meeting on June 7–8, 2017, visitors accessed the live stream video 26 times. These data represent the total number of times “live visitors” entered the site including those visitors who may have come and gone from the site more than once (i.e. “total page views”).

The most meaningful statistics provided for July 1, 2016 through June 30, 2017 were the actual “visits,” the actual, unique visitor numbers, regardless of how many pages that visitor actually viewed on the DCISC’s website during the period of this report included the following:

<table>
<thead>
<tr>
<th>Month</th>
<th>Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2016</td>
<td>866</td>
</tr>
<tr>
<td>August 2016</td>
<td>874</td>
</tr>
<tr>
<td>September 2016</td>
<td>919</td>
</tr>
<tr>
<td>October 2016</td>
<td>918</td>
</tr>
<tr>
<td>November 2016</td>
<td>1,104</td>
</tr>
<tr>
<td>December 2016</td>
<td>1,056</td>
</tr>
<tr>
<td>January 2017</td>
<td>1,239</td>
</tr>
<tr>
<td>February 2017</td>
<td>1,236</td>
</tr>
<tr>
<td>March 2017</td>
<td>1,589</td>
</tr>
<tr>
<td>April 2017</td>
<td>1,5439</td>
</tr>
<tr>
<td>May 2017</td>
<td>1,469</td>
</tr>
<tr>
<td>June 2017</td>
<td>2,399</td>
</tr>
</tbody>
</table>

Top ten countries from which visitors accessed the site were: Russian Federation, United States, Great Britain, Germany, Poland, European Union, Ukraine, Romania,
France and Japan.

Among the most common "key phrases" typed into internet search engines, such as LG, MS Internet Explorer, Konqueror, Firefox, Mozilla, and Google Chrome and others were: “content”, “foreign material exclusion procedure”, “California fire prevention institute 24th annual workshop-fire safety exhibit 2014”, “tour report notice”, “diablo canyon vessel internals”, “annual report preface”.

The top ten downloads were:

22nd-pdf.pdf
25th-pdf.pdf
21st-pdf.pdf
24th-pdf.pdf
23rd-pdf.pdf
2014-10-17-final-assessment.pdf
annual-report-21-2010-2011/21st-g01-telephone-log.pdf
2014-10-17-final-assessment.pdf
sewell-presentation.pdf
annual-report-22-2011-2012/22nd-a01-documents-received-pdf.pdf

The most visited pages were:

index.php
annual-report-22-2011-2012/22nd-b09-minutes-2012-06.php
contact.php
public-tour.php
notice.php
agenda.php
about/history.php
about/general-information.php
glossary.php
During this period (July 1, 2016—June 30, 2017), the Diablo Canyon Independent Safety Committee (DCISC) held three public meetings in the vicinity of Diablo Canyon Nuclear Power Plant (DCPP). The two-day public meetings included numerous informational, programmatic and plant status presentations by PG&E and by Committee Consultants and questions and comments from the public. The Committee always holds an evening session on the first of the two days of a public meeting in the San Luis Obispo area for the convenience of the public. The two-day public meetings are webcast in real time and cable cast afterwards on the local public access television station and by indexed webcast and all meetings are videotaped.

The DCISC encourages members of the public to attend and speak at its public meetings. Times are set aside throughout the meetings for public questions and comments. During the reporting period July 1, 2016—June 30, 2017, thirteen different individuals spoke a total of seventy-three times. Eleven individuals appeared and spoke at the October 19–20, 2016 meeting; eight individuals appeared and spoke at the February 8–9, 2017 meeting; and five individuals appeared and spoke at the June 7–8, 2017 meeting. Six persons addressed the Committee during more than one of its public meetings.

The comments and questions, together with the Committee’s and PG&E’s responses, are contained in the public meeting minutes included in Volume II, Exhibits B.3, B.6, and B.9.
The DCISC usually holds public tours in conjunction with its three public meetings each year in the San Luis Obispo local area. As part of the DCISC outreach program, each tour now provides an opportunity for interested persons to see the plant as interact with DCISC Members and Consultants. The tours conducted in February and June 2017 are described below. No tour was conducted in conjunction with the October 2016 public meeting.

### 8.4.1 February 8, 2017 Public Tour

On the morning of Wednesday, February 8, 2017, the DCISC Members and Technical Consultants accompanied by 8 members of the public participated in a tour of Diablo Canyon Power Plant (DCPP). The group received security badges at the PG&E Energy Education Center and assembled in the auditorium for a brief introduction of the DCISC and its Members and Technical Consultants and a discussion of the role and responsibility of the Committee. Afterward DCPP Lead Manager, External Affairs & Public Policy, Ms. Suzanne Parker gave an informational presentation about the plant and PG&E's current energy generation portfolio and plans for the future. An opportunity was provided for questions. The group then boarded a bus for the plant. During the drive information was presented on the history of the plant. The bus entered the plant site through the Avila Gate and the group received a briefing from PG&E on the various external features and buildings and was taken on a narrated drive-by of the Independent Spent Fuel Storage Installation (ISFSI), also known as the dry cask spent fuel storage facility.

The bus then arrived at the parking area. The members of the public and the DCISC Members and Technical Consultants visited in turn the Control Room Simulator Facility, a full scale mockup of the Unit-1 (U-1) control room and a viewing area for the Intake and Outfall Facilities where the plant pulls in and discharges cooling water from and to the Pacific Ocean. The group then departed DCPP for return to the Energy Education Center and had the opportunity to discuss the plant with individual DCISC members and consultants.

### 8.4.2 June 7, 2017 Public Tour

On the morning of Thursday, June 7, 2017, DCISC Members Drs. Budnitz and Lam, Budnitz together with Technical Consultants Mr. McWhorter and Mr. Wardell,
accompanied by 36 members of the public participated in a tour of Diablo Canyon Power Plant (DCPP). The group received security badges at the PG&E Energy Education Center and assembled in the auditorium for a brief introduction of the DCISC and its Members, Technical Consultants and Assistant Legal Counsel and a brief discussion of the role, responsibilities and operation of the Committee. Afterward DCPP Lead Manager, External Affairs & Public Policy, Ms. Suzanne Parker gave an informational presentation about PG&E’s current energy generation portfolio and PG&E’s challenges and plans for the future with reference to the mix and future of solar, wind and nuclear generation. The group received information on the operation of the plant and an opportunity was provided for questions. The group then boarded a bus for the plant. During the drive information was presented on the history of the plant. The bus entered the plant site through the Avila Gate and the group received a briefing from PG&E on the various external features and buildings and was taken on a narrated drive-by of the Independent Spent Fuel Storage Installation (ISFSI), also known as the dry cask spent fuel storage facility.

The bus then arrived at the parking area. The members of the public and the DCISC Members and Technical Consultants visited in turn the Control Room Simulator Facility, a full scale mockup of the Unit-1 (U-1) control room and a viewing area for the Intake and Outfall Facilities where the plant pulls in and discharges cooling water from and to the Pacific Ocean. The group then departed DCPP for return to the Energy Education Center and had the opportunity to discuss the plant with individual DCISC members and consultants.
The DCISC has been relatively successful to date in implementing its Public Outreach Program as demonstrated by the descriptions above. The public tours of DCPP have varied in popularity during this report period. The website and e-mail channels of communication are used frequently as indicated above. The public meetings during this period were attended by between five to eleven people attending and also addressing remarks or questions to the Committee. Representatives of Congressman Salud Carbajal’s office, State Senator William Monning’s office and of the California Energy Commission, the CPUC, and several representatives of Californians for Green Nuclear Power, a group promoting the use of nuclear power in California, as well as representatives of the San Luis Obispo Mothers for Peace and the Alliance for Nuclear Responsibility, non-profit organizations concerned with the local and nationwide dangers involving DCPP and with the dangers of nuclear power, weapons and radioactive waste on national and global levels also attended various meetings and sessions of the DCISC public meetings during this report period. During this report period the Committee has publicly reviewed its effectiveness including the conduct of fact findings and public meetings; the development and utility of the Annual Report; Committee outreach to government agencies and the officials appointing its members; the engagement of consultants for specific projects; and the Committee’s continuing interaction with PG&E. The Committee intends to continue this review during the next annual report period.
DOCUMENTS RECEIVED BY THE DCISC
### A. Licensing Basis Impact Evaluations

<table>
<thead>
<tr>
<th>Date</th>
<th>LBIE No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no LBIEs this month.</td>
</tr>
</tbody>
</table>

### B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Letter No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/19/17</td>
<td>DCL-17-066</td>
<td>Diablo Canyon Power Plant (DCPP) 2017 10 CFR 50.54(t) Assessment (County)</td>
</tr>
<tr>
<td>7/19/17</td>
<td>DCL-17-067</td>
<td>Diablo Canyon Power Plant (DCPP) 2017 10 CFR 50.54(t) Assessment (State)</td>
</tr>
<tr>
<td>7/19/17</td>
<td>DCL-17-064</td>
<td>Diablo Canyon Power Plant Focused Evaluation Report for External Flooding</td>
</tr>
</tbody>
</table>

### C. NRC Incoming Correspondence (including Inspection Reports)

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/6/17</td>
<td>Nuclear Regulatory Commission Plan for the Audit of Licensees' Responses Concerning Seismic Hazard Reevaluations Related to Request for Information Pursuant to Title 10 of the Code of Federal Regulations Section 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident</td>
</tr>
<tr>
<td>7/17/17</td>
<td>Summary of Annual Assessment Meeting Regarding Diablo Canyon Power Plant 2016 Performance</td>
</tr>
<tr>
<td>7/18/17</td>
<td>Nuclear Regulatory Commission Plan for the Audit of Licensees' Responses Concerning Flooding Hazard Reevaluations Related to Request for Information Pursuant to Title 10 of the Code of Federal Regulations Section 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident</td>
</tr>
</tbody>
</table>

### D. PSRC Documents (PSRC Minutes)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSRC Minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/5/17</td>
<td>2017-007</td>
<td>• E-Plan Appendix D, Category H, Rev. 4.03. &quot;Hazards&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• E-Plan, Appendix F, Rev. 4.05, “ERO On-Shift Staffing”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• NRC Submittal DCL-17-024, “Submittal of the Diablo Canyon Power Plant Mitigating Strategies Assessment for Flooding Report”</td>
</tr>
<tr>
<td>6/12/17</td>
<td>2017-012</td>
<td>M-1177, Nuclear Safety Capability Assessment Various Topics Selected by the Station Director</td>
</tr>
<tr>
<td>6/14/17</td>
<td>2017-013</td>
<td>OP L-0, Attachment 9, Mode Change Authorization Form with Active Technical Specification</td>
</tr>
<tr>
<td>7/18/17</td>
<td>2017-015</td>
<td>DCL-17-064, Diablo Canyon Power Plant Focused Evaluation Report for External Flooding</td>
</tr>
</tbody>
</table>
### E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

<table>
<thead>
<tr>
<th>Type</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCAs</td>
<td></td>
<td>There are no RCAs for this month.</td>
</tr>
<tr>
<td>ACE</td>
<td>SAPN 50923422</td>
<td>DCPP 12kV Ground Buggy Near Hit Potential SIF</td>
</tr>
<tr>
<td>Eff. Eval</td>
<td></td>
<td>There are no Effectiveness Evaluations for this month.</td>
</tr>
</tbody>
</table>

- 7/7/17  Condition Report Backlog Curve
- 7/14/17 Condition Report Backlog Curve
- 7/21/17 Condition Report Backlog Curve
- 7/28/17 Condition Report Backlog Curve

### F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There is no QPAR for this month.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There are no Audit Reports for this month.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is no new Schedule for this month.</td>
</tr>
</tbody>
</table>

- 5/7/17  Assessment #171290094  Breaker 52-1F-41 Replacement
- 6/17/17 Assessment #171510050  Proficiency or Qualification Induced Events in Maintenance at Diablo Canyon
- 7/10/17 Assessment #171920023  Turbine Team Work Package Review
- 7/11/17 Assessment #171780030  1R20 Core Reload
- 7/11/17 Assessment #171780031  1R20 New Fuel Receipt Inspection
- 7/11/17 Assessment #171780029  Outage Safety Scheduling
- 7/17/17 Assessment #171780021  1R20 Transient Combustible Permits
- 7/18/17 Assessment #171780027  1R20 ALARA Assessment
- 7/19/17 Assessment #171780026  1R20 Integrated Outage Assessment
- 7/19/17 Assessment #171780032  1R20 Reactor Startup Assessment
- 8/1/17  Assessment 171920025  STP R-1A Assessment
NSOC & DCISC
List of Documents Transmitted Electronically

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/2/17</td>
<td>Assessment #171920026</td>
<td>TCARB Effectiveness Assessment</td>
</tr>
<tr>
<td>8/3/17</td>
<td>Assessment #172150069</td>
<td>SISIP Walkdown</td>
</tr>
<tr>
<td>8/7/17</td>
<td>Assessment #171920024</td>
<td>1R20 Radiological Shielding</td>
</tr>
<tr>
<td>8/8/17</td>
<td>Assessment #172200029</td>
<td>Maintenance Fundamentals</td>
</tr>
<tr>
<td>8/21/17</td>
<td>Assessment #172260092</td>
<td>7/28/17 Alert Classification</td>
</tr>
</tbody>
</table>

G. Nuclear Safety Culture Monitoring Panel Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There is no Nuclear Safety Culture Monitoring Panel Report for this month.</td>
</tr>
</tbody>
</table>

H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/3/17</td>
<td>SAQH 50829869</td>
<td>QHSA: NRC Force on Force Exercise</td>
</tr>
<tr>
<td>7/5/17</td>
<td>SAQH 50924172</td>
<td>Perform QHSA – completed by MOV orders</td>
</tr>
<tr>
<td>7/11/17</td>
<td>SAQH 50576400</td>
<td>APV Program Quick Hit Self-Assessment</td>
</tr>
<tr>
<td>7/12/17</td>
<td>SAQH 50637594</td>
<td>SNM 71130.11 QHSA for RPI 2014</td>
</tr>
<tr>
<td>7/24/17</td>
<td>SAQH 50542171</td>
<td>FAC Program QH Self Assessment</td>
</tr>
<tr>
<td>6/28/17</td>
<td>SAF 50808104</td>
<td>2016 Ops Comp SA Effectiveness Review</td>
</tr>
<tr>
<td>7/5/17</td>
<td>BNHI 50861864</td>
<td>NT RW Benchmarking ASME/EPRI</td>
</tr>
<tr>
<td>7/6/17</td>
<td>BNHI 50809794</td>
<td>Work Control Benchmarking</td>
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<tr>
<td>7/10/17</td>
<td>BNHI 50838987</td>
<td>Benchmark for Maint AFI leads</td>
</tr>
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</table>
## NSOC & DCISC
### List of Documents Transmitted Electronically

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/10/17</td>
<td>BNHI 50930081</td>
<td>Sec – Trip Report NEI Trng Task Force</td>
</tr>
<tr>
<td>7/27/17</td>
<td>BNHF 50826018</td>
<td>Benchmark of Station Rework</td>
</tr>
<tr>
<td>7/28/17</td>
<td>BNHI 50929930</td>
<td>Informal Benchmarking Palo Verde</td>
</tr>
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</table>

### I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PPIR</td>
<td>If none, state none . . .</td>
</tr>
<tr>
<td>7/19/17</td>
<td></td>
<td>Diablo Canyon Power Plant; Plant Performance Improvement Report Achieving Results; Data: June 2017</td>
</tr>
<tr>
<td></td>
<td>Station Initiative</td>
<td>Performance Improvement and Regulatory Projects Excellence Plan 2017</td>
</tr>
<tr>
<td>7/24/17</td>
<td></td>
<td>Operations Excellence Plan</td>
</tr>
</tbody>
</table>

### J. INPO

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no INPO documents for this month.</td>
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</tbody>
</table>

### K. Operational Documents (ODM Minutes, POAs)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ODMs</td>
<td>There are no ODMs for this month.</td>
</tr>
<tr>
<td></td>
<td>POA</td>
<td>There are no new POAs for this month.</td>
</tr>
</tbody>
</table>

### L. Safety Limit Violation Report

<table>
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<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no Safety Limit Violation Reports for this month.</td>
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### M. Significance Determination Process Calculations

<table>
<thead>
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<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no Significance Determination Process Calculations for this month.</td>
</tr>
</tbody>
</table>
N. Miscellaneous

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
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<tbody>
<tr>
<td></td>
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O. Functional Area Documents

<table>
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<tr>
<th>Subcommittee</th>
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<td>Maintenance</td>
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<td>Week 201727</td>
<td>T+1 Critique</td>
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<td>Week 201729</td>
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P. Documents Previously Transmitted during the Month

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### DCISC
List of Documents Transmitted Electronically

#### A. Licensing Basis Impact Evaluations

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<tbody>
<tr>
<td>8/8/17</td>
<td>2017-011</td>
<td>E-Plan Section 2, Scope and Applicability</td>
</tr>
<tr>
<td>8/8/17</td>
<td>2017-012</td>
<td>E-Plan Section 4, Emergency Conditions</td>
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<tr>
<td>8/8/17</td>
<td>2017-013</td>
<td>E-Plan Section 8, Maintaining Emergency Prep</td>
</tr>
<tr>
<td>8/8/17</td>
<td>2017-014</td>
<td>E-Plan Section 10, Reference</td>
</tr>
<tr>
<td>8/8/17</td>
<td>2017-015</td>
<td>E-Plan App D Intro, Introduction</td>
</tr>
<tr>
<td>8/8/17</td>
<td>2017-016</td>
<td>E-Plan App D FPB Bases, Fission Product Barrier</td>
</tr>
<tr>
<td>8/8/17</td>
<td>2017-017</td>
<td>E-Plan App D Cat S, System Malfunction</td>
</tr>
<tr>
<td>8/8/17</td>
<td>2017-018</td>
<td>E-Plan App D Cat C, Cold Shutdown/Refueling</td>
</tr>
<tr>
<td>8/18/17</td>
<td>2017-020</td>
<td>FPEE 170, NFPA 805 Internal Conduit Seal Design Criteria Equivalency</td>
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#### B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Letter No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/15/17</td>
<td>DCL-17-072</td>
<td>Core Operating Limits Report for Unit 1 Cycle 21</td>
</tr>
<tr>
<td>8/17/17</td>
<td>DCL-17-070</td>
<td>Flaw Evaluation of Unit 1 Residual Heat Removal Suction Weld Joint</td>
</tr>
<tr>
<td>8/17/17</td>
<td>DCL-17-073</td>
<td>Supplement to License Amendment Request 16-04, Request to Adopt Emergency Action Level Schemes Pursuant to NEI 99-01, Revision 6, “Development of Emergency Action Levels for Non-Passive Reactors”</td>
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#### C. NRC Incoming Correspondence (including Inspection Reports)

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
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<tbody>
<tr>
<td>8/10/17</td>
<td>Diablo Canyon Power Plant – NRC Integrated Inspection Report 05000275/2017002 and 05000323/2017002</td>
</tr>
<tr>
<td>8/15/17</td>
<td>Diablo Canyon Power Plant, Units 1 and 2 – Notification of NRC Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans (05000275/2017007 and 05000323/2017007) and Request for Information</td>
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#### D. PSRC Documents (PSRC Minutes)

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<thead>
<tr>
<th>Date</th>
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<tbody>
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#### E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

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<tr>
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# DCISC

## List of Documents Transmitted Electronically

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<td>7/13/17</td>
<td>SAPN 50912407</td>
<td>DA-2017 BRI: Green SL-IV NCV-Lic Operat</td>
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<tr>
<td>8/9/17</td>
<td>SAPN 50923422</td>
<td>DA-Near Hit: Gmd Buggy in 52VU11 Cubicl</td>
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<tr>
<td>8/10/17</td>
<td>SAPN 50920539</td>
<td>DA-EI – SPDS Calculation Error</td>
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<tr>
<td>9/6/17</td>
<td>SAPN 50825789</td>
<td>DA-Adverse Trend in RMS Submittals</td>
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**Eff. Eval**

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<td>9/6/17</td>
<td>SAPN 50680750</td>
<td>LTCA-DA-RV-8708 inlet pipe socket (RCA)</td>
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<td>8/4/17</td>
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<td>Condition Report Backlog Curve</td>
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<td>8/11/17</td>
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<td>Condition Report Backlog Curve</td>
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<td>8/25/17</td>
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<td>Condition Report Backlog Curve</td>
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### F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

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<th>Title</th>
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<tbody>
<tr>
<td>8/8/17</td>
<td>FileNet #171280032</td>
<td>2017 Security Audit</td>
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<td>8/21/17</td>
<td>FileNet #171240002</td>
<td>2017 Special Processes, Inservice Inspection, and Inservice Testing Audit</td>
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<td>8/21/17</td>
<td>Assessment #172260093</td>
<td>1R20 Readiness for Restart Assessment</td>
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### G. Nuclear Safety Culture Monitoring Panel Reports

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<tr>
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<td></td>
<td>There is Nuclear Safety Culture Monitoring Panel Report, and available for viewing in person at next finding.</td>
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### H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

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<tr>
<td></td>
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<td>There is no updated Quick Hit Self-Assessment (QHSA) Schedule for this month.</td>
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There is no Formal Benchmarking and Self-Assessments Schedule for this month.

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<th>Doc. No.</th>
<th>Title</th>
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<td>8/2/17</td>
<td>SAQH 50603110</td>
<td>Quick Hit SA – Reportability (WCNOC)</td>
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<tr>
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<td>SAQH 50831941</td>
<td>2016 NEI EP Working Group Info / Actions</td>
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<tr>
<td>8/8/17</td>
<td>SAQH 50924777</td>
<td>Pre-Inspection 2017 Access Control QHSA</td>
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<td>8/8/17</td>
<td>SAQH 50934047</td>
<td>SAQH Pre Inspection SGI</td>
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<tr>
<td>8/8/17</td>
<td>SAQH 50934500</td>
<td>QHSA Confined Space</td>
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<tr>
<td>8/15/17</td>
<td>SAQH 50876746</td>
<td>Pre Inspection QHSA – PI Verification</td>
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<tr>
<td>8/28/17</td>
<td>SAQH 50927226</td>
<td>QHSA for NRC RP Inspection 71124.02</td>
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<tr>
<td>8/2/17</td>
<td>SAF 50688241</td>
<td>Document ISI Program Self Assessment</td>
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<td>8/2/17</td>
<td>SAF 50890708</td>
<td>50.59 Program Self-Assessment for 2017</td>
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<tr>
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<td>BNHI 50863070</td>
<td>National Nuc Security Conference</td>
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<td>BNHI 50872980</td>
<td>MOV Program Benchmark for RCE</td>
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<tr>
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<td>BNHI 50880282</td>
<td>Perry benchmark 50.54(p)</td>
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<td>8/2/17</td>
<td>BNHI 50930203</td>
<td>2017 NNSC Issues Evaluation</td>
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<td>BNHI 50834217</td>
<td>Informal Benchmark – Outage Management</td>
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<td>BNHI 50703545</td>
<td>PPC: Informal Benchmarking</td>
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<td>BNHI 50914080</td>
<td>3-14 EP Wolf Creek Informal Benchmark</td>
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<tr>
<td>8/17/17</td>
<td>BNHI 50932500</td>
<td>Vermont Yankee Decom Bnchmrk July 2017</td>
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I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)

<table>
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<tr>
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<th>Doc. No.</th>
<th>Title</th>
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## DCISC
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<td>8/16/17</td>
<td>Diablo Canyon Power Plant; Plant Performance Improvement Report Achieving Results; Date: July 2017</td>
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<td></td>
<td>8/31/17</td>
<td>Maintenance Excellence Plan 2017</td>
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<td>Radiation Protection Excellence Plan 2017</td>
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<td>Nuclear Work Management Excellence Plan 2017</td>
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<td>Engineering Excellence Plan 2017</td>
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<td>Chemistry Excellence Plan 2017</td>
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<td>Strategic Projects Excellence Plan 2017</td>
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<td>Organizational Effectiveness Excellence Plan 2017</td>
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<td>Learning Services Excellence Plan 2017</td>
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<td>9/10/17</td>
<td>Access Authorization and Fitness for Duty Excellence Plan 2017</td>
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<td>Emergency Preparedness Excellence Plan 2017</td>
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<td>Fire Protection Excellence Plan 2017</td>
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<td>9/10/17</td>
<td>Security Services Department Excellence Plan 2017</td>
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<td>9/10/17</td>
<td>Emergency Services Performance and Support Excellence Plan 2017</td>
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**IPM**

There are no IPMs for this month.

## J. INPO

<table>
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## K. Operational Documents (ODM Minutes, POAs)

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<tbody>
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<tr>
<td>POA</td>
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## L. Safety Limit Violation Report

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<tbody>
<tr>
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## M. Significance Determination Process Calculations

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## N. Miscellaneous

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<tr>
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## O. Functional Area Documents

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<th>Date/Doc</th>
<th>Title</th>
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<tbody>
<tr>
<td>Maintenance</td>
<td>Week 201730</td>
<td>T+1 Critique</td>
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<tr>
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<td>Week 201731</td>
<td>T+1 Critique</td>
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<td>Week 201732</td>
<td>T+1 Critique</td>
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## P. Documents Previously Transmitted during the Month

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<tbody>
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DCISC  
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

<table>
<thead>
<tr>
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<th>Title</th>
</tr>
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<tbody>
<tr>
<td>9/7/17</td>
<td>2017-022</td>
<td>Barrier Separating Ventilation Rooms at El. 154’6” and Stairwell S-5</td>
</tr>
<tr>
<td>9/7/17</td>
<td>2017-024</td>
<td>Vital Access Mission Doses</td>
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<tr>
<td>9/12/17</td>
<td>2017-021</td>
<td>FPEE 166</td>
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<tr>
<td>9/19/17</td>
<td>2017-027</td>
<td>Open Phase Protection – Unit 2</td>
</tr>
<tr>
<td>9/19/17</td>
<td>2017-029</td>
<td>Fire Door Separating Unit 1 Ventilation Room and Elevator Equipment Room at El. 154’-6”</td>
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<tr>
<td>9/25/17</td>
<td>2017-028</td>
<td>FPEE 187</td>
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<tr>
<td>9/27/17</td>
<td>2017-030</td>
<td>DCP 1000025198 – Revised AST Filter Doses</td>
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B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Letter No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/6/17</td>
<td>DCL-17-078</td>
<td>Request for Extension of Seismic Probabilistic Risk Assessment Submittal</td>
</tr>
<tr>
<td>9/7/17</td>
<td>DCL-17-079 DIL-17-008</td>
<td>Emergency Plan Implementing Procedure Update</td>
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<tr>
<td>9/20/17</td>
<td>DCL-17-081</td>
<td>Owner’s Activity Report for Unit 1 Twentieth Refueling Outage</td>
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<tr>
<td>9/20/17</td>
<td>DCL-17-080 DIL-17-009</td>
<td>Emergency Plan Update for Appendix D Bases, Introduction, Category C, and Category S and Sections 10, 8, 4, and 2</td>
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<tr>
<td>9/26/17</td>
<td>DCL-17-083</td>
<td>Request for Approval of Alternative for Application of Full Structural Weld Overlay, REP-RHR-SWOL, Units 1 and 2</td>
</tr>
<tr>
<td>9/28/17</td>
<td>DCL-17-076</td>
<td>License Amendment Request 17-01 Revision to Technical Specifications to Adopt Technical Specifications Task Force TSTF-547, Revision 1, &quot;Clarification of Rod Position Requirements&quot;</td>
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C. NRC Incoming Correspondence (including Inspection Reports)

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>9/25/17</td>
<td>Diablo Canyon Power Plant, Units 1 and 2 – Issuance of Amendments Re: Emergency Action Level Scheme Change (CAC Nos. MF8528 and MF8529)</td>
</tr>
<tr>
<td>9/27/17</td>
<td>Diablo Canyon Power Plant – NRC Supplemental Inspection Report and Assessment Follow-Up Letter; 05000275/2017008 and 05000323/2017008</td>
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D. NSOC/PSRC Documents (NSOC Minutes, NSOC Responses, PSRC Minutes)

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<thead>
<tr>
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<th>Title</th>
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DCISC
List of Documents Transmitted Electronically

<table>
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<tbody>
<tr>
<td>9/7/17</td>
<td>2017-016</td>
<td>Emergency Plan, Sections 2, 4, 8, 10, and Appendix D</td>
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<td>2017-018</td>
<td>FPEE 168</td>
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<td>2017-017</td>
<td>FPEE 170</td>
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<td>FPEE 166</td>
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<td>9/12/17</td>
<td>2017-019</td>
<td>DCP 1000025149, &quot;Open Phase Protection - Unit 2&quot;</td>
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<td>FPEE 167</td>
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E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

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<tr>
<td>ACE</td>
<td>SAPN 50934650</td>
<td>DA-2-RV-355 leaking by</td>
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<tr>
<td>Eff. Eval</td>
<td>SAPN 50818638</td>
<td>DA-1R19 Fuel Handling Critical Path Dela</td>
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F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There is no QPAR for this month.</td>
</tr>
<tr>
<td>9/20/17</td>
<td>FileNet #162860010</td>
<td>2017 Problem Prevention and Corrective Action Audit</td>
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<tr>
<td></td>
<td></td>
<td>There is no new Schedule for this month.</td>
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<tr>
<td>8/30/17</td>
<td>Assessment # 172400008</td>
<td>Work Control T-Week Process</td>
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G. Nuclear Safety Culture Monitoring Panel Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
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</table>
### H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>There is no updated Quick Hit Self-Assessment (QHSA) Schedule for this month.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is no Formal Benchmarking and Self-Assessments Schedule&quot;</td>
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<tr>
<td>9/5/17</td>
<td>SAPN 50907664</td>
<td>Maintenance Quick HIT Self-Assessment</td>
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<tr>
<td>9/5/17</td>
<td>SAPN 50910374</td>
<td>NFPA 805 QHSA#3 Readiness Review</td>
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<tr>
<td>9/19/17</td>
<td>SAPN 50926855</td>
<td>QHSA – DRT Review of New Plant Issues</td>
</tr>
<tr>
<td>9/5/17</td>
<td>SAPN 50840867</td>
<td>Benchmarking CAP Record Storage</td>
</tr>
<tr>
<td>9/5/17</td>
<td>SAPN 50939193</td>
<td>Required Self-Assessment Guidance BM</td>
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<tr>
<td>9/7/17</td>
<td>SAPN 50936698</td>
<td>Confined Space Informal Benchmark</td>
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### I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>PPIR</td>
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<tr>
<td>9/14/17</td>
<td></td>
<td>Diablo Canyon Power Plant; Plant Performance Improvement Report Achieving Results; Data: August 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Station Initiative</td>
</tr>
<tr>
<td>9/6/17</td>
<td></td>
<td>Learning Services Excellence Plan 2017; Our Path Forward</td>
</tr>
<tr>
<td>9/19/17</td>
<td></td>
<td>Security Services Department Excellence Plan 2017; Our Path Forward</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IPM</td>
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### J. INPO

<table>
<thead>
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<tr>
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<td>There are no INPO documents for this month.</td>
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</table>
### K. Operational Documents (ODM Minutes, POAs)

<table>
<thead>
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<th>Title</th>
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</thead>
<tbody>
<tr>
<td>ODMs</td>
<td>SAPN 50941848</td>
<td>Unit 1 Main Bank Transformer Phase C Neutral Bus Connection</td>
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<td>POA</td>
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<td>There are no new POAs this month.</td>
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### L. Safety Limit Violation Report

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
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### M. Significance Determination Process Calculations

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<th>Title</th>
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</thead>
<tbody>
<tr>
<td>10/4/17</td>
<td>PRA Calculation SDP 17-02</td>
<td>Leakage of Unit 2 PCV-455C Backup Nitrogen Accumulator</td>
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### N. Miscellaneous

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### O. Functional Area Documents

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<tr>
<td>Maintenance</td>
<td>Week 201734</td>
<td>T+1 Critique</td>
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<td>Week 201735</td>
<td>T+1 Critique</td>
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<td></td>
<td>Week 201736</td>
<td>T+1 Critique</td>
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<td>Week 201737</td>
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<tr>
<td></td>
<td>Week 201738</td>
<td>T+1 Critique</td>
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### P. Documents Previously Transmitted during the Month

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<thead>
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<th>Doc. No.</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>There are no documents previously transmitted during the month.</td>
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</tbody>
</table>
### A. Licensing Basis Impact Evaluations

<table>
<thead>
<tr>
<th>Date</th>
<th>LBIE No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>10/3/17</td>
<td>2017-019</td>
<td>USFAR 3.2 for Class Breaks</td>
</tr>
<tr>
<td>10/3/17</td>
<td>2017-023</td>
<td>GDT Tank Rupture</td>
</tr>
<tr>
<td>10/3/17</td>
<td>2017-025</td>
<td>VCT Tank Rupture</td>
</tr>
<tr>
<td>10/3/17</td>
<td>2017-026</td>
<td>LHUT Tank Rupture</td>
</tr>
<tr>
<td>10/18/17</td>
<td>2017-031</td>
<td>FPEE 171</td>
</tr>
<tr>
<td>10/24/17</td>
<td>2017-032</td>
<td>Analyses for assessing the radiation environments used for shielding and equipment qualification as contained in WECTEC 14078110-00004, 5, and 6</td>
</tr>
<tr>
<td>10/24/17</td>
<td>2017-033</td>
<td>Installed Systems and Features in Fire Areas 4-A and 4-B</td>
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</table>

### B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Letter No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/3/17</td>
<td>DCL-17-085</td>
<td>Licensee Event Report 2-2017-001-00, Relief Valve Leakage Resulting in Inoperable Pressurizer Power Operated Relief Valve</td>
</tr>
<tr>
<td>10/19/17</td>
<td>DCL-17-089</td>
<td>Emergency Plan Implementing Procedure Update</td>
</tr>
</tbody>
</table>

### C. NRC Incoming Correspondence (including Inspection Reports)

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/6/17</td>
<td>Diablo Canyon Power Plant, Unit 2 – Relief Requests NDE-SLH U2, NDE-LSL U2, NDE-LHM U2, and NDE-ONV U2, to Allow Use of The Proposed Alternatives due to Impracticalities to Implement Requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI for Reactor Pressure Vessel Welds for the Third Inservice Inspection Interval (CAC Nos. MF9386, MF9387, MF9388, MF9389, and MF9390)</td>
</tr>
<tr>
<td>10/10/17</td>
<td>Notice of Forthcoming Closed Meeting with Pacific Gas and Electric Company to Discuss Security-Related Information for Diablo Canyon Power Plant, Units 1 and 2 (CAC Nos. MF0255 and MF0256; EPID L-2017-LRM-0019)</td>
</tr>
<tr>
<td>10/19/17</td>
<td>Acceptance Review – License Amendment Request to Adopt Technical Specification Task Force (TSTF)-547, Revision 1 (EPID No.:” L-2017-LLA-0309)</td>
</tr>
<tr>
<td>10/26/17</td>
<td>Diablo Canyon Power Plant – NRC Integrated Inspection Report 05000275/2017003 and 05000323/2017003</td>
</tr>
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</table>
## List of Documents Transmitted Electronically

### D. PSRC Documents (PSRC Minutes)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/19/17</td>
<td>2017-022</td>
<td>DCL-17-083: Request for Approval for Application of Full Structural Weld Overlay, REP_RHR-SWOL, Units 1 and 2</td>
</tr>
<tr>
<td>10/19/17</td>
<td>2017-023</td>
<td>FPEE 171: Barriers Separating the Unit 1 and Unit 2 Turbine Buildings and the Auxiliary Building Roof</td>
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### E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

<table>
<thead>
<tr>
<th>Type</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCAs</td>
<td>SAPN 50934855</td>
<td>Response to Nitrogen Leak with Regard to Safety Related Equipment</td>
</tr>
<tr>
<td>ACE</td>
<td>SAPN 50934899</td>
<td>7/28/17 Alert – OSC Staffing Time</td>
</tr>
<tr>
<td></td>
<td>SAPN 50935071</td>
<td>DA-M&amp;T Comp: SAF: Engineering Training</td>
</tr>
<tr>
<td>Eff. Eval</td>
<td></td>
<td>There are no Effectiveness Evals for this month.</td>
</tr>
<tr>
<td>10/6/17</td>
<td></td>
<td>Condition Report Backlog Curve</td>
</tr>
<tr>
<td>10/13/17</td>
<td></td>
<td>Condition Report Backlog Curve</td>
</tr>
<tr>
<td>10/20/17</td>
<td></td>
<td>Condition Report Backlog Curve</td>
</tr>
<tr>
<td>10/27/17</td>
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<td>Condition Report Backlog Curve</td>
</tr>
</tbody>
</table>

### F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There is no QPAR for this month.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There are no Audit Reports for this month.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is no new Schedule for this month.</td>
</tr>
<tr>
<td>10/12/17</td>
<td></td>
<td>Operations Requalification Training R17-2 Assessment</td>
</tr>
<tr>
<td>10/26/17</td>
<td></td>
<td>Leadership Engagement with the Corrective Action Review Board (CARB) Process</td>
</tr>
</tbody>
</table>
### G. Nuclear Safety Culture Monitoring Panel Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There is no Nuclear Safety Culture Monitoring Panel Report for this month.</td>
</tr>
</tbody>
</table>

### H. Self Assessment/Benchmarking *(SA/BM Reports/Schedules)*

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>9/28/17</td>
<td>SAPN 50926856</td>
<td>QHSA – CARB Review of New Plant Issues</td>
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<tr>
<td>10/4/17</td>
<td>SAPN 50926853</td>
<td>QHSA – WCSFM Review of New Plant Issues</td>
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<tr>
<td>10/4/17</td>
<td>SAPN 50935784</td>
<td>QHSA – Casual Eval. W/Trng Solutions</td>
</tr>
<tr>
<td>10/10/17</td>
<td>SAPN 50875532</td>
<td>Track QHSA for OM7.ID1 DA Closures</td>
</tr>
<tr>
<td>10/11/17</td>
<td>SAPN 50926854</td>
<td>QHSA – NRT Review of New Plant Issues</td>
</tr>
<tr>
<td>10/16/17</td>
<td>SAPN 50934873</td>
<td>2Q17 CM QHSA</td>
</tr>
<tr>
<td>10/17/17</td>
<td>SAPN 50882767</td>
<td>HYDRO Generation QHSA</td>
</tr>
<tr>
<td>10/23/17</td>
<td>SAPN 50924088</td>
<td>Perform Self-assessment on RCE effect mea</td>
</tr>
<tr>
<td>10/24/17</td>
<td>SAPN 50876744</td>
<td>Pre Inspection QHSA – Access Control</td>
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<tr>
<td>10/26/17</td>
<td>SAPN 50936975</td>
<td>Quick Hit SA Part 37</td>
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<tr>
<td>10/26/17</td>
<td>SAPN 50947340</td>
<td>INPO ENVP Trip Report</td>
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### I. Performance Information *(PPIR, Operating Plan, Station Initiatives, IPMs)*

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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PPIR

<table>
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<tr>
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<th>Title</th>
</tr>
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<tr>
<td>10/18/17</td>
<td></td>
<td>Diablo Canyon Power Plant; Plant Performance Improvement Report Achieving Results; Data: September 2017</td>
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</table>
NSOC/DCISC
List of Documents Transmitted Electronically

<table>
<thead>
<tr>
<th>Station Initiative</th>
<th>There are no updated station initiatives for this month.</th>
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<tbody>
<tr>
<td>IPM</td>
<td>There are no IPMs for this month.</td>
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**J. INPO**

<table>
<thead>
<tr>
<th>Date</th>
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<th>Title</th>
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</thead>
<tbody>
<tr>
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<td>There are no INPO documents for this month.</td>
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**K. Operational Documents (ODM Minutes, POAs)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
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<tr>
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<td>There are no POAs for this month.</td>
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**L. Safety Limit Violation Report**

<table>
<thead>
<tr>
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<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>There are no Safety Limit Violation Reports for this month.</td>
</tr>
</tbody>
</table>
A. Licensing Basis Impact Evaluations

<table>
<thead>
<tr>
<th>Date</th>
<th>LBIE No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
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<td>There are no LBIEs this month.</td>
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B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

<table>
<thead>
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<th>Letter No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>11/8/17</td>
<td>DCL-17-094</td>
<td>Chief Nuclear Officer Contact Information</td>
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<tr>
<td></td>
<td>DIL-17-011</td>
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<td>HBL-17-014</td>
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<td>HIL-17-008</td>
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<tr>
<td>11/9/17</td>
<td>DCL-17-092</td>
<td>Readiness for Additional Supplemental Inspection</td>
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<tr>
<td>11/20/17</td>
<td>DCL-17-095</td>
<td>Response to NRC Request for Additional Information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regarding “Request for Approval of Alternative for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Application of Full Structural Weld Overlay, REP-RHR-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SWOL, Units 1 and 2”</td>
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<tr>
<td></td>
<td>DIL-17-012</td>
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<tr>
<td>11/29/17</td>
<td>DCL-17-102,</td>
<td>Annual Review of the Emergency Action Levels</td>
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<td>DIL-17-013</td>
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<tr>
<td>11/29/17</td>
<td>DCL-17-099</td>
<td>Reactor Coolant System Pressure and Temperature Limits</td>
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<td></td>
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<td>Report for Units 1 and 2</td>
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C. NRC Incoming Correspondence (including Inspection Reports)

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<tr>
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D. PSRC Documents

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<thead>
<tr>
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<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSRC Minutes</td>
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<tr>
<td>10/24/17</td>
<td>2017-024</td>
<td>WECTEC 14078110, Analyses for assessing the radiation environments used for shielding and equipment qualification as contained in WECTEC 14078110-0004, 5, and 6</td>
</tr>
<tr>
<td>11/7/17</td>
<td>2017-025</td>
<td>• HIL-17-005, Final Safety Analysis Report Update</td>
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<td></td>
<td></td>
<td>• HBPP ISFSI License Renewal Application Charter</td>
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</table>

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

<table>
<thead>
<tr>
<th>Type</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCAs</td>
<td>SAPN 50870357</td>
<td>Undetected ECCS Interlock Failure</td>
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</table>
### November NSOC/DCISC
#### List of Documents Transmitted Electronically

<table>
<thead>
<tr>
<th>SAPN</th>
<th>Title</th>
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<tbody>
<tr>
<td>50886801</td>
<td>DCPP Inadequate NAMCO Procedure</td>
</tr>
<tr>
<td>ACE</td>
<td>DA-PK 9-15 coming in repeatedly (EI)</td>
</tr>
<tr>
<td>SAPN</td>
<td>DA-Security Officer inattentive to duties</td>
</tr>
<tr>
<td>50931403</td>
<td></td>
</tr>
<tr>
<td>50942992</td>
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**Eff. Eval**
- There are no Effectiveness Evals for this month.

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/3/17</td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>11/10/17</td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>11/17/17</td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>11/24/17</td>
<td>Condition Report Backlog Curves</td>
</tr>
</tbody>
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### F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/9/17</td>
<td>Audit Map: Fire Protection</td>
<td>There is no QPAR for this month.</td>
</tr>
<tr>
<td>11/14/17</td>
<td>FileNet #172480003</td>
<td>2017 ISFSI and Fuel Management Audit Report – October 2 through October 23, 2017</td>
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<tr>
<td>11/28/17</td>
<td>Audit Map: ISFSI &amp; Fuel Management</td>
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<td>11/9/17</td>
<td>Assessment # 172980011</td>
<td>Fire Pump 0-3 Torque Issues</td>
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<td>11/22/17</td>
<td>Technical Assessment # 171700001</td>
<td>Technical Assessment of Calculation PGE-019-CALC-003, Revision 5 (Diablo Canyon Units 1 and 2 GSI-191 Debris Generation Calculation)</td>
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### G. Nuclear Safety Culture Monitoring Panel Reports

<table>
<thead>
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<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
<td></td>
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### H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

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<th>Title</th>
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<tbody>
<tr>
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<td>There is no updated Quick Hit Self-Assessment (QHSA) Schedule for this month.</td>
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<td></td>
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<td>10/30/17</td>
<td>SAPN 50931868</td>
<td>Quick Hit SA – ICES Report Timeliness</td>
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November NSOC/DCISC
List of Documents Transmitted Electronically

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<td>11/13/17</td>
<td>SAPN 50920703</td>
<td>QHSA Readiness for Self-Approval</td>
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<td>11/20/17</td>
<td>SAPN 50888776</td>
<td>2017 CDBI formal self assessment</td>
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<td>11/2/17</td>
<td>SAPN 50944028</td>
<td>Informal Benchmark – OE Review Process</td>
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<td>SAPN 50931936</td>
<td>WPUG Benchmark Report for Jan 2017</td>
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<td>11/13/17</td>
<td>SAPN 50948813</td>
<td>BM: Pre-emptive OE Search Process-95001</td>
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I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)

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PPIR

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Station Initiative

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IPM

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J. INPO

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K. Operational Documents (ODM Minutes, POAs)

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L. Safety Limit Violation Report

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M. Significance Determination Process Calculations

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<th>Title</th>
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N. Miscellaneous

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O. Functional Area Documents

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P. Documents Previously Transmitted during the Month

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### A. Licensing Basis Impact Evaluations

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<td>FHARE 153 Rescission</td>
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### B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

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<th>Letter No.</th>
<th>Title</th>
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<tr>
<td>12/21/17</td>
<td>DCL-17-113, DIL-17-014</td>
<td>Emergency Plan Implementing Procedure Update</td>
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<tr>
<td>12/21/17</td>
<td>DCL-17-112</td>
<td>Nuclear Material Transaction Report for New Fuel</td>
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<tr>
<td>12/26/17</td>
<td>DCL-17-109</td>
<td>Anchor Darling Double Disc Gate Valve Information and Status</td>
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### C. NRC Incoming Correspondence (including Inspection Reports)

<table>
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<tr>
<th>Date</th>
<th>Title</th>
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<tbody>
<tr>
<td>12/18/17</td>
<td>Diablo Canyon Power Plant Unit Nos. 1 and 2 – Staff Assessment of Response to 10 CFR 50.54(f) Information Request – Flood-Causing Mechanism Reevaluation (CAC Nos. MF6029 and MF6040: EPID L-2015-JLD-005)</td>
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<tr>
<td>12/18/17</td>
<td>Diablo Canyon Power Plant, Unit Nos. 1 and 2 – Staff Assessment of Flooding Focused Evaluation (CAC Nos. MF9969 and MF9970; EPID L-2017-JLD-0025 and EPID L-2017-JLD-0026)</td>
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<td>Diablo Canyon Power Plant Unit Nos. 1 and 2 – Flood Hazard Mitigation Strategies Assessment (CAC Nos. MF7919 and MF7920; EPID L-2016-JLD-0007)</td>
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### D. PSRC Documents (PSRC Minutes)

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<td>11/21/17</td>
<td>2017-026</td>
<td>AD2.ID1, Procedure and Work Plan Use and Adherence</td>
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<td>12/19/17</td>
<td>2017-029</td>
<td>AD13.ID5, Inservice Testing Program</td>
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### E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

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December DCISC  
List of Documents Transmitted Electronically

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<table>
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<tr>
<th>Date</th>
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<tbody>
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<td>12/1/17</td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>12/8/17</td>
<td>Condition Report Backlog Curves</td>
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<tr>
<td>12/15/17</td>
<td>Condition Report Backlog Curves</td>
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<tr>
<td>12/22/17</td>
<td>Condition Report Backlog Curves</td>
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<tr>
<td>12/29/17</td>
<td>Condition Report Backlog Curves</td>
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</tbody>
</table>

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

<table>
<thead>
<tr>
<th>Date</th>
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<th>Title</th>
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<tbody>
<tr>
<td>12/19/17</td>
<td># 173330010</td>
<td>Quality Performance Assessment Report (QPAR) Second Period 2017; May 1, 2017 through December 1, 2017</td>
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<tr>
<td>12/18/17</td>
<td>FileNet # 172700006</td>
<td>2017 Engineering and Maintenance Rule Programs Audit</td>
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<tr>
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<td>Assessment #173450016</td>
<td>New Nuclear Fuel Receipt and Inspection</td>
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<table>
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<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
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G. Nuclear Safety Culture Monitoring Panel Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

<table>
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<tr>
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<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
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<td></td>
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</tr>
<tr>
<td></td>
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<td>12/21/17</td>
<td>SAPN 50882660</td>
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<td>12/4/17</td>
<td>SAPN 50948418</td>
<td>Informal Benchmark @ STP</td>
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<td>12/5/17</td>
<td>SAPN 50953065</td>
<td>Informal Benchmark/Trip Report FME/SISI</td>
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<td>12/12/17</td>
<td>SAPN 50951898</td>
<td>Trip Report – Braidwood OPS ATV</td>
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<tr>
<td>12/19/17</td>
<td>SAPN 50946738</td>
<td>Benchmark – SCANA SIEM Installation</td>
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</table>
I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>12/20/17</td>
<td></td>
<td>Diablo Canyon Power Plant; Plant Performance Improvement Report Achieving Results; Date: November 2017</td>
</tr>
<tr>
<td>Station Initiative</td>
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<td></td>
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<tr>
<td>12/6/17</td>
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<td>Learning Services Excellence Plan 2017</td>
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<td>12/11/17</td>
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<td>Radiation Protection Excellence Plan 2017</td>
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<tr>
<td>12/12/17</td>
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<td>Leadership Engagement in PI Processes</td>
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<td>12/28/17</td>
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<td>OF.2-1 Operations Action Plan 2017 (SAPNs 50948217/50934855)</td>
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J. INPO

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K. Operational Documents (ODM Minutes, POAs)

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<th>Doc. No.</th>
<th>Title</th>
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<td>POA</td>
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L. Safety Limit Violation Report

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<tbody>
<tr>
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M. Significance Determination Process Calculations

<table>
<thead>
<tr>
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<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
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N. Miscellaneous

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<tr>
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<th>Title</th>
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<tbody>
<tr>
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### O. Functional Area Documents

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<td>Week 201749</td>
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January NSOC & DCISC
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

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<th>LBIE No.</th>
<th>Title</th>
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<td>1/30/18</td>
<td>2018-001</td>
<td>DCM – Unit 2 ECCS Valve Mounted Limit Switch Interlocks</td>
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B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

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<tr>
<td>2/1/18</td>
<td>DCL-18-004</td>
<td>Errata for the Diablo Canyon Power Plant Mitigating Strategies Assessment (MSA) for Flooding Report</td>
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C. NRC Incoming Correspondence (including Inspection Reports)

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<tr>
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<td>Diablo Canyon Power Plant, Units 1 and 2 – Relief Request REP-RHR-SWOL, Request for Approval of Alternative for Application of Full Structural Weld Overlay (EPID L-2017-LLR-0092)</td>
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<tr>
<td>1/10/18</td>
<td>Diablo Canyon Power Plant Unit Nos. 1 and 2 – Correction to Staff Assessment of Response to 10 CFR 50.54(f) Information Request – Flood-Causing Mechanism Reevaluation (CAC Nos. MF6039 and MF6040L EPID L-2015-JLD-005)</td>
</tr>
<tr>
<td>1/17/18</td>
<td>Diablo Canyon Power Plant, Units 1 and 2 – NRC Emergency Preparedness Annual Inspection Report 05000275/2017501 and 05000323/2017501</td>
</tr>
<tr>
<td>1/19/18</td>
<td>Diablo Canyon Power Plant, Units 1 and 2 – NRC Initial Operator Licensing Examination Approval 05000275/2018301; 05000323/2018301</td>
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D. NSOC/PSRC Documents (NSOC Minutes, NSOC Responses, PSRC Minutes)

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<td>11/28/17</td>
<td>2017-027</td>
<td>FSHARE to FPEE Conversions</td>
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<td>2R20 Outage Safety Plan</td>
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E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

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January NSOC & DCISC
List of Documents Transmitted Electronically

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<td>Condition Report Backlog Curves</td>
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<td>1/19/18</td>
<td>Condition Report Backlog Curves</td>
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<td>1/26/18</td>
<td>Condition Report Backlog Curves</td>
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**F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)**

<table>
<thead>
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<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/9/18</td>
<td>QV Assessment #180090007</td>
<td>Work Package Reviews</td>
</tr>
<tr>
<td></td>
<td>There is no QPAR for this month.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There are no Audit Reports for this month.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There is no new Schedule for this month.</td>
<td></td>
</tr>
</tbody>
</table>

**G. Nuclear Safety Culture Monitoring Panel Reports**

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There is no Nuclear Safety Culture Monitoring Panel Report for this month.</td>
</tr>
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</table>

**H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/27/17</td>
<td>SAPN 50590650</td>
<td>Quick Hit SA - Reportability</td>
</tr>
<tr>
<td>1/29/18</td>
<td>SAPN 50958659</td>
<td>QHSA NRC attachment 71124.02</td>
</tr>
<tr>
<td>1/8/18</td>
<td>SAPN 50955392</td>
<td>2017 Winter EPRI ESCP Conf. Trip Report</td>
</tr>
<tr>
<td>1/18/18</td>
<td>SAPN 50955391</td>
<td>2017 Fall Holtec Users Group Trip Report</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is no updated Quick Hit Self-Assessment (QHSA) Schedule for this month.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is no Formal Benchmarking and Self-Assessments Schedule for this month.</td>
</tr>
</tbody>
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**I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PPIR</td>
<td></td>
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### January NSOC & DCISC
#### List of Documents Transmitted Electronically

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>1/18/18</td>
<td>Diablo Canyon Power Plant; Plant Performance Improvement Report Achieving Results; Data: November 2017</td>
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</table>

<table>
<thead>
<tr>
<th>Initiative</th>
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<tbody>
<tr>
<td>Station</td>
<td>Leadership Engagement in PI Processes</td>
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<td>IPM</td>
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**J. INPO**

<table>
<thead>
<tr>
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<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
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<td>There are no INPO documents for this month.</td>
</tr>
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</table>

**K. Operational Documents (ODM Minutes, POAs)**

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<th>Doc. No.</th>
<th>Title</th>
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</thead>
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<tr>
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<td>ODMs</td>
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<tr>
<td>POA</td>
<td>SAPN 50959829</td>
<td>Excessive Use HP Nitrogen</td>
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**L. Safety Limit Violation Report**

<table>
<thead>
<tr>
<th>Date</th>
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<th>Title</th>
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</thead>
<tbody>
<tr>
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**M. Significance Determination Process Calculations**

<table>
<thead>
<tr>
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<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no Significance Determination Process Calculations for this month.</td>
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**N. Miscellaneous**

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<tr>
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**O. Functional Area Documents**

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<th>Date/Doc</th>
<th>Title</th>
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<tbody>
<tr>
<td>Maintenance</td>
<td>Week 201801</td>
<td>T+1 Performance Critique</td>
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<tr>
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<td>Week 201802</td>
<td>T+1 Performance Critique</td>
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<td>Week 201804</td>
<td>T+1 Performance Critique</td>
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**P. Documents Previously Transmitted during the Month**

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February
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

<table>
<thead>
<tr>
<th>Date</th>
<th>LBIE No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
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</table>

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Letter No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/26/18</td>
<td>DCL-18-010, DIL-18-002</td>
<td>Emergency Plan Implementing Procedure Update</td>
</tr>
<tr>
<td>2/26/18</td>
<td>DCL-18-011</td>
<td>(OUO) Cyber Security Plan, Revision 1 (OUO)</td>
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C. NRC Incoming Correspondence (including Inspection Reports)

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>2/6/18</td>
<td>Diablo Canyon Power Plant – NRC Integrated Inspection Report 05000275/2017004 and 05000323/2017004</td>
</tr>
<tr>
<td>2/15/18</td>
<td>Diablo Canyon Power Plant, Units 1 and 2 – Request for Relief to the ASME Code, Section XI, Examination Requirements for Class 1 and Class 2 Piping Welds for the Fourth 10-Year Inservice Inspection Interval (CAC Nos. MF9706 and MF9707; EPID L-2017-LLR-0030)</td>
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D. NSOC/PSRC Documents (NSOC Minutes, NSOC Responses, PSRC Minutes)

<table>
<thead>
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<th>Doc. No.</th>
<th>Title</th>
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<td>PSRC</td>
<td>Minutes</td>
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E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

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<thead>
<tr>
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<th>Doc. No.</th>
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<tbody>
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<td>ACE</td>
<td>SAPN 50946204</td>
<td>EDG 1-2 Load Oscillations</td>
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<td></td>
<td>SAPN 50949422</td>
<td>Operation’s Procedure Use and Adherence (PU&amp;A) Performance Gap</td>
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<td></td>
<td>SAPN 50956513</td>
<td>DA-Employee Pinched Finger</td>
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<tr>
<td>Eff. Eval</td>
<td>SAPN 50893207</td>
<td>EFEV – Rupture Restr. MS-31RR Inspection</td>
</tr>
<tr>
<td>2/2/18</td>
<td></td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>2/9/18</td>
<td></td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>2/16/18</td>
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<td>Condition Report Backlog Curves</td>
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<tr>
<td>2/23/18</td>
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<td>Condition Report Backlog Curves</td>
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February
List of Documents Transmitted Electronically

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
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</tr>
<tr>
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<td>FileNet #</td>
<td>2018 Radiation Protection Programs Audit</td>
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<td>1731800001</td>
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G. Nuclear Safety Culture Monitoring Panel Reports

<table>
<thead>
<tr>
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<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>There is no updated Quick Hit Self-Assessment (QHSA) Schedule for this month.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is no Formal Benchmarking and Self-Assessments Schedule for this month.</td>
</tr>
<tr>
<td>1/31/18</td>
<td>SAPN 50961060</td>
<td>INPO 04-002 QHSA</td>
</tr>
<tr>
<td>2/6/18</td>
<td>SAPN 50949443</td>
<td>3rd. Qtr. 2017 Ops IPM Action Quick Hit Self Assessment</td>
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<tr>
<td>2/5/18</td>
<td>SAPN 50962659</td>
<td>Region IV Design Mgr Meeting 2018</td>
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<tr>
<td>2/6/18</td>
<td>SAPN 50962748</td>
<td>FAC Program – January 2018 Trip Report</td>
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<tr>
<td>2/8/18</td>
<td>SAPN 50946350</td>
<td>OPS Excellence Benchmark Trips 2017</td>
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<td>2/20/18</td>
<td>SAPN 50935700</td>
<td>Informal Benchmark: USA GET Team Meeting</td>
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<tr>
<td>2/20/18</td>
<td>SAPN 50962793</td>
<td>ILT Audit Exam Informal Benchmark</td>
</tr>
<tr>
<td>2/20/18</td>
<td>SAPN 50963298</td>
<td>Dec Trng Trip Report PVNGS</td>
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I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
</table>
February
List of Documents Transmitted Electronically

<table>
<thead>
<tr>
<th>PPIR</th>
<th>There is no PPIR for this month.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station Initiative</td>
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<tr>
<td>IPM</td>
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**J. INPO**

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no INPO documents for this month.</td>
</tr>
</tbody>
</table>

**K. Operational Documents (ODM Minutes, POAs)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no ODMs for this month.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There are no POAs for this month.</td>
</tr>
</tbody>
</table>

**L. Safety Limit Violation Report**

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no Safety Limit Violation Reports for this month.</td>
</tr>
</tbody>
</table>

**M. Significance Determination Process Calculations**

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no Significance Determination Process Calculations for this month.</td>
</tr>
</tbody>
</table>

**N. Miscellaneous**

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>There are no miscellaneous documents for this month.</td>
</tr>
</tbody>
</table>

**O. Functional Area Documents**

<table>
<thead>
<tr>
<th>Subcommittee</th>
<th>Date/Doc</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>Week 201805</td>
<td>T+1 Performance Critique</td>
</tr>
<tr>
<td></td>
<td>Week 201806</td>
<td>T+1 Performance Critique</td>
</tr>
<tr>
<td></td>
<td>Week 201807</td>
<td>T+1 Performance Critique</td>
</tr>
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<td>Week 201808</td>
<td>T+1 Performance Critique</td>
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**P. Documents Previously Transmitted during the Month**

<table>
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<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
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# March
List of Documents Transmitted Electronically

## A. Licensing Basis Impact Evaluations

<table>
<thead>
<tr>
<th>Date</th>
<th>LBIE No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/2/18</td>
<td>2018-002</td>
<td>Unit 1 ECCS Valve Stem Mounted Limit Switch Interlocks</td>
</tr>
<tr>
<td>3/16/18</td>
<td>2018-003</td>
<td>E-Plan Section 7</td>
</tr>
<tr>
<td>3/16/18</td>
<td>2018-004</td>
<td>E-Plan Section 6</td>
</tr>
<tr>
<td>4/2/18</td>
<td>2018-005</td>
<td>FPEE 029</td>
</tr>
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</table>

## B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Letter No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/7/18</td>
<td>DIL-18-001</td>
<td>Biennial Submittal of Diablo Canyon Independent Spent Fuel Storage Installation Updated Final Safety Analysis Report</td>
</tr>
<tr>
<td>3/7/18</td>
<td>DIL-18-005</td>
<td>10 CFR 72.48 Report of Changes, Tests, and Experiments for March 1, 2016, through February 28, 2018</td>
</tr>
<tr>
<td>3/7/18</td>
<td>DCL-18-015</td>
<td>Request to Withdraw Diablo Canyon Power Plant License Renewal Application</td>
</tr>
<tr>
<td>3/7/18</td>
<td>DCL-18-016</td>
<td>Withdrawal of License Amendment Request 13-02; Revision to Technical Specifications to Adopt Risk Informed Completion Times TSTF-505, Revision 1, &quot;Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4B&quot;</td>
</tr>
<tr>
<td>3/22/18</td>
<td>DCL-18-021</td>
<td>Core Operating Limits Report for Unit 2 Cycle 21</td>
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## C. NRC Incoming Correspondence (including Inspection Reports)

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<tr>
<th>Date</th>
<th>Title</th>
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<tbody>
<tr>
<td>3/1/18</td>
<td>Annual Assessment Letter for Diablo Canyon Power Plant, Units 1 and 2 (Report 05000275/2017006 and 0500323/2017006)</td>
</tr>
<tr>
<td>3/1/18</td>
<td>Diablo Canyon Power Plant, Units 1 and 2 – Notification of NRC Design Bases Assurance Inspection (Programs) and (05000275/2018010 05000323/2018010) and Initial Request for Information</td>
</tr>
<tr>
<td>3/20/18</td>
<td>Diablo Canyon Power Plant, Units 1 and 2 – NRC Examination Report 05000275/2018301; 05000323/2018301</td>
</tr>
<tr>
<td>3/29/18</td>
<td>Diablo Canyon Power Plant, Units 1 and 2 – Withdrawal of Amendment Request (CAC Nos. MF3240 and MF3241; EPID L-203-LLA-0001)</td>
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</table>
### D. PSRC Documents (PSRC Minutes)

<table>
<thead>
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<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSRC Minutes</td>
<td>2018-005</td>
<td>Revision to Outage Safety Plan</td>
</tr>
<tr>
<td>2018-004</td>
<td></td>
<td>LBBE No. 2018-002; DCP 1000025425, “Unit 1 ECCS Valve Stem Mounted Limit Switch Interlocks”</td>
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<td>2017-028</td>
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<td>Cyber Security Plan, Revision 1</td>
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<td></td>
<td></td>
<td>DVP 1000025444; DCN 20000018749; FPEE 165; “Installed Systems and Features in Areas 4-A and 4-B”</td>
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<tr>
<td>4/1/18</td>
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<td>Plant Staff Review Committee Members/Alternates</td>
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### E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

<table>
<thead>
<tr>
<th>Type</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCAs</td>
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</tr>
<tr>
<td>ACE</td>
<td>3/13/18</td>
<td>SAPN 50947770 DA-Near-Hit Intake Diving Ops Interference</td>
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<tr>
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<td>3/28/18</td>
<td>SAPN 50954525 DA-L162 Audit Written Exam Failures</td>
</tr>
<tr>
<td>Eff. Eval</td>
<td></td>
<td>There are no Effectiveness Evals for this month.</td>
</tr>
<tr>
<td>3/2/18</td>
<td></td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>3/9/18</td>
<td></td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>3/16/18</td>
<td></td>
<td>Condition Report Backlog Curves</td>
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<td>3/23/18</td>
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<td>Condition Report Backlog Curves</td>
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<td>3/30/18</td>
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<td>Condition Report Backlog Curves</td>
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### F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There is no QPAR for this month.</td>
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<tr>
<td>2/26/18</td>
<td>FileNet #17318001</td>
<td>2018 Radiation Protection Programs Audit</td>
</tr>
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March
List of Documents Transmitted Electronically

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/20/18</td>
<td>Technical Assessment #180790021</td>
<td>Technical Assessment of Calculation M-1129 (Clean Strainer Head Loss Calculation)</td>
</tr>
<tr>
<td>3/20/18</td>
<td>Technical Assessment #180790020</td>
<td>Technical Assessment of Calculation PGE-027-CALC-002 (Diablo Canyon In-Vessel Fiber Calculation)</td>
</tr>
<tr>
<td>3/20/18</td>
<td>Technical Assessment #180790022</td>
<td>Technical Assessment of Calculation PGE-027-CALC-003 (Diablo Canyon Evaluation of Recirculation Sump In-Vessel Debris Deposition)</td>
</tr>
<tr>
<td>3/7/18</td>
<td>Quality Verification Assessment #180600014</td>
<td>Periodic Procedure Use and Adherence</td>
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<tr>
<td>3/14/18</td>
<td>Quality Verification Assessment #180710003</td>
<td>Electrical Maintenance Documentation</td>
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G. Nuclear Safety Culture Monitoring Panel Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
<td></td>
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<td>There is no updated Quick Hit Self-Assessment (QHSA) Schedule for this month.</td>
</tr>
<tr>
<td>3/1/18</td>
<td>SAPN 50963248</td>
<td>Training Analysis informal benchmark</td>
</tr>
<tr>
<td>3/13/18</td>
<td>SAPN 50942954</td>
<td>Rigging Benchmark EPRI Conf.</td>
</tr>
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<td>3/28/18</td>
<td>SAPN 50972553</td>
<td>Sec Trng Report RBNGS</td>
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<tr>
<td>3/28/18</td>
<td>SAPN 50973215</td>
<td>Informal Benchmark Report</td>
</tr>
<tr>
<td>4/2/18</td>
<td>SAPN 50952622</td>
<td>INPO AFI Benchmarking Engineering (Bruns)</td>
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# March

List of Documents Transmitted Electronically

## I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>PPIR</td>
<td>Diablo Canyon Power Plant; Plant Performance Improvement Report</td>
</tr>
<tr>
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<td>3/28/18</td>
<td>Achieving Results; Data: February 2018</td>
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<td></td>
<td>Station</td>
<td>Learning Services Excellence Plan 2018 – Our Path Forward</td>
</tr>
<tr>
<td></td>
<td>Initiative</td>
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## J. INPO

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<tr>
<td>3/26/18</td>
<td>SAPN 50939622</td>
<td>IER L2-17-9 Weakness in MA Fundamentals (NSOC only)</td>
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## K. Operational Documents (ODM Minutes, POAs)

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<th>Doc. No.</th>
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<tr>
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<td>POA</td>
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## L. Safety Limit Violation Report

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<tbody>
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## M. Significance Determination Process Calculations

<table>
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<th>Title</th>
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</thead>
<tbody>
<tr>
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## N. Miscellaneous

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<tbody>
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## O. Functional Area Documents

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<th>Title</th>
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<tbody>
<tr>
<td>Maintenance</td>
<td>Week 201809</td>
<td>T+1 Performance Critique</td>
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March
List of Documents Transmitted Electronically

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<td>Performance Critique</td>
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<tr>
<td>Week 201811</td>
<td>T+1</td>
<td>Performance Critique</td>
</tr>
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<td>Week 201812</td>
<td>T+1</td>
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P. Documents Previously Transmitted during the Month

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April
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

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<thead>
<tr>
<th>Date</th>
<th>LBIE No.</th>
<th>Title</th>
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<tr>
<td>4/17/18</td>
<td>2018-006</td>
<td>E-Plan Appendix A</td>
</tr>
<tr>
<td>4/17/18</td>
<td>2018-007</td>
<td>E-Plan Section 1</td>
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B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Letter No.</th>
<th>Title</th>
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<tr>
<td>4/11/18</td>
<td>DCL-18-029</td>
<td>Emergency Plan Implementing Procedure Update</td>
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<tr>
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<td>DIL-18-006</td>
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<tr>
<td>4/24/18</td>
<td>DCL-18-026</td>
<td>NEI 12-06, Appendix H, Revision 4, H.4.5 Path 5: GMRS &gt; 2 X SSE, Mitigating Strategies Assessment (MSA) report for the New Seismic Hazard Information</td>
</tr>
<tr>
<td>4/24/18</td>
<td>DCL-18-027</td>
<td>Seismic Probabilistic Risk Assessment for the Diablo Canyon Power Plant, Units 1 and 2 – Response to NRC Request for Information Pursuant to 10 CFR 0.54(f) Regarding Recommendation 2.1: Seismic of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident</td>
</tr>
<tr>
<td>4/25/18</td>
<td>DCL-18-035</td>
<td>2017 Annual Nonradiological Environmental Operating Report</td>
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<tr>
<td>4/25/18</td>
<td>DCL-18-022</td>
<td>2017 Annual Radiological Environmental Operating Report</td>
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C. NRC Incoming Correspondence (including Inspection Reports)

<table>
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<tr>
<th>Date</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>4/16/18</td>
<td>Response to Request to Withdraw the Diablo Canyon Power Plant, Unit Nos. 1 and 2, License Renewal Application</td>
</tr>
<tr>
<td>4/24/18</td>
<td>Diablo Canyon Power Plant – NRC Inspection Report 05000275/2018001, 05000323/2018001, and 07200026/2018001</td>
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<tr>
<td>4/30/18</td>
<td>Diablo Canyon Nuclear Power Plant, Units 1 and 2 – Issuance of Amendments Re: Revision to Technical Specifications to Adopt Technical Specifications Task Force (TSTF) Change Traveler TSTF-547, Revision 1 (EPID L-2017-LLA-0309)</td>
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<tr>
<td>4/30/18</td>
<td>Diablo Canyon Power Plant, Units 1 and 2 – Notification of NRC Initial Operator Licensing Examination 05000275/2019301; 05000323/2019301</td>
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D. PSRC Documents (PSRC Minutes)

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<tbody>
<tr>
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April
List of Documents Transmitted Electronically

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

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<tr>
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<td>RCAs</td>
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<tr>
<td>ACE</td>
<td>SAPN 50954525</td>
<td>DA-L162 Audit Written Exam Failures</td>
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<tr>
<td></td>
<td>SAPN 50967050</td>
<td>DA-QESC – Confined Space Escalation</td>
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<tr>
<td>Eff. Eval</td>
<td>SAPN 50818639</td>
<td>DA-Adverse Trend Reactor Cavity Seal Leak</td>
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<table>
<thead>
<tr>
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<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>4/6/18</td>
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<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>4/13/18</td>
<td></td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>4/20/18</td>
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<tr>
<td>4/27/18</td>
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<td>Condition Report Backlog Curves</td>
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F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

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<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>There are no audits for this month.</td>
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<tr>
<td></td>
<td></td>
<td>There is no new Schedule for this month.</td>
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<tr>
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<td>Quality Verification Assessment # 180850014</td>
<td>2R20 Integrated Outage Assessment</td>
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G. Nuclear Safety Culture Monitoring Panel Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
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<td></td>
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H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
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<td>There is no Formal Benchmarking and Self-Assessments Schedule for this month.</td>
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### April

**List of Documents Transmitted Electronically**

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<thead>
<tr>
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<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
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<td>4/11/18</td>
<td>SAPN 50942984</td>
<td>Informal Benchmark Report FLMUG Aug 2017</td>
</tr>
<tr>
<td>4/24/18</td>
<td>SAPN 50948117</td>
<td>Maint. Benchmark Tracking FERMI-2</td>
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<tr>
<td>4/30/18</td>
<td>SAPN 50964564</td>
<td>Sec Trng 71130.07 Self-Assessment</td>
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<td>4/30/18</td>
<td>SAPN 50977564</td>
<td>QHSA Confined Space</td>
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#### I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)

<table>
<thead>
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<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>5/3/18</td>
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<td>Nuclear Generation Operating Plan 2018 – 2022</td>
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<tr>
<td>PPIR</td>
<td></td>
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</tr>
<tr>
<td>4/12/18</td>
<td></td>
<td>Diablo Canyon Power Plant; Plant Performance Improvement Report Achieving Results; Data: March 2018</td>
</tr>
<tr>
<td>Station Initiative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/15/18</td>
<td></td>
<td>Organizational Effectiveness Excellence Plan</td>
</tr>
<tr>
<td>4/16/18</td>
<td></td>
<td>Learning Services Excellence Plan</td>
</tr>
<tr>
<td>4/23/18</td>
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<td>Leadership Engagement in PI Processes</td>
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<tr>
<td>IPM</td>
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#### J. INPO

<table>
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<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
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#### K. Operational Documents (ODM Minutes, POAs)

<table>
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<tr>
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<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>POA</td>
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#### L. Safety Limit Violation Report

<table>
<thead>
<tr>
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<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
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</table>

#### M. Significance Determination Process Calculations

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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April
List of Documents Transmitted Electronically

N. Miscellaneous

<table>
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<tr>
<th>Date</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>4/24/18</td>
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</tr>
<tr>
<td>4/24/18</td>
<td>Maint – Projects – WM (Jesse Reports)</td>
</tr>
<tr>
<td>4/24/18</td>
<td>O/Chem/LS (Jesse Reports)</td>
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<td>4/24/18</td>
<td>All Others (Jesse Reports)</td>
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O. Functional Area Documents

<table>
<thead>
<tr>
<th>Subcommittee</th>
<th>Date/Doc</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>Week 201813</td>
<td>T+1 Performance Critique</td>
</tr>
<tr>
<td></td>
<td>Week 201814</td>
<td>T+1 Performance Critique</td>
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P. Documents Previously Transmitted during the Month

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<tr>
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<td></td>
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### A. Licensing Basis Impact Evaluations

<table>
<thead>
<tr>
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<th>Title</th>
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<tbody>
<tr>
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### B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Letter No.</th>
<th>Title</th>
</tr>
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<tbody>
<tr>
<td>5/14/18</td>
<td>DCL-18-036</td>
<td>Change of Commitment Dates for Full Implementation of Open Phase Detection System</td>
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### C. NRC Incoming Correspondence (including Inspection Reports)

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
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### D. NSOC/PSRC Documents (NSOC Minutes, NSOC Responses, PSRC Minutes)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>NSOC</td>
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</tr>
<tr>
<td>PSRC Minutes</td>
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<td>4/10/18</td>
<td>2018-009</td>
<td>E-Plan Appendix A, E-Plan Section 1</td>
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### E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

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<thead>
<tr>
<th>Type</th>
<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
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<tr>
<td>ACE</td>
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<td>Eff. Eval</td>
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<td>LTCA: DA-Undetected ECCS Interlock Fail</td>
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<td>SAPN 50947033</td>
<td>Effectiveness Eval for SAPN 50923422</td>
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<td>SAPN 50964666</td>
<td>EFEV for DEG 2-2 Broken Bolt RCE</td>
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<tr>
<td>5/4/18</td>
<td></td>
<td>Condition Report Backlog Curves</td>
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<tr>
<td>5/11/18</td>
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<td>Condition Report Backlog Curves</td>
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<tr>
<td>5/18/18</td>
<td></td>
<td>Condition Report Backlog Curves</td>
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<tr>
<td>5/25/18</td>
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### May

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#### F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>5/7/18</td>
<td>FileNet #180710010</td>
<td>2018 Quality Assurance Program Audit</td>
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<tr>
<td>5/22/18</td>
<td>FileNet #180360003</td>
<td>2018 Procurement Audit</td>
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<tr>
<td>5/10/18</td>
<td>Quality Verification Assessment # 181290011</td>
<td>Unit 2 Firewater Deluge Valve Replacement</td>
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<tr>
<td></td>
<td></td>
<td>There is no new schedule for this month.</td>
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#### G. Nuclear Safety Culture Monitoring Panel Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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#### H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>5/1/18</td>
<td>SAPN 50924173</td>
<td>Perform QHSA – Completed 2R20 orders</td>
</tr>
<tr>
<td>5/1/18</td>
<td>SAPN 50953576</td>
<td>IST Program OMN-16 Pumps QHSA</td>
</tr>
<tr>
<td>5/3/18</td>
<td>SAPN 50924171</td>
<td>Perform QHSA – Completed 1R20 orders</td>
</tr>
<tr>
<td>5/17/18</td>
<td>SAPN 50950724</td>
<td>2018 AD3.ID5 Assess Audit Results</td>
</tr>
<tr>
<td>5/17/18</td>
<td>SAPN 50973137</td>
<td>2R20 HU Quick Hit Self-Assessment</td>
</tr>
<tr>
<td>5/9/18</td>
<td>SAPN 50949669</td>
<td>Trip Report – PG&amp;E Gas CAP Assessment</td>
</tr>
<tr>
<td>5/17/18</td>
<td>SAPN 50974248</td>
<td>Audit – Informal Trip Report SNC</td>
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May
List of Documents Transmitted Electronically

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/30/18</td>
<td>SAPN 50967020</td>
<td>Cyber Security Benchmarking – McGuire</td>
</tr>
<tr>
<td>5/30/18</td>
<td>SAPN 50980249</td>
<td>Informal Benchmark – Gateway Gen Station</td>
</tr>
<tr>
<td>5/31/18</td>
<td>SAPN 50957742</td>
<td>PWROG Proc Sub Comm Trip Report, Dec2017</td>
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I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/3/18</td>
<td></td>
<td>Nuclear Generation Operating Plan 2018 – 2022; No new updates this month.</td>
</tr>
<tr>
<td>PPIR</td>
<td></td>
<td>Diablo Canyon Power Plant; Plant Performance Improvement Report; Achieving Results; Data: April 2018; Report Date: May 9, 2018</td>
</tr>
<tr>
<td>Station Initiative</td>
<td></td>
<td>Learning Services Excellence Plan 2018; Generating Excellence</td>
</tr>
<tr>
<td>5/15/18</td>
<td></td>
<td>Our Path Forward – Organizational Effectiveness Excellence Plan</td>
</tr>
<tr>
<td>5/17/18</td>
<td></td>
<td>DCPP Excellence Plan; A Living Plan</td>
</tr>
<tr>
<td>5/18/18</td>
<td></td>
<td>Our Path Forward; Leadership Engagement in PI Processes</td>
</tr>
<tr>
<td>IPM</td>
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<td>There are no IPMs for this month.</td>
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J. INPO

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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<tbody>
<tr>
<td></td>
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K. Operational Documents (ODM Minutes, POAs)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no ODMs for this month.</td>
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<tr>
<td>POA</td>
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<td>There are no new POAs for this month.</td>
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L. Safety Limit Violation Report

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no Safety Limit Violation Reports for this month.</td>
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</table>

M. Significance Determination Process Calculations

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no Significance Determination Process Calculations for this month.</td>
</tr>
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## May
### List of Documents Transmitted Electronically

### N. Miscellaneous

<table>
<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td></td>
<td>May NSOC Report for NSOC only.</td>
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### O. Functional Area Documents

<table>
<thead>
<tr>
<th>Subcommittee</th>
<th>Date/Doc</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>Week 201817</td>
<td>T+1 Performance Critique</td>
</tr>
<tr>
<td></td>
<td>Week 201818</td>
<td>T+1 Performance Critique</td>
</tr>
<tr>
<td></td>
<td>Week 201819</td>
<td>T+1 Performance Critique</td>
</tr>
<tr>
<td></td>
<td>Week 201820</td>
<td>T+1 Performance Critique</td>
</tr>
<tr>
<td></td>
<td>Week 201821</td>
<td>T+1 Performance Critique</td>
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### P. Documents Previously Transmitted during the Month

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<tr>
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<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
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June
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

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<thead>
<tr>
<th>Date</th>
<th>LBIE No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/19/18</td>
<td>2018-008</td>
<td>M-1179, NSCA</td>
</tr>
<tr>
<td>6/19/18</td>
<td>2018-009</td>
<td>M-1179, RAFA</td>
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</tbody>
</table>

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Letter No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/13/18</td>
<td>DCL-18-044</td>
<td>Emergency Plan Update</td>
</tr>
<tr>
<td></td>
<td>DIL-18-008</td>
<td></td>
</tr>
<tr>
<td>6/19/18</td>
<td>DCL-18-048</td>
<td>Owner’s Activity Report for Unit 2 Twentieth Refueling Outage</td>
</tr>
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</table>

C. NRC Incoming Correspondence (including Inspection Reports)

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/8/18</td>
<td>Diablo Canyon Power Plant, Units 1 and 2 – NRC Biennial Problem Identification and Resolution Inspection Report 05000275/2018008 and 05000323/2018008</td>
</tr>
<tr>
<td>6/25/18</td>
<td>Diablo Canyon Power Plant – Notification of an NRC Triennial Fire Protection Baseline Inspection (NRC Inspection Report 05000275/2018007 and 05000323/2018007) and Request for Information</td>
</tr>
</tbody>
</table>

D. NSOC/PSRC Documents (NSOC Minutes, NSOC Responses, PSRC Minutes)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSOC</td>
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<td>There are no NSOC documents for this month.</td>
</tr>
<tr>
<td>PSRC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/30/18</td>
<td>2018-002</td>
<td>DCL-18-004, Errata for the DCPP MSA for Flooding Report DCM 1000025418, U2 ECCS Valve Stem Mounted Limited Switch Interlocks</td>
</tr>
<tr>
<td>3/15/18</td>
<td>2018-006</td>
<td>Mode 4 Ready for Restart</td>
</tr>
<tr>
<td>3/17/18</td>
<td>2018-007</td>
<td>Mode 2 Ready for Restart</td>
</tr>
<tr>
<td>6/5/18</td>
<td>2018-010</td>
<td>Revision to Inservice Testing Program Plan</td>
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E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

<table>
<thead>
<tr>
<th>Type</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCAs</td>
<td></td>
<td>There are no RCAs for this month.</td>
</tr>
<tr>
<td>ACE</td>
<td>SAPN 50971931</td>
<td>DA-Unit 2 fast fuse P22-FU-2212 blown</td>
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June
List of Documents Transmitted Electronically

<table>
<thead>
<tr>
<th>Eff. Eval</th>
<th>Title</th>
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<tbody>
<tr>
<td></td>
<td>There are no Effectiveness Evals for this month.</td>
</tr>
<tr>
<td>6/1/18</td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>6/8/18</td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>6/15/18</td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>6/22/18</td>
<td>Condition Report Backlog Curves</td>
</tr>
<tr>
<td>6/29/18</td>
<td>Condition Report Backlog Curves</td>
</tr>
</tbody>
</table>

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/26/18</td>
<td>FileNet #180940011</td>
<td>2018 Operations and Technical Specifications Audit</td>
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<tr>
<td></td>
<td></td>
<td>There is no QPAR for this month.</td>
</tr>
<tr>
<td>6/7/18</td>
<td>Technical Assessment #181570004</td>
<td>Technical Assessment of Calculation PGE-027-CALC-001 (Diablo Canyon Debris Laden Strainer Head Loss Calculation)</td>
</tr>
<tr>
<td>6/14/18</td>
<td>Quality Verification Assessment #181570002</td>
<td>System Engineering Assessment</td>
</tr>
<tr>
<td>6/14/18</td>
<td>Quality Verification Assessment #181570003</td>
<td>Preventive Maintenance Optimization Project</td>
</tr>
<tr>
<td>6/19/18</td>
<td>Quality Verification Assessment #181510009</td>
<td>Chemistry STP C-1 Spray Additive System Chemical Inventory</td>
</tr>
<tr>
<td>6/5/18</td>
<td></td>
<td>Quality Digest; Information You Can Use</td>
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</table>

G. Nuclear Safety Culture Monitoring Panel Reports

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
</table>

H. Self Assessment/Benchmarking (SA/BM Reports)

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/31/18</td>
<td>SAPN 50930525</td>
<td>PI&amp;R Self-Assessment</td>
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### List of Documents Transmitted Electronically

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<tr>
<th>Date</th>
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<th>Title</th>
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</thead>
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<tr>
<td>5/31/18</td>
<td>SAPN 50982926</td>
<td>Sec: Informal Trip Report (Braidwood)</td>
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<tr>
<td>6/5/18</td>
<td>SAPN 50949811</td>
<td>HMD Site Visit Trip Report</td>
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<tr>
<td>6/5/18</td>
<td>SAPN 50956858</td>
<td>Perform QHSA of RP Instrumentation Prog</td>
</tr>
<tr>
<td>6/5/18</td>
<td>SAPN 50956871</td>
<td>Perform QHSA of Radwaste and RAM</td>
</tr>
<tr>
<td>6/7/18</td>
<td>SAPN 50927227</td>
<td>QHSA for NRC RP Inspection 71124.04</td>
</tr>
<tr>
<td>6/14/18</td>
<td>SAPN 50931893</td>
<td>2016 Planning Department QHSA</td>
</tr>
<tr>
<td>6/14/18</td>
<td>SAPN 50956859</td>
<td>Perform QHSA of Rad Effluents</td>
</tr>
<tr>
<td>6/14/18</td>
<td>SAPN 50956870</td>
<td>Perform QHSA of REMP</td>
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<tr>
<td>6/14/18</td>
<td>SAPN 50973007</td>
<td>QHSA Readiness U2 Self-Approval</td>
</tr>
<tr>
<td>6/25/18</td>
<td>SAPN 50985239</td>
<td>NRC Inspection 2018 QHSA</td>
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</table>

### I. Performance Information (PPIR, Operating Plan, Station Initiatives, IPMs)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>5/3/18</td>
<td></td>
<td>Nuclear Generation Operating Plan 2018 – 2022, No new updates this month.</td>
</tr>
<tr>
<td></td>
<td>PPIR</td>
<td>Diablo Canyon Power Plant; Plant Performance Improvement Report Achieving Results; Data: May 2018; Report Date: June 14, 2018</td>
</tr>
<tr>
<td></td>
<td>Station Initiative</td>
<td>Learning Services Excellence Plan 2018 – Generating Excellence</td>
</tr>
<tr>
<td></td>
<td>7/2/18</td>
<td>Our Path Forward 2017-2018; Organizational Effectiveness Excellence Plan</td>
</tr>
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### J. INPO

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no INPO documents for this month.</td>
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</table>
June
List of Documents Transmitted Electronically

K. Operational Documents (ODM Minutes, POAs)

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<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ODMs: There are no ODMs for this month.</td>
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<tr>
<td></td>
<td>SAPN 50985639</td>
<td>DA-2018 DBA EQ: IH-06 Conduit Configurat</td>
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L. Safety Limit Violation Report

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<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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M. Significance Determination Process Calculations

<table>
<thead>
<tr>
<th>Date</th>
<th>Doc. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>There are no Significance Determination Process Calculations for this month.</td>
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N. Miscellaneous

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/2/18</td>
<td>Jim Welsch’s Weekly Alignment Update</td>
</tr>
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O. Functional Area Documents

<table>
<thead>
<tr>
<th>Subcommittee</th>
<th>Date/Doc</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>Week 201822</td>
<td>T+1 Performance Critique</td>
</tr>
<tr>
<td></td>
<td>Week 201823</td>
<td>T+1 Performance Critique</td>
</tr>
<tr>
<td></td>
<td>Week 201824</td>
<td>T+1 Performance Critique</td>
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<td></td>
<td>Week 201825</td>
<td>T+1 Performance Critique</td>
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P. Documents Previously Transmitted during the Month

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<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>There are no documents previously transmitted during the month.</td>
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</table>
NOTICE IS HEREBY GIVEN that on October 18–19, 2017, at the Avila Lighthouse Lighthouse Suites, located at First & San Francisco Streets, Avila Beach, California, a public meeting will be held by the DCISC in the Point San Luis conference facility in five separate sessions, at the times indicated, to consider the following matters:

1. **Morning Session: (10/18/2017)–9:00 A.M.** Opening comments and remarks; receive public comments and communications to the Committee; discussion of administrative matters, including review and approval of the DCISC 27th Annual Report on the Safety of Diablo Canyon Nuclear Power Plant (DCPP) Operations for the period July 1, 2016—June 30, 2017, an update on financial matters and activities during 2017–2018, review of the Open Items List, reports by Committee Members and scheduling of future public meetings and fact-finding visits, and reports by technical consultant and legal counsel, receive, approve and authorize transmittal of fact-finding report to PG&E.

2. **Afternoon Session: (10/18/2017)–1:30 P.M.** Committee member comments; receive public comments and communications to the Committee; reports by technical consultants, approve and authorize transmittal of fact-finding reports to PG&E; discussion by the Committee of future plans and Committee effectiveness including the conduct of fact findings and public meetings, development and utility of the Annual Report, outreach to governmental officials appointing members, engagement of consultants for specific projects, and Committee’s interaction with PG&E.

3. **Evening Session: (10/18/2017)–5:15 P.M.** Committee member comments; receive public comments and communications to the Committee; receive informational presentations by PG&E on topics requested by the Committee relating to plant safety and operations, including a presentation entitled “State of the Plant” concerning key events, station activities and a summary of station highlights and performance since the last meeting of the DCISC in June 2017, a report on performance during the twentieth refueling outage for Unit-1 (1R20) and plans for the twentieth refueling outage for Unit-2 (2R20), an update on the Joint Proposal for retirement of DCPP at the expiration of its current operating licenses, and an overview of the plant
decommissioning process and initial planning.

4. **Morning Session: (10/19/2017)–9:00 A.M.** Comments by Committee members; receive public comments and communications to the Committee; approve minutes of June 7-8, 2017 public meeting, review of documents received; further informational presentations requested by the Committee from PG&E including an update on spent nuclear fuel storage issues including the potential for corrosion of the multi-purpose fuel storage canisters and lessons learned from storage of spent fuel at decommissioned nuclear facilities and potential implications for accelerating spent fuel transfer from the spent fuel pools to the Independent Spent Fuel Storage Installation, and a report on the status of NRC Performance Indicators, Licensee Event Reports, NRC Notices of Violation including the NRC’s “95001” Inspection for “White” input into a Strategic Performance Area and issues raised by NRC inspectors.

5. **Afternoon Session: (10/19/2017)–1:00 P.M.** Comments by Committee members; receive public comments and communications to the Committee; consider further informational presentations from PG&E on topics relating to plant safety and operations, including an overview of regulations and PG&E programs for classification of plant structures, systems, and components, and a report on the status of completion of the transition to National Fire Protection Association Standard 805 fire protection regulations; wrap-up discussion by Committee members, and confirmation of future site visits, study sessions and public meetings.

The DCISC’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Avila Lighthouse Suites Point San Luis Conference Facility is a wheelchair accessible facility. A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting the DCISC office at (800) 439-4688 or by sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey, CA 93940. Providing your request at least five business days before the meeting will help ensure availability of the requested accommodation.

The meeting will be webcast in real time at: http://www.slo-span.org/local_webcast/DCISC/stream_index.htm and through http://www.dcisc.org

The specific meeting agenda and the staff reports and materials regarding the above meeting agenda items will be available for public review commencing Monday, October 17, 2016, at the Reference Department of the Cal Poly Library in San Luis Obispo

The DCISC’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Avila Lighthouse Suites Point San Luis Conference Facility and 40 Acacia Avenue are wheelchair accessible facilities. A person who needs a disability-related accommodation or modification in order to
participate in the meeting may make a request by contacting the DCISC office at (800) 439-4688 or by sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey, CA 93940. Providing your request at least five business days before the meeting will help ensure availability of the requested accommodation.

The specific meeting agenda and the staff reports and materials regarding the above meeting agenda items will be available for public review at the Reference Department of the Cal Poly Library in San Luis Obispo. For further information, or if you plan to attend and need specialized accommodations, please contact Robert Wellington, Committee Legal Counsel, 857 Cass Street, Suite D, Monterey, California, 93940; telephone: 1-800-439-4688 or read the agenda on line by visiting the Committee’s website at www.dcisc.org.

Dated: October 8, 2017.
28th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2017—June 30, 2018
Preface | Executive Summary
Volume I TOC | Volume II TOC | PG& Response | Contact the DCISC

28th Annual Report, Volume II, Exhibit B.2, DCISC Agenda for the October 18–19, 2017 Public Meeting

Committee Members:

Robert J. Budnitz
Peter Lam
Per F. Peterson

Wednesday & Thursday, October 18–19, 2017
Point San Luis Conference Room
Avila Lighthouse Suites, First & San Francisco Streets, Avila Beach, California
(Click for an interactive map.)

Public Meeting Agenda

This public meeting was webcast in real time at: http://www.slo-span.org/local_webcast/DCISC/stream_index.htm and through www.dcisc.org. Note. This link was only live during the meeting.

Morning Session: 10/18/2017–9:00 A.M.

I Call To Order–Roll Call

II Introductions

Advisement

The Committee may consider at any time requests to change the order of a listed agenda item. Information distributed to the Committee at a public meeting becomes part of the public record of the DCISC. A copy of written material, pictures, etc. must be provided to the Committee’s Legal Counsel for this purpose. Correspondence received and sent by the Committee is on file with the Office of the DCISC Legal Counsel and copies are available upon request. Devices for attendees who may be hearing impaired are available upon request.

III Public Comments and Communications
Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. *There will be a time limit established by the Presiding Officer for each speaker. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.*

**IV Action Items**


B. Update on Financial Matters & Committee Activities During 2017–2018—Discussion/Action

C. Discussion of Open Items List—Discussion/Action

**V Committee Member Reports and Discussion**

A. Public Outreach, Site Visits and Other Committee Activities; Agenda Items, Scheduling and Confirmation of Future Fact-finding Visits and Public Meetings, Public Plant Tours and Outreach Activities

**VI Staff—Consultant Reports & Receive, Approve and Authorize Transmittal of Fact-finding Reports to PG&E**

A. Ferman Wardell: Fact-finding Topics; Report on and Approval of July 25–26, 2017 Fact Finding Report

B. Robert Rathie: Regulatory and Legal Matters

**VII Adjourn Morning Meeting**

**Afternoon Session: 10/18/2017–1:30 P.M.**

**VIII Reconvene for Afternoon Meeting**

**IX Committee Member Comments**

**X Public Comments and Communications**

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. *There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.*
XI Staff-Consultant Reports & Receive, Approve and Authorize Transmittal of Fact-finding Report to PG&E (Cont’d)

C. Ferman Wardell: Fact-finding Topics; Report on and Approval of August 9–10, 2017 Fact Finding Report


XII Information Items Before the Committee

A. Informational Presentations Requested by the Committee of PG&E Representatives

1. Committee Discussion of Future Plans and Committee Effectiveness: Including Conduct of Fact Findings and Public Meetings; Development and Utility of the Annual Report; Outreach to Government Officials Appointing Members; Engagement of Consultants for Specific Projects; and the Committee’s Interaction with PG&E

XIII Adjourn Afternoon Meeting

Evening Session: 10/18/2017–5:15 P.M.

XIV Reconvene for Evening Meeting

XV Committee Member Comments

XVI Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.

XVII Information Items Before the Committee

A. Informational Presentations Requested by the Committee of PG&E Representatives

1. State of the Plant Update including Key Events, Highlights, INPO Evaluation Results, and Station Activities since the DCISC’s Last Public Meeting in June 2017

2. Performance during the 20th Refueling Outage for Unit 1(1R20) Including Key Activities, Performance Indicators, Results Achieved,
Fuel and Steam Generator Inspection Results, Open Items and Plans for the 20th Refueling Outage for Unit 2(2R20)

3. Update on the Joint Proposal

4. Overview of the Decommissioning Process and Initial Planning

XXIII Adjourn Evening Meeting

Morning Session – 10/19/2017 – 9:00 A.M.

XIX Reconvene for Morning Meeting

XX Committee Member Comments

XXI Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.

XXII Consent Agenda

Routine items which the Committee can approve with a single motion and vote. A member may request that any item be placed on the regular agenda for separate consideration.

A. Minutes of June 7–8, 2017, Meeting: Approve

B. Documents Provided to the Committee: Informational

XXIII Information Items Before the Committee (Cont’d)

B. Informational Presentations Requested by the Committee of PG&E Representatives (Cont’d)

5. Update on Spent Fuel Storage Technical Issues Including PG&E & Industry Activities Related to Study of Potential Corrosion of Multi-Purpose Canisters (MPCs), Lessons Learned from Spent Fuel Activities at Decommissioned Facilities (including SONGS), and the Potential Implications for Accelerating Spent Fuel Transfer to the ISFSI and Decreasing Spent Fuel Pool Inventory

6. Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC Notices of Violation, the “95001” Inspection, and Issues Raised by NRC Resident Inspectors
XXIV Adjourn Morning Morning Meeting

Afternoon Session — 10/19/2017 — 1:00 P.M.

XXV Reconvene for Afternoon Meeting

XXVI Committee Member Comments

XXVII Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.

XXVIII Information Items Before the Committee (Cont’d)

C. Informational Presentations Requested by the Committee of PG&E Representatives (Cont’d)

7. Overview of Regulations and PG&E Programs for Classification of Structures, Systems and Components


II Concluding Remarks & Discussion by Committee Members of Future DCISC Activities

A. Future Actions by the Committee

B. Further Information to Obtain/Review

C. Confirmation of Future Site Visits, and Public Meetings

XXIV Adjournment of Eighty–eighth Public Meeting

The DCISC’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Avila Lighthouse Suites Point San Luis Conference Facility is a wheelchair accessible facility. A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting the DCISC office at (800) 439-4688 or by sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey, CA 93940. Providing your request at least five business days before the meeting will help ensure availability of the accommodation.
**Notice of Diablo Canyon Power Plant Tour and Public Meeting of Diablo Canyon Independent Safety Committee (DCISC)**

28th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2017—June 30, 2018

Preface | Executive Summary
Volume I TOC | Volume II TOC | PG& Response | Contact the DCISC

**28th Annual Report, Volume II, Exhibit B.4, Notice of Public Meeting and Plant Tour**

**NOTICE IS HEREBY GIVEN** that on February 7, 2018, at 8:00 A.M. the members of the Diablo Canyon Independent Safety Committee (“DCISC”) will conduct an inspection tour of certain areas of the Diablo Canyon Power Plant (“DCPP”). This tour, which will take approximately four hours, was previously advertised to the public. Because the plant is an operating nuclear power plant the number of participants is limited and space will be assigned on the basis of prior reservations. Prior clearance of all public attendees is required in compliance with rules of the U.S. Nuclear Regulatory Commission (“NRC”).

In the alternative, if security or other considerations preclude the public tour on February 7th, the DCISC may convene an informal presentation and question and answer session at the Pacific Gas & Electric Company (“PG&E”) Energy Education Center, 6588 Ontario Road, San Luis Obispo, California.

**Notice Is Hereby Further Given** that on February 7–8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility, located at First and San Francisco Streets, Avila Beach, California, a public meeting will be held by the DCISC in four separate sessions, at the times indicated, to consider the following matters:

1. **Afternoon Session: (02/07/2018)–1:30 P.M.** Opening comments and remarks; receive public comments and communications to the Committee; approve the Minutes of the DCISC’s October 18–19, 2017 public meeting; discussion of administrative matters, including receipt of PG&E’s response to the DCISC 27th Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations for the period July 1, 2016—June 30, 2017; an update on financial matters and activities; review of the Open Items List; reports by Committee Members and Technical Consultants; scheduling of future fact-finding visits and public meetings; review documents received; and approve fact finding reports and authorize their transmittal to PG&E.

2. **Evening Session: (02/07/2018)–6:00 P.M.** Committee member comments; receive public comments and communications to the Committee; receive informational presentations related to plant safety and operations requested by the Committee from PG&E, including the “State of the Plant” regarding key events, station activities, organizational changes, the Institute of Nuclear Power Operation’s evaluation results, and a summary of station activities.
highlights and performance since October 2017, and an update on the status of the Joint Proposal to retire DCPP and on the Employee Retention Plan and efforts to retain qualified staff including licensed operators.

3. **Morning Session: (02/08/2018)–8:00 A.M.** Comments by Committee members; receive public comments and communications to the Committee; a summary by a DCISC Technical Consultant of the NRC Staff Assessment and of a Technical Evaluation by Taylor Engineering of the flooding hazard due to tsunamis; receive further informational presentations requested by the Committee from PG&E relating to plant safety and operations, including an update on NRC Performance Indicators, recent Licensee Event Reports, NRC Notices of Violation, the NRC 95001 Inspection related to a White finding, and issues raised by NRC Resident Inspectors, and a presentation on the results of the 2017 Operating Plan and key elements of the 2018 Operating Plan; approve fact-finding report and authorize its transmittal to PG&E; report by Assistant Legal Counsel on administrative and regulatory matters, and discussion by the Committee of a potential role for the DCISC following expiration of the operating licenses.

4. **Afternoon Session: (02/08/2018)–1:00 P.M.** Comments by Committee members; receive public comments and communications to the Committee; consider further informational presentations from PG&E on topics relating to plant safety and operations, including the handling and disposal of damaged spent fuel, and an overview of training in the use of FLEX equipment including a representative training video; wrap-up discussion by Committee members, and confirmation of future site visits, study sessions and public meetings.

The DCISC’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Avila Lighthouse Suites Point San Luis Conference Facility is a wheelchair accessible facility. A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting the DCISC office at (800) 439-4688 or by sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey, CA 93940. Providing your request at least five business days before the meeting will help ensure availability of the requested accommodation.

The specific meeting agenda and the staff reports and materials regarding the above meeting agenda items will be available for public review commencing Monday, February 5, 2018, at the Reference Department of the Cal Poly Library in San Luis Obispo and online at www.dcisc.org. **For further information regarding the public meeting, please contact Robert Wellington, Committee Legal Counsel, 857 Cass Street, Suite D, Monterey, California, 93940; telephone: 1-800-439-4688 or read the agenda on line by visiting the Committee’s website at www.dcisc.org.**

The DCISC’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Avila Lighthouse Suites Point San Luis
Conference Facility and 40 Acacia Avenue are wheelchair accessible facilities. A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting the DCISC office at (800) 439-4688 or by sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey, CA 93940. Providing your request at least five business days before the meeting will help ensure availability of the requested accommodation.

The specific meeting agenda and the staff reports and materials regarding the above meeting agenda items will be available for public review at the Reference Department of the Cal Poly Library in San Luis Obispo. For further information, or if you plan to attend and need specialized accommodations, please contact Robert Wellington, Committee Legal Counsel, 857 Cass Street, Suite D, Monterey, California, 93940; telephone: 1-800-439-4688 or read the agenda on line by visiting the Committee’s website at www.dcisc.org.

Committee Members:

Robert J. Budnitz
Peter Lam
Per F. Peterson

Wednesday & Thursday, February 7–8, 2018
Point San Luis Conference Room
Avila Lighthouse Suites, First & San Francisco Streets, Avila Beach, California
(Click for an interactive map.)

Public Tour - 02/07/2018 - 8:00 A.M.

Public Tour of Diablo Canyon Nuclear Power Plant to assemble at the PG&E Community Center
(Prior registration and security clearance required of all public participants.)

The Members of the Independent Safety Committee, accompanied by members of the public, will conduct a tour of the Plant.

Following the tour, or in the alternative if the tour must be cancelled for any reason, the Committee may convene an informal question and answer session at the PG&E Energy Education Center (formerly the PG&E Community Center), 6588 Ontario Road, San Luis Obispo.

Public Meeting Agenda

This public meeting will be webcast in real time at: http://www.slo-span.org/local_webcast/DCISC/stream_index.htm and through www.dcisc.org. Note. This link will only be live during the meeting.

Afternoon Session: 02/07/2018–1:30 P.M.

I Call To Order–Roll Call
II Introductions

Advisement

The Committee may consider at any time requests to change the order of a listed agenda item. Information distributed to the Committee at a public meeting becomes part of the public record of the DCISC. A copy of written material, pictures, etc. must be provided to the Committee’s Legal Counsel for this purpose. Correspondence received and sent by the Committee is on file with the Office of the DCISC Legal Counsel and copies are available upon request. Devices for attendees who may be hearing impaired are available upon request. This meeting will be webcast in real time.

III Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.

IV Approval of Minutes

A. Minutes of October 18–19, 2017, Meeting: Approve

V Action Items


B. Update on Financial Matters, & Committee Activities: Discussion/Action

C. Discussion of Open Items List: Discussion/Action

VI Committee Member Reports and Discussion

A. Public Outreach, Site Visits and Other Committee Activities; Agenda Items, Scheduling and Confirmation of Future Fact-findings and Public Meetings

B. Documents Provided to the Committee

VII Technical Consultant Reports & Receive, Approve and Authorize Transmittal of Fact-finding Reports to PG&E

A. Ferman Wardell: Fact-finding Topics; Report on and Approval of the


VIII Adjourn Afternoon Meeting

Evening Session: 02/07/2018–6:00 P.M.

IX Reconvene for Evening Meeting

X Committee Member Comments

XI Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.

XII Information Items Before the Committee

A. Informational Presentations Requested by the Committee of PG&E Representatives

1. State of the Plant Update including Key Events, Highlights, Organizational Changes, Institute of Nuclear Power Operations Evaluation Results, and Station Activities since DCISC’s October 2017 Public Meeting

2. Update on the Status of the Joint Proposal and Employee Retention Plan Including Efforts to Retain Qualified Staff including Licensed Operators

XIII Adjourn Evening Meeting

Morning Session: 02/08/2018–8:00 A.M.

XIV Reconvene for Morning Meeting

XV Committee Member Comments

XVI Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the
matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.

XVII Technical Consultant Report Report & Committee Discussion

C. Richard D. McWhorter Jr.: Brief Summary of the NRC Staff Assessment and the Technical Evaluation by Taylor Engineering of the Flooding Hazard Due to a Tsunami

XVIII Information Items Before the Committee (Cont’d.)

3. Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC Notices of Violation, the NRC’s 95001 Inspection, and Issues Raised by the NRC Resident Inspectors

4. Results of the 2017 Operating Plan and Key Elements of the 2018 Operating Plan


D. Ferman Wardell: Fact-finding Topics; Report on and Approval of the January 18–19, 2018 Fact Finding Report

XX Legal Counsel Report & Committee Discussion

A. Robert Rathie: Administrative, Regulatory and Legal Matters including Discussion of a Potential Role for the Committee after Expiration of the Operating Licenses: Discussion/Direction

XXI Adjourn Morning Meeting

Afternoon Session – 02/08/2018 – 1:00 P.M.

XXII Reconvene for Afternoon Meeting

XXIII Committee Member Comments

XXIV Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.
XXV Information Items Before the Committee (Cont’d)

5. Handling and Disposal of Damaged Spent Fuel
6. Overview of Training in the Use of FLEX Equipment Including a Representative Training Video

II Concluding Remarks & Discussion by Committee Members of Future DCISC Activities

A. Future Actions by the Committee
B. Further Information to Obtain/Review
C. Confirmation of Future Site Visits, and Public Meetings

XXIV Adjournment of Eighty-ninth Public Meeting

The DCISC’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Avila Lighthouse Suites Point San Luis Conference Facility is a wheelchair accessible facility. A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting the DCISC office at (800) 439-4688 or by sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey, CA 93940. Providing your request at least five business days before the meeting will help ensure availability of the accommodation.
NOTICE IS HEREBY GIVEN that on Tuesday, May 22, 2018, at the Graduate (formerly known as the Hotel Durant), in the Board Room meeting facility, located at 2600 Durant Avenue, Berkeley, California, a public meeting will be held by the Diablo Canyon Independent Safety Committee (DCISC) under the provisions of the Bagley-Keene Open Meeting Act (Govt. Code §§11120 et seq.) in a single session, at the time indicated, to consider the following matter:

May 22, 2018 - 10:00 A.M. Committee member comments; consideration of approval of a letter commenting on California Senate Bill 1090 (Monning) with reference to funding for the Diablo Canyon Nuclear Power Plant employee retention program; receive public comments and communications to the Committee; and wrap-up discussion by Committee members.

Members of the public are welcome to attend the meeting at the Berkeley, California, location in person or members of the public may participate in the meeting by calling 1-800-309-2350 and entering the conference identification number 439-4688. All calls will be recorded. The meeting agenda, including the final draft of the letter to be considered, will be available on the Committee’s website prior to the public meeting.

For further information regarding the public meeting, please contact Robert Wellington, DCISC Legal Counsel, 857 Cass Street, Suite D, Monterey, California, 93940; telephone:1-800-439-4688 or read the agenda on line by visiting the DCISC’s website at http://www.dcisc.org.

Dated: May 12, 2018.
28th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2017—June 30, 2018

Preface | Executive Summary
Volume I TOC | Volume II TOC | PG& Response | Contact the DCISC

28th Annual Report, Volume II, Exhibit B.8, DCISC Agenda for the May 22, 2018 Public Meeting

Committee Members:

Robert J. Budnitz  
Peter Lam  
Per F. Peterson

To join the meeting by teleconference: 1. Dial-In Number (1-800) 309-2350. 2. Enter Conference Code: 439 4688.

This public meeting was livestreamed in real time at: http://www.slo-span.org/local_webcast/DCISC/stream_index.htm.

Public Meeting Location  
The Graduate (formerly the Hotel Durant)  
Board Room Conference Facility  
2600 Durant Avenue, Berkeley, CA

I Call to Order – Roll Call

II Introductions/Establishment of a Quorum

III Action Item

A. Consideration of approval of a letter commenting on California Senate Bill 1090 (Monning) with reference to funding for the Diablo Canyon Nuclear Power Plant employee retention program. Approve.

IV Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.
V Adjournment of Public Meeting

The Committee’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Graduate is an accessible facility. A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting the DCISC office at (800) 439-4688 or sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey, CA 93940. Providing your request at least five business days before the meeting will help ensure availability of the requested accommodation.
Notice Is Hereby Given that on June 13, 2018, at 8:00 A.M. the members of the Diablo Canyon Independent Safety Committee (“DCISC”) will conduct an inspection tour of certain areas of the Diablo Canyon Power Plant (“DCPP”). This tour, which will take approximately four hours, was previously advertised to the public. Because the plant is an operating nuclear power plant the number of participants is limited and space will be assigned on the basis of prior reservations. Prior clearance of all public attendees is required in compliance with rules of the U.S. Nuclear Regulatory Commission (“NRC”).

In the alternative, if security or other considerations preclude the public tour on February 7th, the DCISC may convene an informal presentation and question and answer session at the Pacific Gas & Electric Company (“PG&E”) Energy Education Center, 6588 Ontario Road, San Luis Obispo, California.

Notice is hereby further given that on June 13–14, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility, located at First and San Francisco Streets, Avila Beach, California, a public meeting will be held by the DCISC in four separate sessions, at the times indicated, to consider the following matters:

1. **Afternoon Session: (06/13/2018)–1:30 P.M.** Opening comments and remarks by Committee Members, receive public comments and communications to the Committee; review and approval of the Minutes of the February 7–8 and May 22, 2018, public meetings; discussion of administrative matters, including an update on financial matters and activities during 2018; review of the Open Items List; nomination and election of Chair and Vice Chair to serve for the July 1, 2018 to June 30, 2019 term; consider adopting a revision of DCISC Policy No. 2 “Accounting Procedures;” reports by Committee Members, technical consultants and legal counsel; scheduling of future public meetings and site visits; receive, approve and authorize transmittal of fact-finding reports to PG&E; and review of documents received.

2. **Evening Session: (06/13/2018)–5:30 P.M.** Comments by Committee members; receive public comments and communications to the Committee; consider informational presentations requested by the Committee from PG&E on topics relating to plant safety and operations, including a report on the
State of the Plant and key events, operational highlights and performance and station activities since the DCISC February 2018 public meeting, an update on long-term capital project planning under CPUC Decision D.18-01-022 including the Plant Investment Review process and an overview of the Project Review Working Group process and results of its analysis to date, and an update on the DCPP Employee Retention Plan under D.18-01-022 including ongoing efforts to retain sufficient numbers of qualified licensed Operations Department staff.

3. **Morning Session: (06/14/2018)–9:00 A.M.** Comments by Committee members; receive public comments and communications to the Committee; receive informational presentations on topics relating to plant safety and operations including, an update on the status of NRC Performance Indicators, Licensee Event Reports, NRC Notices of Violation and issues raised by NRC inspectors, the results of the Seismic Probabilistic Risk Assessment Project including an update on the status of PG&E’s review of the tsunami hazard and risk at DCPP and its environs; and a presentation on a fact-finding visit by Committee Technical Consultant and approval of report and authorize its transmittal to PG&E

4. **Afternoon Session: (06/14/2018)–1:00 P.M.** Committee member comments; receive public comments and communications to the Committee; receive informational presentation from PG&E on performance during the 20th refueling outage for Unit-2 (2R20) including key activities, performance indicators, results achieved and fuel and steam generator inspection results and open items; Committee discussion of a post-shutdown roles matric with reference to a potential post-shutdown role for the Committee and possible engagement, on an ad hoc basis, of a technical consultant to assist in identification of decommissioning issues; and wrap-up discussion by Committee Members.

The DCISC’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Avila Lighthouse Suites Point San Luis Conference Facility is a wheelchair accessible facility. A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting the DCISC office at (800) 439-4688 or by sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey, CA 93940. Providing your request at least five business days before the meeting will help ensure availability of the requested accommodation.

The specific meeting agenda and the staff reports and materials regarding the above meeting agenda items will be available for public review commencing Monday, June 11, 2018, at the Reference Department of the Cal Poly Library in San Luis Obispo and online at www.dcisc.org. **For further information regarding the public meeting, please contact Robert Wellington, Committee Legal Counsel, 857 Cass Street, Suite D, Monterey, California, 93940; telephone: 1-800-439-4688 or read the agenda on line by visiting**

the Committee’s website at www.dcisc.org.

The DCISC’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Avila Lighthouse Suites Point San Luis Conference Facility and 40 Acacia Avenue are wheelchair accessible facilities. A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting the DCISC office at (800) 439-4688 or by sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey, CA 93940. Providing your request at least five business days before the meeting will help ensure availability of the requested accommodation.

The specific meeting agenda and the staff reports and materials regarding the above meeting agenda items will be available for public review at the Reference Department of the Cal Poly Library in San Luis Obispo. For further information, or if you plan to attend and need specialized accommodations, please contact Robert Wellington, Committee Legal Counsel, 857 Cass Street, Suite D, Monterey, California, 93940; telephone: 1-800-439-4688 or read the agenda on line by visiting the Committee’s website at www.dcisc.org.

Dated: June 3, 2018.
Committee Members:

Robert J. Budnitz  
Peter Lam  
Per F. Peterson

Wednesday & Thursday, June 13–14, 2018  
Point San Luis Conference Room  
Avila Lighthouse Suites, First & San Francisco Streets  
Avila Beach, California  
(Click for an interactive map.)

Public Tour - 06/13/2018 - 7:30 A.M. – Noon

Public Tour of Diablo Canyon Nuclear Power Plant to assemble at the PG&E Community Center  
(Prior registration and security clearance required of all public participants.)

The Members of the Independent Safety Committee, accompanied by members of the public, will conduct a tour of the Plant.

Following the tour, or in the alternative if the tour must be cancelled for any reason, the Committee may convene an informal question and answer session at the PG&E Energy Education Center (formerly the PG&E Community Center), 6588 Ontario Road, San Luis Obispo.

Public Meeting Agenda

This public meeting was webcast in real time at: http://cal-span.org/unipage/index.php?site=slo-span&meeting=2266&owner=DCISC&point=DCISC.

Afternoon Session: 06/13/2018–1:30 P.M.

I Call To Order–Roll Call
II Introductions

Advisement

The Committee may consider at any time requests to change the order of a listed agenda item. Information distributed to the Committee at a public meeting becomes part of the public record of the DCISC. A copy of written material, pictures, etc. must be provided to the Committee’s Legal Counsel for this purpose. Correspondence received and sent by the Committee is on file with the Office of the DCISC Legal Counsel and copies are available upon request. Devices for attendees who may be hearing impaired are available upon request.

III Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.

IV Consent Agenda

Routine items which the Committee can approve with a single motion and vote. A member may request that any item be placed on the regular agenda for separate consideration.

A. Minutes of February 7–8, 2018, Meeting: Approve
B. Minutes of May 22, 2018 Public Meeting: Approve

V Action Items

A. Update on Financial Matters and Committee Activities during 2018—Discussion/Action
B. Discussion of Open Items List—Discussion/Action
C. Nomination and Election of Chair and Vice-Chair for the July 1, 2018—June 30, 2019 Term—Discussion/Action
D. Consider Adoption of a Revision to Committee Policy #2 “Accounting Procedures” to Regarding Electronic Deposits & Payments—Discussion/Action

VI Committee Member Reports and Discussion
A. Public Outreach, Site Visits and Other Committee Activities; Agenda Items, Scheduling and Confirmation of Future Fact-finding Visits and Public Meetings

B. Documents Provided to the Committee

VII Staff – Consultant Reports & Receive, Approve and Authorize Transmittal of Fact-finding Reports to PG&E

A. Consultant Richard D. McWhorter Jr.: Fact-finding Topics; Report on and Approval of March 7–8, 2018 Fact Finding Report

B. Consultant R. Ferman Wardell. Fact-finding Topics; Report on and Approval of April 17–18, 2018 Fact Finding Reports

C. Assistant Legal Counsel Robert W. Rathie: Administrative, Regulatory and Legal Matters

VIII Adjourn Afternoon Meeting

Evening Session: 06/13/2018–5:30 P.M.

IX Reconvene for Evening Meeting

X Committee Member Comments

XI Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.

XII Information Items Before the Committee

A. Informational Presentations Requested by the Committee of PG&E Representatives

1. Presentation on the State of the Plant: including Key Events, Highlights and Station Activities since February 2018

2. Update on Long-term Capital Project Planning under CPUC Decision D.18-01-022 including the Plant Investment Review Process and an Overview of the Project Review Working Group Process and the Results of its Analysis to Date

3. Update on the DCPP Employee Retention Plan under CPUC Decision D.18-01-022 including Ongoing Efforts to Retain Sufficient Numbers of...
Qualified Licensed Operations Department Staff.

XIII Adjourn Evening Meeting

Morning Session: 06/14/2018–9:00 A.M.

XIV Reconvene for Morning Meeting

XV Committee Member Comments

XVI Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.

XVII Information Items Before the Committee (Cont’d)

4. Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC Notices of Violation and Issues Raised by NRC Resident Inspector

5. Seismic Probabilistic Risk Assessment Project Results including an Update on the Status of PG&E’s Review of the Tsunami Hazard and Risk at DCPP and its Environs

XXIII Technical Consultant Report & Receive, Approve and Authorize Transmittal of Fact-finding Report to PG&E (Cont’d)

D. Richard McWhorter: Fact-finding Topics; Report on and Approval of the May 2–3, 2018 Fact Finding Report

XIX Adjourn Morning Meeting

Afternoon Session – 06/14/2018 – 1:00 P.M.

XX Reconvene for Afternoon Meeting

XXI Committee Member Comments

XXII Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. The public may comment on any matter listed on the Agenda immediately following the time the
matter is considered by the Committee. There will be a time limit for each speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item but they may be referred to staff for further study, response or action.

XXIII Informational Discussion by Committee Members & Consultants (Cont’d)

6. Performance during the 20th Refueling Outage for Unit-2 (2R20) including Key Activities, Performance Indicators, Results Achieved, Fuel and Steam Generator Inspection Results and Open Items

XXIV Informational Discussion By Committee Members & Consultants

1. Committee Discussion of Post-Shutdown Role Matrix of Areas for Review with reference to a Potential Role for the DCISC After Expiration of the Operating Licenses for DCPP and the Possible Engagement, on an Ad Hoc Basis, of a Consultant to Assist in the Identification of Decommissioning-related Issues—Discussion/Direction

XXV Concluding Remarks & Discussion by Committee Members of Future DCISC Activities

A. Future Actions by the Committee
B. Further Information to Obtain/Review
C. Confirmation of Future Site Visits, and Public Meetings

XXVI Adjournment of Ninetieth Public Meeting

The DCISC’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Avila Lighthouse Suites Point San Luis Conference Facility is a wheelchair accessible facility. A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting the DCISC office at (800) 439-4688 or by sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey, CA 93940. Providing your request at least five business days before the meeting will help ensure availability of the accommodation.
DCISC Service Mailing List

The DCISC sends legal notices of meetings and press releases with the informational items for discussion at its public meetings to those persons who have requested same and to governmental entities, interested groups and to the news media. This exhibit includes a list of the persons, governmental and public entities, interested groups and the news media outlets who regularly receive information regarding the DCISC's public meetings. Address information for private citizens has been redacted and a copy of a notice sent to those persons and the entities on the mailing list offering them an opportunity to receive notice of DCISC public meetings by email is included.
EMAIL LIST FOR DCISC LEGAL NOTICE

28th Annual Report Period

Gene A. Nelson, Ph.D.  
redacted

Garry Gillette  
Nipomo, CA 93444  
redacted

Linda Seeley  
Los Osos, CA 93402  
redacted
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE
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Organization: _______________________
Address: ____________________________
City, State, Zip: ____________________________
E-Mail: ____________________________

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Electronic delivery of public notices will include an e-mail with a hyperlink to the DCISC’s home page on the internet which includes the notice for meetings. Please add info@dcsafety.org to your “safe senders” list to ensure that you receive e-mail notification of the DCISC’s public meetings.

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Office of the Legal Counsel
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Monterey, CA, 93940

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1.0 Summary

The results of the July 25–26, 2017 fact-finding trip to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Meet with NRC Resident Inspector
2. Fire Doors
3. Annual Radiological Release Report
4. Annual Radiological Environmental Monitoring Report
5. Control Room Ventilation System
6. Direct Current (DC) Power System
7. Plant Health Committee
8. Management Observation Program
9. Nuclear Fuel Performance
10. Independent Spent Fuel Storage Installation
11. DCPP Safety Culture
12. Use of FLEX Equipment to Reduce Plant Risk
13. Cyber Security

2.0 Introduction

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if PG&E’s performance is appropriate and whether any areas revealed observations which are important enough to warrant further review, follow-up, or presentation at a Public Meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.
Section 4—Conclusions highlights the conclusions of the Fact-finding Team based on items reported in Section 3—Discussion. These highlights also include the team’s suggested follow-up items for the DCISC, such as scheduling future fact-finding meetings on the topic, presentations at future public meetings, and requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations lists specific recommendations to PG&E proposed by the Fact-finding Team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the Fact-finding Report, including its recommendations, is provided to PG&E. The Fact-finding Report will also appear in the DCISC Annual Report.

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if Pacific Gas and Electric’s (PG&E’s) performance is appropriate and whether any areas revealed observations, which are important enough to warrant further review, follow-up, or presentation at a public meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4—Conclusions highlights the conclusions of the fact-finding team based on items reported in Section 3—Discussion. These highlights also include the team’s suggested follow-up items for the DCISC, such as scheduling future fact-finding meetings on the topic, presentations at future public meetings, and requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations presents specific recommendations to PG&E proposed by the fact-finding team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the fact-finding report, including its recommendations, will be provided to PG&E. The fact-finding report will also appear in the DCISC Annual Report.

3.0 Discussion

3.1 Meet with NRC Resident Inspector

The DCISC Fact-finding Team (FFT) met with John Reynoso, NRC Resident Inspector at DCPP to share information about plant issues, status and evaluations. The DCISC last met with NRC in May 2017 (Reference 6.1), concluding the following:

*The regular meetings with the NRC Resident Inspectors are beneficial. During the meeting, the topics of the use of FLEX equipment to reduce day-to-day risk and the upcoming NRC FLEX inspection on November 14, 2017, were discussed. The DCISC should review these topics in future...*
Fact-finding Meetings.

The DCISC and Resident Inspector discussed the following items:

- Seismic workplace safety, including successfully testing several bookcases in the NRC office area.
- NRC’s DCPP FLEX inspection will begin November 14, 2017.
- NRC is aware of DCPP’s plans to use FLEX equipment to reduce day-to-day risk in the refueling outage 1R20 and future outages (see Item 3.12 below).
- NRC’s tsunami evaluation should be released by 2017 year end.
- NRC has approved DCPP’s use of the Alternate Source Term for its Control Room Ventilation System analyses (see Item 3.5 below).
- NRC has completed its 95001 inspection of the Residual Heat Removal valve white finding, but the report has not yet been approved by NRC Region 4.
- DCPP is implementing its modifications for the Open Phase Power issue.
- DCPP post-accident field monitoring teams (the DCISC plans to include this in a future fact-finding meeting). Both DCISC and NRC did not believe they knew enough about the field monitoring teams.

Conclusions:

The DCISC Fact-finding Team concluded that the meeting with NRC resident inspectors was beneficial and should continue them. From the above discussion, the DCISC plans to follow up on DCPP Post-Accident Field Monitoring Teams.

Recommendations:

None

3.2 Fire Doors

The DCISC Fact-finding Team met with Al Clark, Manager, Door Replacement Program, and Jeremy Hartley, Project Manager in Strategic Projects, for an update on DCPP Fire Doors status. The DCISC last reviewed fire doors in July 2016 (Reference 6.2), when it concluded the following:

*DCPP continues to make good progress in the repair or replacement of its impaired fire and Equipment Control Guideline doors.*

DCPP has the following numbers of doors in the Power Block:

- 967 total ECG Equipment Control Guideline* (ECG) and Non-ECG doors
- 414 ECG doors, including 280 fire, 83 HVAC (ventilation system), 26 HELB (high energy line break), and four combination flood and fire doors
148 doors with security functions

*Equipment Control Guidelines are similar to Technical Specifications in that they specify requirements for items, although ECGs do not require NRC approval for changes.*

Door impairments include problematic hinges, handles, skin failures, locks, closers, etc. Plant doors typically experience tens of thousands of openings and closings per year. A top-rated fire door typically costs about $5000 itself and an additional $90,000—$100,000 to install, including engineering analyses, compensatory actions while the door is being installed, and PG&E corporate cost burden.

After a slow start on repairing or replacing impaired doors, which were subject to compensatory actions such as fire watches, a new “Power Block Door Project” was presented in July 15, 2014 to the Project Review Committee for funding. This Project included replacement of all 94 doors in the Power Block because they had outlived their useful life, i.e., they had degraded to the point where they can no longer be repaired to meet the design safety function. (Note that later, in 2016, DCPP decided to repair as many doors as possible [see below]). The Project Review Committee, in its July 15, 2014 meeting, approved including the 2015 Power Block Project scope in the DCPP Five Year Plan and funding for an additional four years in the future.

In the July 2016 Fact-finding Meeting the DCISC concluded that DCPP was making good progress with its impaired fire doors. Impaired doors are included on a prioritized list and are repaired/replaced in that order in numbers dictated by the budget. The numbers of fire doors that have been or are scheduled to be replaced are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>9</td>
</tr>
<tr>
<td>2015</td>
<td>18</td>
</tr>
<tr>
<td>2016</td>
<td>11</td>
</tr>
<tr>
<td>2017</td>
<td>11</td>
</tr>
<tr>
<td>2018</td>
<td>5</td>
</tr>
<tr>
<td>2019</td>
<td>7</td>
</tr>
</tbody>
</table>

DCPP is looking more at door repair than replacement to speed up fixes and to keep costs down. Approximately one-half of impaired doors will be repaired and one-half replaced. The Fix It Now Team is the primary organization assigned to repair and replace doors.

Conclusions:

DCPP is making good progress in repairing and/or replacing its impaired fire doors, while maintaining compensatory measures as
long as the doors remain impaired. The schedule and budget for fire doors appears appropriate.

Recommendations:

None

3.3 Annual Radiological Release Report

The DCISC Fact-finding Team met with Clint Gans, Senior Chemical Engineer, and Trevor Rebel, Radioactive Effluents Program Manager from DCPP’s Chemistry Department, to review the 2016 Annual Radiation Release Report. The DCISC last reviewed this topic in August 2016 (Reference 6.3), concluding the following:

DCPP radioactive releases have been measured to be a very small fraction of allowable releases. This has been confirmed by environmental sampling around the plant.

DCPP submitted its 2016 Annual Radioactive Effluent Release Report (ARERR) to NRC on April 26, 2017. This report described the measured quantities of radioactive gaseous and liquid effluents released from the plant in 2016. Based on records of 2016 radioactive liquid and gaseous releases, the following radiation doses to the total body of a hypothetical individual at the site boundary (approximately 800 yards from the plant) and the corresponding percent of Technical Specifications limits for the year 2016 were reported in the ARERR as:

<table>
<thead>
<tr>
<th>Effluent Type</th>
<th>Calculated Radiation Dose</th>
<th>Percent of Tech. Spec. Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid</td>
<td>0.0002 milliRem</td>
<td>0.0066</td>
</tr>
<tr>
<td>Gaseous</td>
<td>0.00032 millirad</td>
<td>0.0032</td>
</tr>
</tbody>
</table>

A calculation was performed to determine the upper limit of possible radiation exposure for any member of the public. The calculation found that direct radiation was 5.1 milliRem per year to an individual working at the onsite makeup water facility up near the Independent Spent Fuel Storage Installation (ISFSI).

The DCISC Received and reviewed DCPP Procedure CY2.ID1, "Radioactive Effluent Controls Program," Revision 14, March 16, 2017. This procedure appeared appropriate for controlling and measuring radioactive effluents from DCPP. All releases were planned, controlled ones with no accidental releases.

Conclusions:

DCPP’s Radiological Effluent Control Program was satisfactory in controlling and measuring the plant’s radiological effluents and keeping them within very small fractions of permissible limits.

Recommendations:
3.4 Annual Radiological Environmental Monitoring Report

The DCISC met with Marty Wright, Radiation Protection Senior Advising Engineer, and Tom Hook, Radiation Protection Engineer, for a report on the 2016 Radiological Environmental Monitoring Program (REMP). The DCISC last reviewed the DCPP REMP in July 2016 (Reference 6.4), concluding the following:

*DCPP radioactive releases have been measured to be a very small fraction of allowable releases. This has been confirmed by environmental sampling around the plant.*

The 2016 Annual Radiological Environmental Operating Report (AREOR), submitted to NRC on April 26, 2017, describes the results of the REMP, which reports and assesses the levels of radiation or radioactivity in the environment related to operation of DCPP. The 2016 REMP includes more than 2,400 samples (including Thermo-luminescent Dosimeters [TLDs]) with approximately 1,700 radionuclide or exposure rate analyses being performed. Samples included surface water, drinking water, marine samples, vegetation, food crops, milk, and meat. The report concluded the following:

*The results of the 2015 REMP showed no unusual environmental isotopic findings from DCPP site operations. These results were compared to preoperational data and showed no unusual trends. Diablo Canyon site operations had no significant environmental radiological impact on airborne, surface water, drinking water, marine life aquatic vegetation, terrestrial vegetation, sediment, milk, or meat radioactivity.*

Direct ambient radiation was continuously measured at 32 locations surrounding DCPP using TLDs. These 32 locations are made up of 29 indicator stations and 3 control stations. Three TLD badges are placed at each location, and each badge has three detectors to provide an average dose at each location. The dosimeters are collected and read every calendar quarter. The results are trended and compared with preoperational and historical operating values to look for adverse trends. The ambient direct radiation levels in the DCPP offsite environs did not change and were within preoperational ranges throughout 2016.

The Old Steam Generator Storage Facility (OSGSF) contains four old steam generators and two old reactor vessel heads. The OSGSF did not cause any changes to the ambient direct radiation levels in the DCPP environment during 2016. Also the sumps to the OSGSF were inspected quarterly and remained empty and dry during 2016.

Tritium levels in three monitoring wells beneath the power block all had detectable tritium at very low concentrations well below the Environmental Protection Agency...
Twenty-eighth Annual Report, Volume 2, Report on Fact-finding Meeting at Diablo Canyon Nuclear Power Plant (DCPP)

(EPA) drinking water standard of 0.02 microcuries per liter. This tritium was attributed to rain-washout of gaseous tritium contained in water evaporated from the Spent Fuel Pools, exiting the plant through the plant ventilation exhaust system, which is an approved discharge path. All groundwater at the site flows into the Pacific Ocean and is not a source of drinking water.

An evaluation of direct radiation measurements and member-of-public occupancy times surrounding the ISFSI has indicated that all Federal criteria for member-of-public dose limits are being conservatively met. Also, because all of these TLDs are located well within the site boundary and are not in the unrestricted area, the ISFSI loading has not affected the TLD trending results with respect to the 32 locations surrounding DCPP, and the public is not affected significantly by the ISFSI.

In addition, annual cumulative radiation dose is evaluated at the closest site boundary for the combined effects of the OSGSF, the ISFSI, radioactive waste containers outside of plant buildings, and radioactive tools and equipment stored inside plant buildings. This cumulative annual radiation dose was reported in the ARERR to be less than 1.0 milliRem, compared to 310 milliRem average annual radiation exposure to people in the U.S. from natural sources (e.g., cosmic, terrestrial, radon, etc.).

Conclusions:

The DCPP Radiological Environmental Monitoring Program appeared satisfactory in monitoring and measuring radioactivity in the environment surrounding DCPP. There were no abnormal levels of radioactivity detected.

Recommendations:

None

3.5 Control Room Ventilation System

The DCISC FFT met with Michael Richardson, Control Room Ventilation System Engineer, for an update on the Control Room Ventilation System issues. The DCISC last reviewed this issue in May 2016 (Reference 6.5), concluding the following:

DCPP is making good progress in resolving issues with its Control Room Ventilation System (CRVS). The two remaining issues, upgrading the CRVS air conditioning system and NRC approval of Control Room Envelope accident radiation dose calculations, are on-track for completion in 2018 and 2017, respectively.

The DCPP Control Room Ventilation System (CRVS) consists of the following three
systems:

1. Control Room HVAC System (CRHVAC)
2. Control Room Pressurization System (CRPS)
3. Plant Process Computer (PPC) Room Air Conditioning System

The CRHVAC consists of two independent trains for each unit. The CRPS is composed of one train for each unit. These two systems are interconnected mechanically and operationally and are intended to be operational during all plant operating modes. The PPC Room Air Conditioning System serves only to cool the Plant Process Computer room.

The CRHVAC and CRPS operate in one of the following modes:

<table>
<thead>
<tr>
<th>Mode</th>
<th>CRVS “normal” mode (CRNV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode 1</td>
<td>CRVS smoke removal mode to remove smoke in the Control Room</td>
</tr>
<tr>
<td>Mode 3</td>
<td>CRVS 100% air recirculation with 27% passing through high efficiency particulate air (HEPA) filtration, and manual zone isolation is used in the event of a toxic chemical spill outside the Control Room when personnel sense a problematic odor or smell.</td>
</tr>
<tr>
<td>Mode 4</td>
<td>CRVS pressurization mode (CRPS) to counteract the detected presence of radiation at the Control Room air intake or a Containment Isolation signal. The system can detect radiation at various air intake locations and select the unaffected intake. Pressurization mode is the only required mode for the CRVS to be considered operable.</td>
</tr>
</tbody>
</table>

The CRVS is designed to meet the following criteria/guides:

- 10CFR50 Appendix A, General Design Criterion 19, “Control Room” radiation protection for normal and accident conditions
- NRC Standard Review Plan 6.4, “Control Room Habitability System”
- NRC Standard Review Plan 9.4.1, “Control Room Ventilation System”

The initial DCISC review was prompted by its receipt from the station of a January 24, 2013 PG&E Licensee Event Report (LER) to the NRC discussing a long term inadequacy in the ability of the Control Room Ventilation Systems (CRVS) to control air in-leakage into the Control Room in postulated post-accident situations when the atmosphere could contain radionuclides. Although other factors through
the years affected the integrity of the CRVS, the consistent long term issue that was not recognized until recently was that in-leakage to the Control Room Envelope could not be maintained below allowable limits in situations where one of the ventilation units is in pressurization mode and the other is in recirculation mode and a ventilation fan fails. In such a configuration, the reverse flow in one of the ducts allows unfiltered air to bypass the filters and can result in a level of airborne radioactivity in the Control Room that exceeds regulatory limits.

The remedy was to install backdraft dampers in two of the ventilation ducts. This design change was implemented in October 2012. As stated in the LER: “PG&E concluded that because the in-leakage was performed with both trains operating, the SR (surveillance requirement) had not been performed as required, nor had it ever been performed as required.” In December 2012, after modifying the Control Room Ventilation System, PG&E satisfactorily completed in-leakage testing on the CRVS using a single CRVS train, thereby successfully demonstrating acceptable in-leakage in the most limiting configuration with a single CRVS train operating. The system was declared operable on December 20, 2012.

The “long term” aspect of this design issue was documented during an NRC Integrated Inspection during the first quarter of 2012 when the NRC noted that PG&E had incorrectly confirmed in April 2005 that the required control room habitability testing had demonstrated that the main control room did not have any unfiltered in-leakage when the test was performed in the most limiting configuration for operator dose. This Integrated Inspection Report also stated that the NRC had identified in September 2011 that the control room in-leakage test results had been greater than both the values reported to the NRC in response to the 2003 NRC Generic Letter 2003-01, “Control Room Habitability”, and the values assumed in the design basis radiological analyses. Also, NRC inspectors had identified that PG&E had not performed the trace gas in-leakage testing in the most limiting configuration for operator dose consistent with Regulatory Guide 1.197, ”Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors”. In response to these notifications, PG&E took the steps necessary to resolve this issue.

DCPP has been working the following two remaining issues:

1. The Control Room Air Conditioning System needed upgrading due to a long history of reliability issues due to design, age and corrosion. Design of the new system has been funded and is in progress. Unit 1 design has been completed in 2016, and Unit 2 design is expected in 2018.

2. DCPP developed a new CRE (Control Room Envelope) dose analysis using the “Alternate Source Term” to restore dose margins. The analysis, submitted to the NRC in June 2015 along with a License Amendment Request (LAR), will make unnecessary any major physical changes to the CRVS. NRC provided approval in mid-2017, and this has become the new licensing basis. Part of this effort was to add a shielding wall to the Control Room Briefing Room.
Additionally, radiation monitor set points were changed for earlier CRVS switchover to pressurization mode.

3. Planned modifications include the following:

   a. Upgrade exhaust ducts to Class 1
   b. Install HEPA (high efficiency, particulate, absolute) filter in Technical Support Center vent
   c. Move a Unit 2 flow switch to address an equipment qualification issue

DCPP performed its most recent tracer test of the CRE in January 2016. This test confirmed the assumed CRVS air in-leakage rates.

With the AST analysis complete DCPP expects to complete its CRVS modifications, setpoint changes, and procedure (Operations, Maintenance, Chemistry, Emergency Preparedness, Engineering, and Learning Services) changes by the end of 2017. The DCISC should follow up on three CRVS changes in early 2018.

Conclusions:

DCPP has successfully obtained NRC approval to use the Alternate Source Term in its Control Room Ventilation System and has completed its re-analysis of the “Control Room Envelope,” which assures that calculated post-accident radiation levels are within acceptable limits. Other changes, i.e., modifications and procedure changes are to be completed in 2017. The DCISC should follow up in early 2018.

Recommendations:

None

3.6 Direct Current (DC) Power System

The DCISC FFT met with Gary Segich, Direct Current (DC) Power System Engineer, for an update on the DC Power System. The DCISC last reviewed this system in September 2014, (Reference 6.6), when it concluded:

_The 125-Volt DCPP Direct Current Power Systems (DCPS) in both Units are in good health (Green). An aging issue in both Units pertaining to molded case circuit breakers is being effectively addressed as is a margin issue in Unit 2’s Battery 27 due to sediment._

The battery-powered DCPP DC Power System (DCPS) is a 125 and 150 Volt Direct Current (VDC) system designed to provide power for operation and control of equipment during all modes of plant operation. The batteries are kept charged with dedicated battery chargers. The DCPS consists of two subsystems, which are isolated from each other:
1. Vital 125 VDC
2. Non-vital 125/150 VDC

The Vital DCPS is redundant with three separate trains, i.e., a single active or passive failure will not prevent the system from performing its safety functions. Though physically separate, the trains can be manually cross connected. The redundancy permits a single train to be out of service for a pre-determined length of time to perform periodic inspection, maintenance, and testing of major components. The system is capable of providing emergency DC power from the vital batteries for a minimum of two hours during a design basis accident coincident with a loss of battery chargers. It can perform its function during the following events:

- Loss of main generator
- Loss of off-site power
- Degraded off-site power
- Loss of battery chargers
- Loss or start failure of Emergency Diesel Generators

The Vital DCPS schematic is shown below.

The Vital DCPS is designed to operate before, during, and after a Design Earthquake, Double Design Earthquake, or a Hosgri Earthquake. It can be operated from either the Main Control Room or the Hot Shutdown Panel.

Each unit has 180 DCPS batteries, which are designed for a 20-year life. Since beginning operation, DCPP has had only three battery cell failures (low voltage situations). Analyses showed these were isolated failures. New batteries are
qualification tested prior to installation for thermal aging, discharge capability, and shaking for seismic loads.

The System Engineer performs his walkdowns quarterly and documents the results on a standard inspection form. There are periodic (weekly, monthly and refueling outage) maintenance inspections consisting of visual inspections, voltage measurements, temperature measurements, electrolyte level, and specific gravity measurements.

The DCISC FFT reviewed the DCPS Health Reports. The systems for both Units 1 and 2 were rated Green overall, i.e. Healthy. The Health Reports also grade the systems on a variety of performance related categories including: Critical Component Failures and Critical Equipment Clock Resets, Causes of Unplanned Entries into Limiting Conditions of Operation, Deficiencies Resulting in Unit Capacity Reduction, Causes of Unit Trips, and Prompt Operability Assessments. All of the performance related categories, except one category for both Units and a second category for Unit 2, were rated Green.

The one category in both Units that was not Green was “Aging Issues Affecting Reliability”. This pertains to an aging issue for molded case circuit breakers, i.e. not battery cells. The System Health Reports for both units indicate that two of the three such breakers for Unit 1 and one of the three breakers for Unit 2 have already been replaced. The three remaining breakers were replaced during refueling outages 2R18, 1R19, and 2R19.

The second category that was rated White (needs improvement) for Unit 2 was a “Margin Issue”. That is, Battery 27 has been found to have excessive sediment. A new Battery 27 was installed in October 2009 during 2R15.

The DCISC Fact-finding Team accompanied the System Engineer on a tour of the Unit 1 DC Power System. The group observed the vital and non-vital battery rooms and switchgear rooms. The system appeared to be in working order, and the areas of the plant visited were clean and orderly.

Conclusions:

The DCPP Direct Current Power Systems are rated Green, i.e.,
Healthy with several issues that are being worked. The System Engineer appeared knowledgeable and proactive about his system, The system was in good working order, and the areas of the plant visited were clean and orderly.

Recommendations:

None

3.7 Plant Health Committee

The DCISC FFT met with Hector Garcia, DCPP Liaison to the DCISC, to attend and observe the weekly Plant Health Committee (PHC) meeting. The DCISC last observed a PHC meeting in March 2017 (Reference 6.7), when it concluded the following:

The March 22, 2017 Plant Health Committee (PHC) meeting was well planned, organized, and implemented with crisp presentations and intrusive questioning. Participants willingly accepted action items to carry out PHC decisions.

The PHC is governed by DCPP Procedure OM4.ID16, “Plant Health Committee” and is a management team responsible for:

- Continual review of system and program health issues
- Routinely monitoring the status of plant health issues on the plant health issues list for action status and completion
- Routinely monitoring the status of the system health tactical list
- Review and approval of action plans to address plant health issues that originated from system health reports, maintenance rule, operator workarounds, program health reports, emergent issues, and others deemed important to monitor
- Reviewing and approving action plans to resolve degraded, unanalyzed and non-conforming conditions
- Review and monitoring of plant health issue plans that are presented to the PHC
- Performing Preventative Maintenance Oversight Committee functions
- Annual approval of system, component, and program long range plans
- Quarterly review and monitoring of the Top Margin Issues list
- Approving and authorizing the PHC budget for the solution to plant health issues

The membership of the PHC Core Team, which is the Decision Making (i.e. voting)
group of the PHC, is as follows:

- Plant Health Committee Chairman (currently the Station Director)
- Engineering Director
- Operations Director
- Nuclear Work Management Director
- Maintenance Director
- Strategic Projects Director

The PHC is also supplemented by a group of Supporting (non-voting) Members from other various station departments.

The agenda for this meeting included the following:

- Safety/Human Performance Message
- Facilitative Leadership Minute
- Verify Quorum
- Introduce Operations Personnel
- Review Purpose and Desired Outcomes
- Review and Approve Minutes from Previous Meeting
- Review of Action Items
- Reliability Update: Anchor Darling Valve BWROG
- High Critical Walk-in Items (None)
- Evaluation of the Conduct of the Meeting
- Action Item Review

The meeting was chaired by the Operations Director and Facilitated by Mark Baker, Supervisor of Nuclear Engineering. The meeting was conducted with efficiency, and the agenda was covered as scheduled. A strong emphasis was placed on plant safety and reliability throughout the discussion. One representative from the Operations shift was present, and his participation was strongly encouraged by the Chair, which was the case.

**Security Equipment Reliability**

Emergent maintenance associated with Security equipment negatively impacts equipment reliability, emergent workload, causes unplanned overtime, and creates error-likely situations for Security and Maintenance personnel. Short-term actions include monthly Security equipment oversight, naming a Project Manager to lead
equipment reliability, and piloting five preventive maintenance procedures. Long-term action is to implement Security equipment Preventive Maintenance Optimization and organizational alignment to more efficiently utilize Maintenance resources. The PHC was asked to support a project to re-baseline equipment preventive maintenance to manufacturer specifications. These actions appeared appropriate to the DCISC FFT.

**Anchor Darling Double Disk Gate Valves**

This item was presented as information to the PHC. Nuclear plant operating experience has reported that the Anchor Darling Double Disk Gate Valves have had problems with loose stem-to-wedge connections, which failure may result in stem/disk separation and failure to open. This problem was reported as a Part 21 Notification to NRC, and NRC issued an information notice to all nuclear plants. DCPP has reviewed their uses of this valve, and their 2013 analysis, inspections, and re-analysis in 2017 have concluded that the valves are capable of performing their design function and have been since original installation.

**Conclusions:**

The July 26, 2017 DCPP Plant Health Committee meeting was performed efficiently and effectively with clear and concise system and equipment reports, good participation and discussion by members, and clear actions and assignments.

**Recommendations:**

None

**3.8 Management Observation Program**

The DCISC FFT met with Eric Nelson, Director of Performance Improvement and Regulatory Projects, for an update on the DCPP Management Observation Program. The DCISC last reviewed the Management Observation Program at the October 2015 DCISC Public Meeting.

DCPP management, down to the first line supervisor or foreman, performs observations of first line workers, or individual contributors, in the plant during work in progress. The purpose is to evaluate worker performance and to impart supervision’s expectations, especially human performance and worker safety practices. The observations are meant to be non-intrusive and non-threatening, which requires a soft, friendly approach. Results of observations are entered into a plant database for trending. DCPP states that the purpose of observations, or “time in the field, engagement and coaching”, is that “Leaders, by commitment and example, inspire, motivate, and align our organization to achieve safe and reliable operation.” DCPP has a policy providing expectations for engagement and coaching and time in the field.
DCPP has developed an application which runs on a smart phone for streamlining the process of recording directly to an observation database. Facilitative leadership techniques, as opposed to command and control principles, are employed in the effort to empower individuals and get good employee engagement. Leadership also engages in what are termed “crucial conversations” in the effort to get all the facts on the table and come to a collective solution. Human performance high impact teams have been established to monitor performance and the data from observations and to identify trends and communicate improvement opportunities. Human performance defenses are managed by observing and by checking in with, as opposed to checking on, workers to help them remove obstacles, address conflicting priorities and clarify misunderstanding.

DCPP Station Policy, “Time in the Field/Engagement and Coaching”, dated January 24, 2017 delineates the expectations for management observations. Each Tuesday morning is set aside for Time in the Field. The time is to be used for actual time in the field and documenting observations. Training, “How to Do Observations in the Field”, is provided to all supervision. Occasionally craft and other individual contributors perform or participate in observations.

When there is a human performance event, the responsible department manager initiates an “observation blitz” as soon as practical but no later than two days following the event. Department PICOS (Performance Improvement Coordinators) gather and analyze the data during and following the observation blitz and report to the respective management within 24 hours. Management then recommends/takes actions to prevent recurrence. This information as well as information from all other aspects of Performance Improvement (i.e., Corrective Action Program, Benchmarking, Self-Assessments, Operating Experience, etc.) rolls up into the Integrated Performance Monitoring Process Report, which is available to management.

**Conclusions:**

The DCPP Time in the Field/Engagement and Coaching Program, a prescriptive observation program, appears satisfactory for providing management expectations on human performance and worker safety practices to workers as well as collecting worker input.

**Recommendations:**

None

3.9 Nuclear Fuel Performance

The DCISC Fact-finding team met with John Harmon, Reactor Engineering Manager, and Mark Mayer, Nuclear Fuel Procurement and Storage Manager, for an update on DCPP’s Nuclear Fuel Program and fuel performance following Refueling Outage 1R20. The DCISC last reviewed DCPP nuclear fuel in November 2016
Twenty-eighth Annual Report, Volume 2, Report on Fact-finding Meeting at Diablo Canyon Nuclear Power Plant (DCPP)

(Reference 6.8), when it concluded the following:

**DCPP nuclear fuel has performed well for many years with no leaks or failures. DCPP’s programs for assuring nuclear fuel integrity appear effective.**

Unit 1 has continued to run with no fuel defects since its Cycle 4, i.e. for 27+ years. Unit 2 has had no defects identified since a DCISC previous review of this topic in November 2011, when the Unit 2 fuel was in Cycle 17.

Close-up “four face” video inspections have been performed on all fuel assemblies removed from the reactor core in preparation for placing them either back into the Reactor Vessel for an additional operating cycle or into the Spent Fuel Pool (and eventually the Independent Spent Fuel Storage Installation [ISFSI]). No abnormalities were observed. There were no indications of leaking fuel or other problems noted in the periodic chemistry sampling of the Reactor Coolant System. However, Unit 1 coolant did exhibit slightly elevated Cobalt-60 due to the neutron irradiation of Stellite, which is believed to have come from the rubbing of a Reactor Coolant Pump shaft. Because of the excellent performance of the Westinghouse nuclear fuel used, DCPP plans no fuel changes.

As of this fact-finding meeting in July 2017 following Refueling Outage 1R20, there have been no recent indications of fuel leaks or failures. The DCISC FFT reviewed DCPP procedures on Fuel Integrity Monitoring, Failed Fuel Mitigation Program, and Failed Fuel Prevention and Healthy Fuel Inspection Program. These procedures appeared effective in assuring healthy nuclear fuel. Fuel performance data support this conclusion.

In addition to its normal cycle-to-cycle nuclear core design and analysis, the Reactor Engineering Group is performing extended analysis of core design out through 2024 and 2025, when the plant is planned to be shut down.

**Conclusions:**

**DCPP nuclear fuel has been performing as designed based on results of fuel inspections and chemistry sampling through Refueling Outage 1R20. DCPP plans to stay with its same Westinghouse fuel design throughout its remaining operating license in 2024 for Unit 1 and 2025 for Unit 2.**

**Recommendations:**

None

3.10 Independent Spent Fuel Storage Installation (ISFSI)

The DCISC Fact-finding Team met with Rich Hagler, Used Fuel Storage
Supervisor; Mark Mayer, Nuclear Fuels Procurement and Storage Manager; and John Harmon, Reactor Engineering Manager, for an update on the DCPP ISFSI. The DCISC last reviewed the ISFSI during its March 2017 Fact-finding Meeting (Reference 6.9), when it concluded the following:

The 2016 ISFSI cask loading campaign was successfully completed. An issue with cask overpack thread stud engagement was appropriately resolved. DCPP will be submitting a request for license renewal for the ISFSI in 2022, two years before its scheduled expiration in 2024. Acceleration of the movement of spent fuel to dry storage at the ISFSI will be considered as required by the Joint Proposal and as a part of the decommissioning planning process. Such acceleration could require changes to the current DCPP or ISFSI licenses.

During the previous (2016) ISFSI loading campaign, 12 casks were successfully loaded with 32 spent fuel assemblies each and moved to the ISFSI. The campaign brought the total of loaded casks at the ISFSI to 49. Plans for the near term cask loading campaigns call for loading and moving nine casks in 2018, and eight casks each in 2020 and 2022. Procurement of casks for the 2018 campaign has begun. The campaigns were scheduled such as to fall into years where the station planned only one refueling outage during the year.

DCPP has stored no damaged fuel in the ISFSI to date. In the Spent Fuel Pool (SFP) there is one failed fuel canister which has a capacity of up to 64 damaged fuel rods and currently contains several damaged rods. Additionally, there are some assemblies stored in the SFP with damaged rods; however, the those damaged rods have decayed sufficiently so as to not cause any problems. Up to two failed fuel canisters are permitted per ISFSI cask.

The current license for the DCPP ISFSI was obtained as a site-specific license under 10 CFR Part 72 and issued by the NRC in 2004. The 20-year license expires in 2024 and licensees are required to submit any desired renewals within 24 months prior to expiration, such that DCPP would be submitting a request for license renewal for the ISFSI in 2022.

The Joint Proposal for DCPP directs operations to cease at the end of its current operating licenses in 2024 for Unit 1 and 2025 for Unit 2. This included a requirement that PG&E prepare a plan for expedited post-shutdown transfer of spent fuel to dry cask storage as promptly as is technically feasible using the plans of San Onofre Nuclear Generating Station as a benchmark for comparison. This activity would be a part of overall decommissioning planning process, for which PG&E was just beginning to assemble the staff to begin work. The current ISFSI pads contain enough space for storage of all the spent fuel that would be present at the end of the licenses both in terms of physical space and total fuel burnup concentration as allowed by the ISFSI license.
The current facility licensing requirements for the Spent Fuel Pool contain significant constraints for maintaining assemblies in the Spent Fuel Pool, including technical specification requirements for minimum durations that spent fuel be stored in the pool before moving to dry cask storage. Additionally, there are requirements for the mixing of older and newer spent fuel assemblies in the pool to maintain thermal inertia requirements that are assumed in analyses used to meet the NRC requirements for responding to security events involving large fires or explosions (the ‘B.5.b’ program). In addition, the ISFSI license contains requirements for the mixing of older and new spent fuel assemblies in individual storage casks to minimize the radiation dose surrounding the casks. With the current requirements considered it could take approximately 12 years after the cessation of operations for all spent fuel assemblies to be offloaded from the pool to the ISFSI.

As a part of the requirements in the Joint Proposal PG&E will review what actions and associated licensing changes could be made to accelerate the spent fuel offload from the pool to dry storage casks. Any necessary changes to the licenses could require several years to obtain NRC approval, and the needed licensing changes could be subject to external interventions that could further slow the process.

The loading and storage of one or more canisters of Class C radioactive waste at the ISFSI would likely be considered as a part of the decommissioning plan. Class C wastes are radioactive wastes that contain very high levels of radioactivity such that their disposal would best be made at an underground repository such as that proposed for spent fuel. A similar approach was taken at PG&E’s Humboldt Bay facility where a cask was filled with Class C waste and added to the ISFSI as a part of the decommissioning process.

Conclusions:

DCPP continues to manage its spent fuel satisfactorily in both the Spent Fuel Pool (SFP) and the Independent Spent Fuel Storage Installation (ISFSI). DCPP has stored no damaged fuel in the ISFSI to date and is permitted to place up to two damaged spent fuel assemblies per ISFSI cask. As part of its decommissioning activities, DCPP is investigating accelerated movement of spent fuel from the SFP to the ISFSI.

Recommendations:

None

3.11 Nuclear Safety Culture

The DCISC FFT met with Pierre Dube, Senior Manager of Organizational Effectiveness, for an update on DCPP’s Safety Culture. The DCISC last reviewed
this topic in March 2017 (Reference 6.10), concluding the following:

DCPP’s Safety Culture Dashboard showed that its overall safety culture performance was Green, or in good health. Several individual areas were rated White (healthy but needing improvement). DCPP’s action plans for these areas appeared satisfactory. DCPP’s plant-wide safety culture survey concluded that the safety culture was positive, although it had not been finalized. The DCISC should follow up on these items at its May 10–11, 2017 Fact-finding Meeting.

DCPP had performed a plant-wide Nuclear Safety Culture Survey Assessment in February 2017, which although not complete and approved at the time of the March 2017 Fact-finding Meeting, concluded at a high level that, “The DCPP nuclear safety culture supports all of the INPO [Institute of Nuclear Power Operations] Traits and is not compromised by production priorities.” The report was completed in mid-April 2017, and the purpose of this July 25–26, 2017 Fact-finding Meeting was to review the results of the completed survey.

DCPP’s February 2017 Nuclear Safety Culture Dashboard, which is its performance measurement system for safety culture, showed Safety Culture to be Green overall, or in good health. Several areas as follows were classified as White, healthy but needing improvement:

- Personal Accountability
- Leadership Safety Values and Actions
- Respectful Work Environment
- Work Processes

The results of the survey for the top ten traits were as follows:

<table>
<thead>
<tr>
<th>Trait</th>
<th>% Favorable</th>
<th>% Neutral</th>
<th>% Unfavorable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Accountability</td>
<td>81</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Questioning Attitude</td>
<td>89</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Effective Safety Communications</td>
<td>68</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>Leadership Safety Values &amp; Actions</td>
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<td>30</td>
<td>9</td>
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<tr>
<td>Decision Making</td>
<td>76</td>
<td>19</td>
<td>5</td>
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<tr>
<td>Respectful Work Environment</td>
<td>72</td>
<td>21</td>
<td>7</td>
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<tr>
<td>Continuous Learning</td>
<td>72</td>
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<td>6</td>
</tr>
<tr>
<td>Problem Identification &amp; Resolution</td>
<td>72</td>
<td>14</td>
<td>4</td>
</tr>
</tbody>
</table>
The DCISC FFT determined that these results were overwhelmingly positive.

The following observations were noted in the results. These were employee comments on various parameters.

**Strengths**

- Questioning Attitude – a robust questioning attitude exists.

**Positive Observations**

- Decision Making – plant staff routinely follow a consistent and systematic process to make decisions, ensuring key stakeholders are involved.
- Respectful Work Environment – trust is good, communication is improving, and differing opinions are encouraged.
- Continuous Learning – leadership training and Dynamic Learning Activities are positive.
- Effective Safety Communication – increased face-to-face communications are noted across the site.

**General Observations**

- Leadership Safety Values and Actions – positions are being filled when necessary, and tools and equipment were properly funded, and change management was cited as effective.
- Work Processes – long-standing equipment issues are being addressed, and there is a focus on addressing late preventive maintenance.
- Respectful Work Environment – overall work environment is healthy, and employees want to know why certain decisions are made.
- Environment for Raising Concerns – workers feel free to raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination.
- Continuous Learning – continuous learning is generally in keeping with nuclear industry high standards.
- Problem Identification and Resolution – an increased focus on resolving conditions adverse to safety is recognized across the site, although some groups believe they do not receive feedback on Notification resolutions.
- Effective Safety Communication – an increase in effective safety communication is recognized by the site, and face-to-face communications
Negative Observations

- Personal Accountability – a lack of coordination around station work activities has created a strain on time and resources mainly in projects and security.
- Leadership Safety Values and Actions – most worker level employees were satisfied with the amount of time their direct supervisor spent with them, but not so for upper level leaders.
- Work Processes – employees perceive that a weakness exists with coordination and schedule adherence of Security Projects and Security-related emergent work; however, improvements are noted.
- Continuous Learning – there is the perception that after the four-year extension offer ends and many workers leave, it will be difficult to qualify new workers.

Weaknesses

- None identified

Conclusions:

The DCISC believes the results of the February 2017 DCPP Nuclear Safety Culture Survey show that DCPP continues to exhibit the traits of a healthy nuclear safety culture.

Recommendations:

None

3.12 Use of FLEX Equipment to Reduce Plant Risk

The DCISC FFT met with Brian Ashbrook, Manager of Emergency Services Performance and Support; Dan Yoder, BDB/FLEX Program Engineer; Garrett Reed, BDB/FLEX Program Manager; and David Imbaratto, Probabilistic Risk Assessment Engineer, to discuss how DCPP is using FLEX equipment in routine activities to reduce plant safety risk. The DCISC had found in March 2017 (Reference 6.11) that DCPP was planning to use FLEX equipment during Refueling Outage 1R20 as described the Outage Safety Plan as follows:

*New FLEX actions are required when entering Mode 5. Specifically, this means that in the event of loss of AC power, Containment Penetration 58
could be opened utilizing FLEX equipment (manual tools) to vent the Containment, if necessary.

This is the only routine use of FLEX planned by DCPP to date. The plant is considering other applications to reduce plant safety risk by use of FLEX equipment.

DCPP plans FLEX demonstration drills on October 9 and November 9, 2017. The drills will include a simulated loss of all AC power. NRC plans its FLEX Implementation Inspection to begin November 14, 2017.

Conclusions:

DCPP has successfully implemented its FLEX program of portable equipment and quick-connect connections to mitigate Fukushima-like events which result in loss of AC power and cooling water. The plant is using FLEX in one application during refueling outages to reduce plant safety risk and is considering other similar applications. The DCISC should review new applications for FLEX equipment when they are identified.

Recommendations:

None

3.13 Cyber Security

The DCISC FFT met with Dennis Royer, Program Manager of Cyber Security, and Jordan Tyman, Manager of Regulatory Projects, for an update on DCPP Cyber Security. The DCISC last reviewed DCPP Cyber Security in December 2015 (Reference 6.12), concluding the following:

DCPP is proceeding satisfactorily according to schedule with its implementation of NRC’s Cyber Security Rule. Completion is set for year-end 2017.

DCPP’s current Procedure CF2.ID11, “Cyber Security Assessment of Critical Digital Assets” spells out the requirements for cyber security assessments of critical systems and critical digital assets. Instructions for maintenance of the cyber security defensive strategy for a system or application and its specific defensive model are included in the system specific System Configuration Management Plan, as applicable. The defensive model for a system takes into account the physical security of the plant and the physical security and defensive strategy of any interconnected systems.

A Software Configuration Management Plan (SCMP) identifies the following:
The software products to which it applies
- The current software configuration of the application/system is documented and maintained
- The organizations responsible for performing the work and achieving software quality and their tasks and responsibilities
- Required documentation
- Standards, conventions, techniques, or methodologies which guide the software development, as well as methods to assure compliance to the same
- The required software reviews
- Methods for maintaining cyber security of the system
- Methods for assuring proper status control for the system and its applications during the modification process.
- The methods for error reporting and corrective action

Because of the potential for a cyberattack on a U.S. nuclear power plant, the NRC issued 10CFR73.54, “Protection of Digital Computer and Communication Systems and Networks”, in March 2009 to establish cyber security requirements for the following plant functions:

- Safety and important to safety functions
- Security Systems
- Emergency Preparedness Functions
- Support systems

This typically includes all systems that use plant data, including Protection Systems, Safety Systems, Non-safety Systems, and the Physical Access Control System. The regulation addresses interconnections among digital systems, including pathways for errors and malfeasance, interactions between digital systems and the plant, including new kinds of failures and spurious actuations not addressed in traditional safety analyses.


DCPP submitted its Cyber Security Plan and implementation schedule to NRC in a License Amendment Request (LAR) on April 4, 2011, which is still under NRC review pending DCPP’s cyber security plan completion. Two projects have been initiated to implement the plan: 1. Cyber Security Program Implementation, and 2. Plan Data Network Isolation. Cyber Security Implementation was performed as
follows:

- Assemble a Cyber Security Assessment Team and perform walk downs and tabletop discussions
- Identify critical systems and critical digital assets
- Isolate the plant data network
- Control portable media devices
- Include Cyber Security tampering in security records
- Implement Cyber Security controls on selected critical digital assets

In 2013 NRC issued a cyber security enforcement discretion order, and the Nuclear Energy Institute (NEI) issued its related clarification/guidance document for various levels of system significance. The NRC is currently reviewing the NEI document. The NRC originally expected plants to have completed their Cyber Security Programs, including plan modifications, maintenance and operations procedure changes and plant training by December 31, 2015. At the request of most plants, this deadline has been extended by NRC to the end of 2017.

The NRC performed an inspection in 2014 on DCPP’s progress in addressing the cyber security rules. The findings and deficiencies were documented in the inspection report, and actions to address them were identified as Milestones 1-7, primarily identifying Critical Digital Assets and enhancing cyber security processes, which have been completed by DCPP. Applicable sections of Milestone 8 (Full implementation of DCPP Cyber Security Plan for all SSEP functions to be achieved) is currently being implemented. With this completion the DCPP Cyber Security Plan will be fully implemented for all Safety, Security, and Emergency Preparedness functions in accordance with 10 CFR 73.54. This date (12/31/17) also marks the completion of all individual asset security control design remediation actions including those that require a refueling outage for implementation.

Actions to address NRC’s requirements are scheduled to proceed as follows:

**Phased Implementation**

- Interim Milestones 1-7 (completed by 12/31/2012)
- Cyber Security Plans - Milestone 8 (site specific dates through 2017)
- Full cyber security program implementation
- Procedures and training
- Complete all design remediation actions

**NRC Oversight**

- Inspections of Milestones 1-7 planned for completion in 2015
Inspections of Milestone 8 will begin in 2016

Since January 2016, DCPP has accomplished the following:

- Completed its assessment of Critical Digital Assets
- Implemented portable media protection
- Completed NRC Milestones 1-7
- Received an NRC inspection: six violations (Non-cited) – all closed with no questions

  - Performed the following remediation items:
    - Harden devices
    - Physical controls
    - Implement passwords
    - Eliminate unused ports
    - Disable wireless capability
- Wireless connections are significantly restricted
- Fall 2016 Nuclear Energy Institute (NEI) assessment – joined NEI Task Force
- Addressed a Wolf Creek Plant event. (That attack was on business site systems, which were separated from plant systems by data diodes. DCPP has similar separation by data diodes, plus portable media controls.)
- Made plans for Cyber security drills – plan one tabletop drill before end of 2017
- Completed cyber security awareness for employees
- Information Technology has mock “phishing” exercises to train personnel

Conclusions:

DCPP cyber security actions are progressing satisfactorily to meet NRC requirements.

Recommendations:

None

4.0 Conclusions

4.1

The DCISC Fact-finding Team concluded that the meeting with NRC resident inspectors was beneficial and should continue them. From the above discussion, the DCISC plans to follow up on DCPP Post-Accident Field Monitoring Teams.

4.2
DCPP is making good progress in repairing and/or replacing its impaired fire doors, while maintaining compensatory measures as long as the doors remain impaired. The schedule and budget for fire doors appears appropriate.

4.3

DCPP’s Radiological Effluent Control Program was satisfactory in controlling and measuring the plant’s radiological effluents and keeping them within very small fractions of permissible limits.

4.4

The DCPP Radiological Environmental Monitoring Program appeared satisfactory in monitoring and measuring radioactivity in the environment surrounding DCPP. There were no abnormal levels of radioactivity detected.

4.5

DCPP has successfully obtained NRC approval to use the Alternate Source Term in its Control Room Ventilation System and has completed its re-analysis of the “Control Room Envelope,” which assures that calculated post-accident radiation levels are within acceptable limits. Other changes, i.e., modifications and procedure changes are to be completed in 2017. The DCISC should follow up in early 2018.

4.6

The DCPP Direct Current Power Systems are rated Green, i.e., Healthy with several issues that are being worked. The System Engineer appeared knowledgeable and proactive about his system, The system was in good working order, and the areas of the plant visited were clean and orderly.

4.7

The July 26, 2017 DCPP Plant Health Committee meeting was performed efficiently and effectively with clear and concise system and equipment reports, good participation and discussion by members, and clear actions and assignments.

4.8

The DCPP Time in the Field/Engagement and Coaching Program, a prescriptive observation program, appears satisfactory for providing management expectations on human performance and worker safety practices to workers as well as collecting worker input.

4.9

DCPP nuclear fuel has been performing as designed based on results
of fuel inspections and chemistry sampling through Refueling Outage 1R20. DCPP plans to stay with its same Westinghouse fuel design throughout its remaining operating license in 2024 for Unit 1 and 2025 for Unit 2.

4.10

DCPP continues to manage its spent fuel satisfactorily in both the Spent Fuel Pool (SFP) and the Independent Spent Fuel Storage Installation (ISFSI). DCPP has stored no damaged fuel in the ISFSI to date and is permitted to place up to two damaged spent fuel assemblies per ISFSI cask. As part of its decommissioning activities, DCPP is investigating accelerated movement of spent fuel from the SFP to the ISFSI.

4.11

The DCISC believes the results of the February 2017 DCPP Nuclear Safety Culture Survey show that DCPP continues to exhibit the traits of a healthy nuclear safety culture.

4.12

DCPP has successfully implemented its FLEX program of portable equipment and quick-connect connections to mitigate Fukushima-like events which result in loss of AC power and cooling water. The plant is using FLEX in one application during refueling outages to reduce plant safety risk and is considering other similar applications. The DCISC should review new applications for FLEX equipment when they are identified.

4.13

DCPP cyber security actions are progressing satisfactorily to meet NRC requirements.

5.0 Recommendations:

None

6.0 References

6.1


6.2

Ibid., Exhibit D.1, Section 3.7, “Fire Doors.”

6.3

Ibid., Exhibit D.3, Section 3.3, “Annual Radiation Release and Radiation Environmental Operating Reports.”

6.4

Ibid.

6.5


6.6


6.7


6.8

Ibid., Exhibit D.4, Section 3.9, “Nuclear Fuel Program Health/Update/Plans.”

6.9


6.10

Ibid., Exhibit D.8, Section 3.12, “Nuclear Safety Culture Health and Survey.”

6.11

Ibid., Exhibit D.8, Section 3.3, “1R20 Outage Safety Plan.”

6.12

1.0 Summary

The results of the August 9–10, 2017 fact-finding trip to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Meet with Senior NRC Resident Inspector
2. Containment In-Service Inspection
4. DCISC Member Meet with DCPP Officer
5. Steam Generator Health
6. Equipment Qualification Process
7. Engineering Excellence Plan
8. Observe Chemistry Sampling Process
9. Operator Staffing Adequacy
10. Independent Spent Fuel Storage Installation (ISFSI) Loading Campaigns

2.0 Introduction

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if PG&E’s performance is appropriate and whether any areas revealed observations which are important enough to warrant further review, follow-up, or presentation at a Public Meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4—Conclusions highlights the conclusions of the Fact-finding Team based on items reported in Section 3—Discussion. These highlights also include the team’s suggested follow-up items for the DCISC, such as scheduling future fact-finding meetings on the topic, presentations at future public meetings, and
requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations lists specific recommendations to PG&E proposed by the Fact-finding Team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the Fact-finding Report, including its recommendations, is provided to PG&E. The Fact-finding Report will also appear in the DCISC Annual Report.

3.0 Discussion

3.1 Meet with NRC Resident Inspector

The DCISC Fact-finding Team (FFT) met with Chris Newport, Senior NRC Resident Inspector, for an update. The DCISC last met with the NRC in July 2017 (Reference 6.1), concluding the following:

*The regular meetings with the NRC Resident Inspectors are beneficial. During the meeting, the topics of the use of FLEX equipment to reduce day-to-day risk and the upcoming NRC FLEX inspection on November 14, 2017, were discussed. The DCISC should review these topics in future Fact-finding Meetings.*

The participants discussed the following topics:

1. Emergency evacuation process and routes
2. Decommissioning – following final reactor defueling, the operating NRC Residents’ Office will terminate, and responsibility will be transferred to the off-site NRC Decommissioning Office.
3. NRC Public Information Meeting on Decommissioning will be held on August 29, 2017 in San Luis Obispo
4. Spent fuel transportation
5. DCPP’s maintaining plant safety following the four-year incentive period and after a three-year incentive plan, if any
6. NRC 95001 Inspection of the Residual Heat Removal Valve White Finding corrective actions – the inspection has been completed, awaiting final results from NRC Headquarters.
7. Mr. Newport meets with Jim Welsch, DCPP Site VP, every two weeks

**Conclusions:**

The DCISC Fact-finding Team concluded that the meeting with the NRC resident inspector was beneficial and that the DCISC should continue them.
Recommendations:
None

3.2 Containment In-Service Inspection

The DCISC Fact-finding Team (FFT) met with David Gonzales, Manager of In-Service Inspection, for an update on DCPP’s Containment In-Service Inspection Program. The DCISC last reviewed Containment inspections in July 2012 (Reference 6.2), concluding the following:

_The examination of the Unit 2 containment concrete was a carefully planned and thoroughly implemented process. The indications that were identified were subjected to several levels of review culminating in a review by a certified Responsible Professional Engineer. The results of this in-depth evaluation were that none of the evaluated indications require follow-up repair at this time._

The functions of the Containment Structure Exterior (CSE) and Containment Structure – Steel Liner (CSL) are to protect the public, environment, and plant personnel from the uncontrolled release of radioactivity to the environment under normal and postulated accident conditions and to protect the Reactor Coolant System (RCS) from external missiles.

The CSE consists of

- A 14 foot-6 inch thick, 153 foot diameter reinforced base mat
- A 3 foot-8 inch thick, 140 foot inside diameter and 142 foot high reinforced concrete cylindrical wall
- A 2 foot-6 inch thick, 140 foot inside diameter reinforced concrete hemispherical dome roof

The CSL consists of

- A 3/4 inch thick mild carbon steel plate placed on top of the CSE base mat
- A 3/8 inch thick mild carbon steel plate covering the inside surface of the Containment shell
- Penetration sleeves and local reinforcement of the liner around penetration openings
- Anchorage system of the liner to concrete

The above Containment System has a design pressure of 47 psig (pounds per square inch gauge) at 271 degrees F. It is designed for the 7.5 magnitude Hosgri Earthquake acceleration spectrum peak of 0.75g. Other design loads arise from wind, pipe rupture, jet impingement, and missile impacts.
The Containment System is subject to the following tests/inspections:

- **Visual inspection of Containment concrete surfaces** as per Title 10 of the U.S. Code of Federal Regulations (10CFR50), Appendix J and American Society of Mechanical Engineers (ASME) Section XI Code. This 100% inspection is performed every five years. The most recent prior inspections were performed in 2014 for Unit 1 and in 2015 for Unit 2 with satisfactory results for both units.

- **Visual inspection of the steel liner plate inside the Containment** as per 10CFR50, Appendix J and ASME Section XI Code. These inspections are performed every 3-1/3 years on a 10-year cycle.

- **Containment Integrated Leak Rate Tests (ILRTs)** as per 10CFR50, Appendix J. This test is performed every 10 years. The most recent ILRTs were conducted in April 2008 during Outage 2R14 and 2009 during Outage 1R15. There have been no indications or problems found in these inspections/tests.

DCPP has procedures for each of the above tests/inspections. The procedure specifies such parameters as follows:

- Certification level of inspector
- Lighting levels on surface being inspected
- Distances for direct and remote inspections
- Degradation to look for
  - Cracked, blistered, flaking, peeling, discolored or distressed coatings
  - Corrosion, pitting or discoloration
  - Cracks
  - Wear or erosion
  - Dents, gouges or other surface irregularities
- Acceptance criteria
  - No evidence of degradation that may affect the structural integrity or leak tightness shall be acceptable
  - Degraded conditions such as listed above shall be reported and evaluated

DCPP performed its most recent Containment steel liner inspection during Refueling Outage 1R20 (April – June 2017). No repairs were required, and DCPP
has never had to make repairs of the Containment steel liner. The inspections were performed by trained and certified inspectors.

Containment dome steel liner with welds visible.

DCPP’s inspection report concluded the following:

*No reportable conditions or indications were observed during this exam that affect the structural integrity or leak tightness of the containment liner.*

**Conclusions:**

**DCPP Unit 1 Containment steel liner successfully passed its visual inspection performed in accordance with 10CFR50, Appendix J, and the American Society of Mechanical Engineers (ASME) Code Section XI. There were no reportable conditions or indications that affect the structural integrity or leak tightness of the liner.**

**Recommendations:**

*None*

### 3.3 Radioactive Waste (Radwaste) Processing Systems

The DCISC Fact-finding Team met with Clint Miller, Liquid and Solid Radwaste Systems Engineer, for an update of these systems. The DCISC last reviewed these systems in July 2008 (Reference 6.3), when it concluded the following:

*The DCPP Liquid and Gaseous Radioactive Waste Processing Systems appeared to be in good working order with no major problem areas. Radioactive releases had been properly controlled to assure levels were well below those permitted. Solid radioactive waste was properly shipped to approved off-site disposal sites or stored on-site. The System engineers were knowledgeable about their systems.*

Mr. Miller described the LRWS process flow paths and major components using the...
The purpose of the LRWS is to collect radioactive liquid wastes from various sources and, prior to discharge, process the waste to reduce the radioactivity to environmentally acceptable levels. Except for equipment in Containment, DCPP Units 1 and 2 share a common collection and processing equipment. The LRWS performs the following functions:

- Collect radioactive liquid wastes generated by plant operation and provide adequate surge volume and processing capability to assure plant availability is not limited.
- Reduce and limit the radioactivity of the liquid effluent to acceptable levels.
- Maintain safe LRWS operating conditions and system integrity.
- Provide adequate drainage of radioactive liquids during both normal plant operations and postulated flooding conditions following equipment failure.

The LRWS is comprised of the following mechanical subsystems:

- Closed Drains Subsystem
- Open Drains Subsystem
- Equipment Drain Subsystem
- Floor Drain Subsystem
- Demineralizer Regenerant Subsystem
- Chemical Drain Subsystem
- Laundry and Hot Shower Subsystem
- Processed Waste Subsystem
- Liquid Radwaste Processing Subsystem
- Radwaste Discharge Filtration Subsystem
- Waste Concentrator Subsystem
- Other miscellaneous subsystems

Major sources of liquid waste to the LRWS include the following:

- Reactor Coolant Drain Tanks (RCDT)
- Containment Sumps
- Demineralizer Overflows
- Steam Generator Blowdown
- Laundry and Hot Shower Drain Tanks
- Post-LOCA Sample System
Resin Sample system
- Residual Heat Removal Pump Sumps
- Auxiliary Building Sumps
- Radwaste Filters

DCPP Liquid Radwaste Processing System Schematic.

The system processes approximately one million gallons of liquid per year. This is a major reduction since 2000 and again in 2005 due to improved plant operation and improved LRWS operation. Collected liquids are stored in tanks and processed by filtration and/or ion exchange and recycled or sampled and discharged through the Auxiliary Salt Water (ASW) System into the Pacific Ocean. The ASW discharge is provided with a radiation monitor-controlled valve to assure liquid releases are below prescribed levels. Industry top quartile is 14 mCi (millicuries) or less per year. Use of a vendor filtration skid and Zinc addition has reduced particulates to produce the lower activity discharges. DCPP Liquid Radwaste discharges for 2017 are below its year-to-date goal (20 vs. 27 mCi) and appear to be on-target to be well below the year-end 35 mCi goal. DCPP’s 25-year discharge history is as follows:
DCPP liquid radwaste discharge 25-year history.

The DCPP Quality Verification (QV) Department conducted an audit of the Radioactive Effluents Control Program in 2017. It concluded that the program was being effectively implemented and that overall performance was satisfactory.

Regarding solid Radwaste, DCPP has minimized the generation of Class B/C waste. DCPP sends its Class A LLW (Low Level Waste) (lowest radioactivity and half-life less than 5 years) to a licensed disposal site in Utah, its B/C LLW (higher radioactivity) currently to Andrews Texas; DCPP’s old Steam Generators and Reactor Vessel Heads will be stored on-site for the foreseeable future. Solidified resins and cartridge filters in concrete containers, both B and C LLW, will be stored on-site for the life of the plant or until shielded shipping casks can be reserved for transport to a licensed disposal site. DCPP’s solid waste volumes are consistently well below those of similar industry nuclear power plants.

**Conclusions:**

**DCPP’s Liquid and Solid Radwaste Processing Systems are effective in minimizing the volumes and radioactivity levels discharged or sent to licensed storage facilities.**

**Recommendations:**

None

**3.4 DCISC Member Meeting with DCPP Officer**

DCISC Member Peter Lam met with Jim Welsch, Site Vice-President, to discuss the items in this fact-finding meeting and other items of mutual interest.

**Conclusions:**

The regular meetings between DCISC Members and DCPP Officers and Directors appear to be beneficial for both organizations.

**Recommendations:**
3.5 Steam Generator Health

The DCISC FFT met with John Arhar, Steam Generator (SG) System Engineer, for an update on DCPP Steam Generator health. The DCISC last reviewed steam generators in November 2014 (Reference 6.4), concluding the following:

*The DCPP Steam Generators (SGs) have been performing as expected since their replacement in 2008 and 2009. The most important SG parameter, tube integrity, has been shown to meet all criteria as a result of visual inspection and Eddy Current testing.*

The four DCPP SGs per unit were replaced in outages 2R14 (Unit 2) in 2008 and 1R15 (Unit 1) in 2009 and have been performing as expected. One of the most important SG parameters is the integrity of the 4444 0.75-inch diameter Alloy 690 tubes in each SG. The tubes serve as the pressure boundary between the Reactor Coolant and the Main Steam and Feedwater Systems. Visual and Eddy Current Testing (ECT) inspections of 100% of the tubes have been performed in refueling outages 2R15 and 1R16 with only one tube in each unit showing minor indications of cracks. Inspections of 100% of the tubes in outage 2R18 resulted in 15 tubes showing minor indications. After evaluation, all were left in place. The next inspections were required to be in 1R19 and 2R21 (September to December 2019).

DCPP performed eddy current testing inspections of the DCPP Unit 1 Steam Generators during Refueling Outage 1R19 in October 2015. These were the second in-service inspections since the SG replacements in 2009, after the first inspections in Outage 1R16 in 2010. Eight tubes were plugged in 1R19 due to tube-to-tube structure wear: one in SG 1-1, five in SG 1-2, two in SG1-3, and none in SG 1-4. No tubes required removal or in-situ testing. Other inspections were as follows:

- **Proximity Indications** – no degradation was detected
- **Channel Head Inspections** – no areas of defects or unusual discolorations were noted
- **Secondary Side Integrity**
  - **Pre-Sludge Lance Visual Inspection** – there were no indications of wear
  - **Sludge Lancing** – six pounds of sludge were removed from the tops of the tubesheets of the four SGs. This was an insignificant amount.
  - **FOSAR (Foreign Object Search and Removal) Exam** – one small wire (0.007 inch diameter and 0.6 inch long) was discovered in the post-sludge-lance exam. The wire was removed.
Foreign Material in Sludge Lance Filter Strainer – some small amounts of debris of small dimension and insignificant mass were found.

Tube wear continues to be a non-relevant tube degradation mechanism for the DCPP SGs.

DCPP’s Condition Monitoring Assessments, required following each outage SG inspection, had the following conclusions:

The condition monitoring (CM) assessment concluded that, based on the results of the 1R19 inspections, none of the SG performance criteria were exceeded since the last ECT inspection in 1R16, that is, the three cycle operating period between the start of the Unit 1 Cycle 17 and the end of Unit 1 Cycle 19. The operational assessment (OA) concludes that there is reasonable assurance that operation of the DCPP Unit 1 SGs until the next scheduled ECT inspection in 1R22, three operating cycles, in 2020 will not cause any of the SG performance criteria to be exceeded.

Conclusions:

The DCPP Steam Generators (SGs) have been performing as expected since their replacement in 2008 and 2009. The most important SG parameter, tube integrity, has been shown to meet all criteria as a result of visual inspection and Eddy Current testing.

Recommendations:

None

3.6 Equipment Qualification Process

The DCISC FFT met with Akbar Moarefy, Equipment Qualification (EQ) Process Owner, for an update of the DCPP EQ Program. The DCISC last reviewed the EQ Process in November 2014 (Reference 6.5), when it concluded the following:

The DCPP Equipment Qualification Program appeared satisfactory. Because of an upcoming retirement, a new engineer is being qualified for the process.

The EQ Process is within the Electrical Engineering Department. It is an industry-wide program; and at DCPP it is controlled by Procedure CF3.1D3, “Environmental Qualification (EQ) Program”, Revision 9A, February 8, 2016, which implements Title 10 of the U.S. Code of Federal Regulations, Part 50.49 (10CFR50.49). This requires the generation and maintenance of evidence to ensure that electric equipment important to safety will operate when required to meet system performance requirements when subjected to expected environmental conditions.
This includes mostly electrical equipment located where environmental conditions could be harsh during normal or postulated accidents, such as high temperature, high radiation, water spray, steam, etc. The procedure specifies the design bases for environmental conditions in various locations of the plant, the EQ Master List, applicable departmental procedures, deficiency identification and resolution, documentation requirements, and records retention. The procedure lists responsibilities for Engineering, Operations, Maintenance, Procurement, Learning Services, Document Services, and Quality Verification personnel for their parts of the program.

The EQ Procedure includes the following:

- Personnel qualification
- EQ Master List Maintenance
- EQ file preparation, revision and retention
- Procurement and shelf life requirements
- Maintenance and surveillance of EQ equipment
- EQ deficiencies and EQ discrepancies
- Condition monitoring and self-assessment
- Assessment of industry operating experience

The DCISC Fact-finding Team reviewed the current revision of the procedure and found it appropriate for the task.

The EQ Process requires the EQ Process Coordinator to prepare a self-assessment (S-A) report following each Unit 2 refueling outage. The most recent report dated January 2016 serves as the program “health card.” The self-assessment included the following items:

**Industry**

- NRC has been developing a new “deep dive” EQ inspection procedure, which is being tested at several other nuclear plants.
- There is a Part 21 (required reporting to NRC of equipment problems) concern regarding unaccounted-for uncertainties in dosimetry readings from a dosimetry vendor. This is being monitored by DCPP for impact.
- Sufficient margins exist for ASCO solenoid valves, and there are no EQ concerns; however, there is a potential cable EQ issue.
- Several DCPP engineers attended the 2015 EQ Technical Conference in Dallas, and one presented a paper on the 4kV bus steam issue during a postulated Main Steam Line Break.
- Two DCPP engineers each attended two technical conferences on temperature
monitoring and EQ testing.

DCPP Site

- EQ Engineer qualifications have been simplified, and there are now five qualified EQ Engineers.
- The EQ Procedure has been upgraded, and the “EQ Program” converted to an “EQ Process” to become better aligned with industry guidelines and practices.
- Several minor issues with EQ qualification records have been corrected.
- The EQ Master List review resulted in no concerns or problems.

Conclusions:

The DCPP Equipment Qualification (EQ) Process appeared healthy with no major outstanding issues. Depth of staff expertise appeared satisfactory with five qualified EQ Engineers.

Recommendations:

None

3.7 Engineering Excellence Plan

The DCISC FFT met with Bob Waltos, Assistant Engineering Director, for an update of the DCPP Engineering Excellence Plan. The DCISC last reviewed this program in January 2016 (Reference 6.6), when it concluded the following:

The Engineering Department Excellence Plan appears to be an effective tool for implementing and tracking the program of important aspects of DCPP’s Engineering function by communicating objectives and status. The DCISC should consider examining the station’s status and results with regard to implementing some selected elements of the Plan in the second half of 2016. Engineering’s implementation of the Top Ten Issues List and accomplishments achieved through Engineering’s use of the Corrective Action Program would seem to be desirable areas for DCISC’s review.

The purpose and vision of this Plan are to: “Provide outstanding operational focus to DCPP to ensure safe, reliable, and affordable operation by acting as the organization’s technical conscience for the design and licensing basis compliance and excellence in equipment reliability for the long term.”

The DCPP 2017 Generation Operating Plan consists of the following attributes (paraphrased):

1. Safety – operating in a manner that puts health and safety first
2. Reliability – ensure reliable and clean generation
3. Affordability – operate in a manner that meets the affordability expectations of customers and shareholders
4. Risk, Compliance & Ethics – ensure a comprehensive, demonstrable compliance program, resulting in zero significant findings or infractions
5. People – engage the full spectrum of the workforce and leverage technology to ensure employees have the skills, tools, and training to provide excellent service
6. Regulatory, External, Strategy – engage regulators, external stakeholders, and internal business partners to position DCPP for a strong run through end of license and ensure a smooth decommissioning transition.

This Excellence Plan is aligned with the above Generation Operating Plan, the Premier Culture Survey, and Joint Proposal, \textit{inter alia}, and its “path to success” includes the following attributes:

- Empowering and engaging employees
- Strong integration with station Operations and a customer focus
- Simplification and process improvement
- Continuous improvement through the use of operating experience, benchmarking, and self-assessment
- Cost effective, innovative, and compliant engineering solutions
- Strong single point of contact (Engineering Fix It Now)

Engineering Excellence Plan Measures of Success are as follows:

- No safety incidents (recordable injury, lost work days or Significant Incident or Fatality
- Execute the 2020 people planning
- Execute the Configuration Management initiative
- Maintain an average ERI (Equipment Reliability Index) Score greater than 94 throughout 2017
- Maintain a top quartile Plant Equipment Indicator throughout 2017
- Meet the Engineering budget goals within 2%
- No executive level Areas for Improvement in Engineering, Equipment Reliability or Configuration Management during industry evaluation
- Complete actions on top three Premier Survey feedback areas
- Less than or equal to four critical equipment clock resets for 2017
- Meet 1R20 Safety, Reliability, Schedule and Cost goals
• Continue DA Notification reduction to less than 150 by end of 2017
• Implement key DNP (Delivering the Nuclear Promise) in systems and program engineering administrative burden reduction and pilot initiatives in Critical Component reclassification, high cost non-critical PM review and value-based maintenance, and standard design change process

Appropriate elements of the Excellence Plan are included in supervisors’ and individual employees’ Performance Management Plans.

A continuous improvement process is utilized for a “living plan,” and actions are to be added and later deleted as objectives are met.

The Plan describes the various actions that are prescribed for implementing the elements of the above areas of action. The plan appears to serve as an effective mechanism for identifying, prioritizing, and tracking key department activities.

Conclusions:

The DCPP Engineering Excellence Plan appears appropriate for achieving and maintaining excellence in engineering support to the plant.

Recommendations:

None

3.8 Observe Chemistry Sampling Process

Consultant Wardell of the DCISC FFT met with David Alvarado, Chemistry Technician, to observe the DCPP process of obtaining a pressurized chemistry sample of the Reactor Coolant System. The DCISC last observed a DCPP work process in March 2017 (Reference 6.7), concluding the following:

_The March 23, 2017 DCPP operations morning shift turnover observed by the DCISC was crisp and complete. The DCISC-observed operator Turbine Building rounds observation went smoothly and professionally. Proper attention was paid to personal safety, security, accurate data collection, and assuring that doors locked securely when closed. The plant appeared clean and orderly._

The weekly sampling process followed the DCPP Chemical Analysis Procedure CAP E-1:IV “CVCS [Chemical Volume and Control System] Influent Sampling,” Revision 9, September 9, 2015. This procedure was appropriately detailed with requirements for technician qualification and with prerequisites, precautions and limitations, and personnel safety. The procedure also addressed apparatus, acceptance criteria, references and records. Two other applicable procedures were “Plant Logs” and “Conduct of Operations”.

Messrs. Alvarado and Wardell donned lab coats, personnel protective equipment, and dosimeters and entered the Radiation Control Area and Chemistry Laboratory.

Performing chemistry sampling in the exhaust hood in the DCPP Chemistry Laboratory.

Mr. Alvarado obtained the current revision of the procedure and assured that his qualifications were current. He then followed the procedural steps, using the human performance tool of “circling and slashing” each step as it was followed and completed. The group then walked to the Primary Sample Laboratory where the actual pressurized sample was drawn in an exhaust hood. Appropriate Radiation Protection practices were followed. Finally, the group returned to the Chemistry Laboratory where the sample was prepared for later chemical and radiation spectral analyses.

Conclusions:

The DCPP Reactor Coolant System chemistry sampling process was performed by a Chemistry technician and observed by a member of the DCISC Fact-finding Team. The Chemistry technician correctly followed proper Chemistry, Radiation Protection and Human Performance practices in obtaining the pressurized sample. The plant and Chemistry Laboratories appeared orderly and clean.

Recommendations:

None

3.9 Operator Staffing Adequacy

Member Peter Lam of the DCISC Fact-finding team met with Bill Lalon, Operations Planning Manager, to review the DCPP control operator staffing process for assuring adequate numbers of qualified operators. The DCISC is especially interested in DCPP’s plans for operator staffing in light of the Joint Proposal plan for ending operation in 2025. The Joint Proposal includes an incentive plan for five years (and potentially longer) to incentivize qualified personnel to stay with the plant to assure its continued safe, reliable operation. The DCISC last reviewed operator staffing in August 2016 (Reference 6.8), when it concluded the following:
DCPP’s “no solo” (i.e., limited solo activity) licenses are being appropriately managed. Because of PG&E’s recent decision to not pursue license renewal for DCPP, a Retention Plan has been put in place and overstaffing has been authorized to help ensure that adequate numbers of licensed operators remain on board through the end of the current plant license. The DCISC should follow closely the success of the Retention Plan in retaining adequate numbers of licensed operators specifically along with adequate numbers of qualified facility staff in general.

DCPP has developed a Retention Plan which offers 25% annual salary bonuses for each employee who commits to continue working at the station for at least four more years. For licensed operators, license premium pay will be included in the base for calculating the bonus. Additionally, the Operations Department has obtained approval to overstaff positions in 2017 to help ensure that adequate numbers of fully trained operators remain on staff through the end of the current plant license.

DCPP has a required minimum Control Room staffing of Licensed Operators and Nuclear (Non-Licensed) Operators. To assure it meets or exceeds these numbers DCPP plans five years ahead for the testing, hiring, training, and qualification of its operators. DCPP includes in its plans such factors as early and normal retirements, historical resignation trends, and projected resignations due to the Joint Proposal’s planned cessation of remaining plant operation in 2025. One DCISC FFT concern is how DCPP will retain/hire well-qualified operators when incentive plans end. This is recommended as a DCISC Open Item.

DCPP has developed a detailed five-year plan with different staffing attrition scenarios and a year-by-year action plan to adjust hiring, retaining, and training of Licensed Operators. This action plan appears to be flexible and has a good rationale for anticipating different staffing contingencies.

Conclusions:

DCPP appears to be appropriately planning ahead for operator staffing, taking into account potential early and normal retirements, resignations, and the possible effects on staffing of the Joint Proposal, which requires plant shutdown in 2025. The DCISC should keep an Open Item for follow up on staffing when incentive plans end.

Recommendations:

None

3.10 Independent Spent Fuel Storage Installation (ISFSI)
The DCISC Fact-finding Team met with Rich Hagler, Used Fuel Storage Supervisor; Mark Mayer, Nuclear Fuels Procurement and Storage Manager; and John Harmon, Reactor Engineering Manager, for an update on the DCPP ISFSI. The DCISC last reviewed the ISFSI during its July 2017 Fact-finding Meeting (Reference 6.9), when it concluded the following:

The 2016 ISFSI cask loading campaign was successfully completed. An issue with cask overpack thread stud engagement was appropriately resolved. DCPP will be submitting a request for license renewal for the ISFSI in 2022, two years before its scheduled expiration in 2024. Acceleration of the movement of spent fuel to dry storage at the ISFSI will be considered as required by the Joint Proposal and as a part of the decommissioning planning process. Such acceleration could require changes to the current DCPP or ISFSI licenses.

During the 2016 ISFSI loading campaign, a total of 12 casks were successfully loaded with 32 spent fuel assemblies each and moved to the ISFSI. This brought the total of loaded casks at the ISFSI to 49. Plans call for loading and moving nine casks in 2018, and eight casks each in 2020 and 2022. The campaigns were scheduled such as to fall into years where the station planned only one refueling outage during the year. It takes about one week to load, transport, and secure each cask.

The current license for the DCPP ISFSI was obtained as a site-specific license under 10 CFR Part 72 and issued by the NRC in 2004. The 20-year license expires in 2024. Licensees are required to submit any renewals within 24 months of expiration. DCPP plans to submit a request for license renewal for the ISFSI in 2022. One factor that may affect license renewal is the need for additional inspection requirements to address stress corrosion cracking concerns. [Stress corrosion cracking concerns were most recently reviewed by the DCISC at its December 2016 Fact-finding Meeting (Reference 6.10).] The Electric Power Research Institute and the American Society of Mechanical Engineers are continuing to work on preparing acceptable cask surface inspection methods and acceptance criteria.

The Joint Proposal includes a requirement that DCPP prepare a plan for expedited post-shutdown transfer of spent fuel to dry cask storage as promptly as is technically feasible using the plans of San Onofre Nuclear Generating Station as a benchmark. This activity would be a part the DCPP decommissioning planning process. DCPP is just beginning to assemble the staff to begin decommissioning planning. The current ISFSI pad contains enough space for storage of all the spent fuel that would be present at the end of the license both in terms of physical space and total fuel burnup concentration as allowed by the ISFSI license.

The current facility licensing requirements for the Spent Fuel Pool include Technical Specification requirements for minimum durations that spent fuel must be stored.
in the pool before moving to dry cask storage as well as requirements for the
mixing of older and newer spent fuel assemblies in the pool to maintain thermal
inertia requirements that are assumed in analyses used to meet the NRC
requirements for events involving large fires or explosions (the ‘beyond design
basis’ program). Additionally, the ISFSI license contains requirements for the
mixing of older and new spent fuel assemblies in individual storage casks to
minimize the radiation dose surrounding the casks. With these requirements, it
could take approximately 12 years after the end of operations for all spent fuel
assemblies to be moved from the pool to dry cask storage. As a part of the
evaluation required under the Joint Proposal, DCPP will review what actions and
associated licensing changes could be made to accelerate the spent fuel offload
from the pool to dry storage casks. It was noted that any necessary changes to
the licenses could require several years to obtain approval and that the needed
licensing changes could be subject to external interventions that could further slow
the process.

Conclusions:

DCPP continues to manage its spent fuel satisfactorily in both the
Spent Fuel Pool (SFP) and Independent Spent Fuel Storage
Installation (ISFSI). As part of its decommissioning activities required
by the Joint Proposal, DCPP is investigating accelerated movement of
spent fuel from the SFP to the ISFSI.

Recommendations:

None

4.0 Conclusions

4.1

The DCISC Fact-finding Team concluded that the meeting with NRC
resident inspector was beneficial and that the DCISC should continue
them.

4.2

DCPP Unit 1 Containment steel liner successfully passed its visual
inspection performed in accordance with 10CFR50, Appendix J, and
the American Society of Mechanical Engineers (ASME) Code Section
XI. There were no reportable conditions or indications that affect the
structural integrity or leak tightness of the liner.

4.3

DCPP’s Liquid and Solid Radwaste Processing Systems are effective
in minimizing the volumes and radioactivity levels discharged or sent
to licensed storage facilities.

4.4
The regular meetings between DCISC Members and DCPP Officers and Directors appear to be beneficial for both organizations.

4.5

The DCPP Steam Generators (SGs) have been performing as expected since their replacement in 2008 and 2009. The most important SG parameter, tube integrity, has been shown to meet all criteria as a result of visual inspection and Eddy Current testing.

4.6

The DCPP Equipment Qualification (EQ) Process appeared healthy with no major outstanding issues. Depth of staff expertise appeared satisfactory with five qualified EQ Engineers.

4.7

The DCPP Engineering Excellence Plan appears appropriate for achieving and maintaining excellence in engineering support to the plant.

4.8

The DCPP Reactor Coolant System chemistry sampling process was performed by a Chemistry technician and observed by a member of the DCISC Fact-finding Team. The Chemistry technician correctly followed proper Chemistry, Radiation Protection and Human Performance practices in obtaining the pressurized sample. The plant and Chemistry Laboratories appeared orderly and clean.

4.9

DCPP appears to be appropriately planning ahead for operator staffing, taking into account potential early and normal retirements, resignations, and the possible effects on staffing of the Joint Proposal, which requires plant shutdown in 2025. The DCISC should keep an Open Item for follow up on staffing when incentive plans end.

4.10

DCPP continues to manage its spent fuel satisfactorily in both the Spent Fuel Pool (SFP) and Independent Spent Fuel Storage Installation (ISFSI). As part of its decommissioning activities required by the Joint Proposal, DCPP is investigating accelerated movement of spent fuel from the SFP to the ISFSI.

5.0 Recommendations:

None

6.0 References
6.1

6.2

6.3

6.4

6.5
Ibid., Exhibit D.4, Section 3.8, “Equipment Qualification Program Update.”

6.6

6.7

6.8
Ibid., Exhibit D.2, Section 3.4, “Review of Operator Aging and Retention.”

6.9
“Diablo Canyon Independent Safety Committee Twenty-Eighth Annual Report

6.10


1.0 Summary

The results of the September 6–7, 2017 fact-finding trip to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Plant Health Committee
2. Non-seismic Probabilistic Risk Assessment Programs
3. National Fire Protection Association (NFPA) 805 Program
4. Maintenance Department Performance
5. Foreign Material Exclusion Program
6. Institute for Nuclear Power Operations Evaluation Preparations
7. Local Intense Precipitation Analysis
8. Tsunami Hazard Analysis
9. Meet with NRC Senior Resident Inspector
10. Seismic Probabilistic Risk Assessment Program
11. Auxiliary Saltwater System Health
12. DCISC Member Meet with DCPP Officer

2.0 Introduction

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if PG&E’s performance is appropriate and whether any areas revealed observations which are important enough to warrant further review, follow-up, or presentation at a Public Meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4—Conclusions highlights the conclusions of the Fact-finding Team based
on items reported in Section 3—Discussion. These highlights also include the
team’s suggested follow-up items for the DCISC, such as scheduling future fact-
finding meetings on the topic, presentations at future public meetings, and
requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations lists specific recommendations to PG&E proposed by
the Fact-finding Team. These recommendations will be considered by the DCISC.
After review and approval by the DCISC, the Fact-finding Report, including its
recommendations, is provided to PG&E. The Fact-finding Report will also appear in
the DCISC Annual Report.

3.0 Discussion

3.1 Plant Health Committee Meeting

The DCISC Fact-finding Team met with Hector Garcia, DCPP Liaison to the
DCISC, to attend and observe the weekly Plant Health Committee (PHC) meeting.
The DCISC last observed a PHC meeting in July 2017 (Reference 6.1), when it
concluded the following:

The July 26, 2017 DCPP Plant Health Committee meeting was performed
efficiently and effectively with clear and concise system and equipment
reports, good participation and discussion by members, and clear actions
and assignments.

The PHC is governed by DCPP Procedure TS5.ID9, “Plant Health Committee” and is
a management team responsible for:

- Continual review of system and program health issues
- Routinely monitoring the status of plant health issues on the plant health
  issues list for action status and completion
- Routinely monitoring the status of the system health tactical list
- Review and approval of action plans to address plant health issues that
  originated from system health reports, maintenance rule, operator
  workarounds, program health reports, emergent issues, and others deemed
  important to monitor
- Reviewing and approving action plans to resolve degraded, unanalyzed and
  non-conforming conditions
- Review and monitoring of plant health issue plans that are presented to the
  PHC
- Performing Preventative Maintenance Oversight Committee functions
- Annual approval of system, component, and program long range plans
Quarterly review and monitoring of the Top Margin Issues list
Approving and authorizing the PHC budget for solutions to plant health issues

The membership of the PHC Core Team, which is the Decision Making (i.e. voting) group of the PHC, is as follows: the Station Director (Chair), the Engineering Director (Alternative Chair), the Operations Manager, the Maintenance Director, and the Nuclear Work Management Director. The PHC is also supplemented by a group of Supporting (non-voting) Members from other various station departments. This meeting of the PHC was facilitated by the Reliability Engineering Supervisor.

The agenda for this meeting included the following:

- Safety/Human Performance Message
- Facilitative Leadership Minute
- Verify Quorum
- Introduce Operations Personnel
- Review Purpose and Desired Outcomes
- Review and Approve Minutes from Previous Meeting
- Review of Action Items
- Reliability Updates – Vital Inverter Input Breaker Failure to Latch and Unit 1 High Pressure Turbine Blade Cracking
- Reliability Walk-in Items – Non-conforming Condition Regarding Technical Specifications for X/Q Methodology for Control Room Dose Assessments
- Evaluation of the Conduct of the Meeting
- Action Item Review

The meeting was chaired by the Station Director and facilitated by Mark Baker, Reliability Engineering Supervisor. The meeting was conducted with efficiency, and the agenda was covered as scheduled. A strong emphasis was placed on plant safety and reliability throughout the discussion. Although not required by procedure, it was typical for a representative from the Operations shift to attend and participate in the meeting. Such representative was not present at the planned start time for the meeting, and the Chair took action to request participation from the Operations shift staff. Shortly after the request was relayed, a shift Operator arrived and participated in the remainder of the meeting.

**Vital Inverter Input Breaker Failure to Latch**

The Vital AC System Engineer, Gary Segich, provided a reliability update related to input breakers for Vital AC Inverters which serve to supply AC power from the Vital DC Batteries to the Vital AC Buses. During the recent 1R20 outage, one of the four
Vital AC Inverter input breakers would not reset following manual tripping. Investigations revealed that the reset latch lever stuck due to dried grease on the mechanism. Resetting of the breaker was not a safety function of the breaker; however, the breaker could be called upon to be manually cycled by Operators when responding to off-normal events. The System Engineer reviewed previous similar events as well as a previous NRC Information Notice regarding failures on breakers which were similar but from different manufacturers. Additionally, he presented the plan to obtain replacements for all four Vital AC Inverter input breakers by the end of November 2017. The PHC members asked appropriate and challenging questions which resulted in an action item regarding the formation of contingency plans for the interim period until replacement breakers were available. These actions appeared appropriate to the DCISC Fact-finding Team.

**Unit 1 High Pressure Turbine Blade Cracking**

The Turbine System Engineer, Robert Fiori, provided a reliability update related to cracking of Unit 1 High Pressure (HP) Turbine blades. During the recent 1R20 outage, non-destructive testing of HP Turbine blades identified a total of 20 indications. The indications were evaluated and two were determined to be significant enough to require immediate repair. The remaining indications were either polished away or were evaluated as too small to cause failure during the remaining life of the HP Turbine. Repairs for the two significant indications were performed by replacing two groups of four blades with their associated shroud sections. Because of the indications found on Unit 1, planning had been initiated for possible similar repairs during the upcoming Unit 2 outage, 2R20. These actions appeared appropriate to the DCISC Fact-finding Team.

**Walk-in Item on Non-conforming Condition Regarding Technical Specifications for Heat Flux Hot Channel Factor, FQ(z)**

An item not on the agenda was presented as a walk-in issue to the PHC. The item concerned a non-conforming condition regarding Technical Specifications for the transient Heat Flux Hot Channel Factor, FQ(z), limit. This issue was listed as item 11 on DCPP’s Degraded, Unanalyzed, Non-conforming Conditions (DUNC) list. The primary issue was the identification that actions required to be taken by Technical Specifications should the actual FQ(z) limit be exceeded were found to be non-conservative. Procedural revisions had already been implemented to ensure the correct, conservative actions would be taken. However, correction of the non-conservative Technical Specifications required action needed approval of a license amendment from the NRC. Recently, the NRC had requested that DCPP not submit a license amendment request until early 2019 due to their current processing of a similar license amendment request from another facility being used by the NRC as a ‘pilot’ license amendment request. Because of this delay, the presenter requested approval of moving the corrective action due date until late 2019, and the PHC approved the change noting that plant operations within design basis was currently assured by the revised procedures. This action appeared appropriate to
Conclusions:

The September 6, 2017, DCPP Plant Health Committee meeting was performed efficiently and effectively with clear and concise system and equipment reports, good participation and discussion by members, and clear actions and assignments.

Recommendations:

None

3.2 Non-seismic Probabilistic Risk Assessment Programs

The DCISC Fact-finding Team met with Rasool Baradaran, Probabilistic Risk Assessment (PRA) Supervisor; Matt Shepard, Senior PRA Engineer; and David Imbaratto, PRA Engineer, to discuss the current status of the PRA group’s work under Baradaran’s supervision. That group is responsible for maintaining the station’s PRA, upgrading the PRA as needed, and applying it to address safety and reliability issues affecting the plant. The principal topics discussed were the status of the several PRA-development and PRA-enhancement projects now underway, as well as various applications of the PRA and PRA methods to support plant safety. The seismic PRA part of the group’s responsibilities was not discussed in this meeting, but in a separate session later in the Fact-finding Meeting (see Section 3.10). The DCISC last reviewed the overall PRA Program during its August 2016 Fact-finding Meeting (Reference 6.2), when it concluded the following:

The DCPP Probabilistic Risk Assessment (PRA) group’s development work today is emphasizing the completion of a new PRA model in the seismic area, and upgrading their models in several other technical areas. The use of the PRA for various applications continues effectively. The DCISC Fact-finding Team concludes that the PRA group is doing excellent work. The DCISC should continue to follow developments in the Seismic PRA area closely.

Fire PRA: The DCPP team has been working on a new fire PRA for a few years, and it is now in regular use at the plant. The model and analyses using it served as a major part of the plant’s submittal to the NRC for switchover of its NRC fire-protection regulations from the older Appendix R-based approach to the new approach based on National Fire Protection Association (NFPA) Standard 805. That switchover was approved by the NRC in April 2016 and, one year later, in April 2017, the new NFPA requirements for DCPP took effect.

The plant has also begun to use the fire PRA in NRC Regulatory Guide (RG) 1.174 applications, in which the PRA is used to justify certain plant configuration changes that need NRC approval. A good example is using the fire PRA to support changes
to Unit One in the recent outage for which it can be demonstrated that the change in plant core-damage frequency is smaller than the RG 1.174 decision thresholds. Modifications to Unit 2 in the upcoming 2R20 Refueling Outage in early 2018 will also be made on the same basis.

Internal-flooding PRA: Matthew Shepard reported that the PRA team’s internal-flooding PRA model is now complete and in use, after several years of development. An external peer review was conducted in 2012, which was quite positive, and which provided helpful findings and observations. The findings and observations have all been resolved, resulting in the issuance of an updated model in 2015. The team is now working on an updated model to be implemented during the next year. The contribution of internal flooding to the total plant core damage frequency is small, in the 5% range.

Low Power and Shutdown (LPSD) PRA: The DCPP team reported that their plans to initiate a new PRA to evaluate LPSD conditions is on hold awaiting the completion of two pilot applications of the new ANS-ASME LPSD standard (Reference 6.3) at other US plants, in order to benefit from the insights gained during those pilot studies. In the meantime, they are switching over their shutdown risk analysis methodology from “Safety Monitor,” which had been in use for several years, to the new “Phoenix” analysis methodology. Both of these methodologies use PRA-type analysis methods. The plant is already using Phoenix to support decisions about online maintenance, and will be using it to support outage risk management decision-making for the upcoming Unit 22R20 Refueling Outage in early 2018.

PRA for Other External Events: The team reported that accidents arising from external flooding still screen out as contributing very little to the risk profile, after having done additional work on modeling external-flooding scenarios arising from severe flooding in Diablo Creek. They reported to the DCISC earlier (in 2016) that risks from aircraft impacts have been screened out based on data from the Department of Transportation, and this is still true. The team reported on recent work on modeling tornado missile impacts as part of a high-winds PRA, but no results are available yet. They also reported on PRA work to model seismic-induced near-shore landslide tsunamis. This topic is covered in a separate section of this FF report (see Section 3.8).

PRA Application - GI-191: For a few years, the PRA team has been active with an industry consortium of 14 other nuclear power plants that is fostering the use of PRA risk insights in the resolution of NRC Generic Issue 191, "Assessment of Debris Accumulation on PWR Sump Pump Performance." Mr. Baradaran reported that testing work at a contractor’s laboratory was completed toward the end of last year, and that provided a basis for a more realistic probabilistic model of this phenomenon. However, the plant has decided that this NRC regulatory issue can be more easily resolved for Diablo Canyon using deterministic analysis approaches rather than the probabilistic approaches that have been developed. The regulatory submittal relying on these deterministic analyses is now in preparation.
PRA Application - Revision to Technical Specifications Based on Risk Insights: In late 2013, the plant submitted a License Amendment Request to the NRC to revise the plant’s Technical Specifications based on insights from the plant PRA. Recently, another plant has received a regulatory approval using similar arguments, and DCPP expects its approval sometime soon. If the approval is granted, the plant expects to make some modifications (such as changes to certain allowed outage times and testing intervals for vital equipment) in the next two upcoming outages.

Conclusions:

The DCPP Probabilistic Risk Assessment (PRA) group’s development work today is emphasizing the support of various applications, such as resolving generic issues and modifying technical specifications, and the use of the PRA for these purposes continues effectively. The DCISC Fact-finding Team concludes that the PRA group is doing excellent work. The DCISC should continue to follow developments in this area closely.

Recommendations:

None

3.3 National Fire Protection Association (NFPA) 805 Program

The DCISC Fact-finding Team met with Katie Bartlett, Senior Project Manager; Brian Roeder, NFPA-805 Project Manager; Paul Bemis, Senior Mechanical Engineer; and Sal Dolcemascolo, Project Manager, for an update on DCPP’s NFPA-805 Program implementation status. The DCISC last reviewed the NFPA-805 Program during its December 2016 Fact-finding Meeting (Reference 6.4), when it concluded the following:

DCPP is proceeding satisfactorily on its implementation of NFPA-805. DCPP’s procedures and process for transferring control to the Remote Hot Shutdown Panel and maintaining control of unit from the panel in the event of a need to evacuate the Control Room appear to be sound.

The NFPA-805 Program is an alternative approach to the NRC Fire Protection Program regulations for nuclear plants that is endorsed by the NRC and incorporated into Federal Regulations as 10 CFR 50.48(c). The NRC offered each operating nuclear power plant a choice as to whether to make the transition to the new regulations or to remain regulated according to existing NRC fire regulations, 10 CFR 50, Appendix R. About half of the U.S. nuclear plants, including DCPP, chose to make the transition, which has been a multi-year process. DCPP received a License Amendment and the NRC’s Final Safety Evaluation in April 2016, which approved DCPP’s programmatic move to NFPA-805. DCPP had until 365 days from that date (until April 15, 2017) in which to update all training, procedures, etc., and until the 1R20 and 2R20 Refueling Outages to implement the required physical
modifications.

The Fact-finding Team confirmed that DCPP has completed transitioning Fire Protection Program management, implementing procedures, and training required to comply with the NFPA-805 based license amendment. Additionally, DCPP has successfully completed installing all of the required physical modifications for NFPA-805 for Unit 1, including two modifications that were completed during Refueling Outage 1R20: the installation of an incipient fire detection system and of upgrades to the Remote Hot Shutdown Panel. The installation of an incipient fire detection system on Unit 2 remains as the final required modification to be completed, and that modification is planned to be installed during Refueling Outage 2R20 in the spring of 2018.

Under the NRC-approved NFPA-805 program, DCPP is allowed to evaluate all future changes made to the Fire Protection Program to ensure that they are acceptable without prior NRC approval. This process is called ‘self-approval’ and consists of establishing baseline Fire Protection Engineering Evaluations (FPEEs) and establishing a program under which an integrated assessment of the acceptability of risk, defense-in-depth, and safety margins can be made for any future changes using the FPEEs. The FPEEs need to include validations of final configurations for all of the modifications, including those completed during 1R20. The Project Managers reported that DCPP was currently working to complete all FPEEs for Unit 1 by the end of September 2017 and to implement the self-approval process for Unit 1 by the end of November 2017. Following 2R20, Unit 2 would undergo a similar evaluation and implementation process to completed by the end of June 2018. Ultimately, the self-approval process is planned to be managed using Fire Safety Analysis Software, which is planned to be ready for use by the end of 2017. The DCPP Fire PRA has been frozen until the self-approval process is implemented, after which the Fire PRA will be fully updated.

The Fact-finding Team asked what challenges had been encountered during implementation. The Project Managers responded that the largest challenge had been the cost of the transition to the NFPA-805 program, which totaled approximately $19 million excluding the significant costs of the physical modifications. Additionally, they confirmed that there were issues identified just prior to the implementation date regarding the design basis calculations for some containment penetration seals that were unclear. This issue was identified during reviews conducted by a new integrated engineering services provider. Ultimately, documentation was located which demonstrated that the performance of the seals was functionally equivalent to the design assumptions used when applying for the license amendment from the NRC, and that basis would be included in the appropriate FPEEs.

Conclusions:

DCPP has satisfactorily completed its implementation of NFPA-805,
with the NRC-approved exception of one remaining Unit 2 modification (incipient fire detection) to be completed in the next outage. DCPP is currently working to implement the self-approval process for Unit 1 and plans to complete that work by November 2017. The DCPP should next review this issue in late 2018 following implementation of the Unit 2 self-approval process, which is planned for June 2018.

Recommendations:

None

3.4 Maintenance Department Performance

The DCISC Fact-finding Team met with Craig Murry, Director, Maintenance Services Department, to review the overall performance of the Maintenance Department. The DCISC last reviewed Maintenance Department performance during its July 2015 Fact-finding Meeting (Reference 6.5), when it concluded the following:

*Station-wide performance indicators that focus on, or are dependent upon, Maintenance performance have been generally healthy. Maintenance rework, which has previously been an area of continuing management attention, and which was an area of focus in DCISC’s prior Fact-finding Visit, appears to be generally improving, but is still worthy of continued focus. Past improvements in foreign material exclusion are being sustained. DCISC should review the status of DCPP’s Emergency Diesel Generators no later than June 2016.*

As part of this Fact-finding activity, the DCISC Fact-finding Team examined the DCPP Plant Performance Improvement Report (PPIR) and reviewed various Maintenance-related reports from the Quality Verification (QV) Department received as a part of DCPP’s Monthly Documents Transmittals to the DCISC. Significant indicators noted in the reports included the fact that Maintenance Human Performance and Electrical Safety Challenges were listed as top performance issues by the QV Department. Weaknesses in procedural use and adherence expectations as well as the management actions taken in response to performance shortfalls were also specifically noted as areas of concern by QV. Additionally, various PPIR indicators such as station re-work, work management, recordable injuries, and department level event rate displayed data and trends that were indicative of weaknesses in Maintenance Department human performance.

The Fact-finding Team also reviewed a recent Apparent Cause Evaluation, “DCPP 12kV Ground Buggy Near Hit Potential SIF,” (SAPN 50923422) for a near Significant Injury or Fatality (SIF) event in which a 12kV ground buggy was nearly racked into an incorrect and energized 12kV cubicle. The activity was halted prior
to execution by a question from a nearby supervisor who overheard the workers and realized that the ground buggy was possibly in the wrong cubicle. Had the ground buggy been racked into the incorrect and energized 12kV cubicle, the resulting arc flash would have released considerable electrical energy into the breaker room and could potentially have caused serious injuries. The direct cause of the event was determined to be the failure of the workers to follow Electrical Maintenance procedures or to use standard human performance tools for risk mitigation. Corrective actions for the event included removal of qualifications and remediation for the workers involved, Electrical Maintenance stand downs to review the event, revising procedures, enhancing cubicle component identification, and developing and conducting an Electrical Maintenance Dynamic Learning Activity to reinforce the use of human performance tools for risk mitigation.

Mr. Murry briefed the Fact-finding Team on recent personnel changes within the Maintenance Department. He had been assigned the Director’s role starting in July of 2017, and other leadership in the Department also had been reorganized around that time. Four of the five lead managers in the Department now were former holders of a Senior Reactor Operator’s license. He felt that such experience would be beneficial in addressing recent areas of weak performance within the Department. Current staffing in the department was 232, which would reduce to 228 in 2018, and slowly trend down to about 200 thereafter. The reduction in personnel would coincide with the reduction in preventive maintenance activities that would be expected to occur as the facility approached the end of licensed operations in 2025. Approximately 23 personnel had turned over to date during 2017, and DCPP was actively moving to fill open positions with a preference to obtain personnel who had some prior work experience at DCPP. Mr. Murry also noted that in light of decision for DCPP to cease operations in 2025, he was working to steer the Department to focus on “doing the right work, error free.”

Currently, Mr. Murry was focusing on completing several initiatives to address performance weaknesses within the Department. His focus areas included:

- Optimizing Outage Scope
- Improving Workweek T-4 (four weeks prior to the work) Walkdowns
- Improving Maintenance Fundamentals as defined in the Institute for Nuclear Power Operations Event Report (IER) 17-05
- Clarifying the Roles and Responsibilities of the Shop Coordinators
- Improving Housekeeping
- Improving the Leak Indicators used in the PPIR

Mr. Murry also presented and discussed with the team a recently updated Maintenance Department Dashboard, which was a consolidated representation of multiple indicators of Department performance. Within the Department Dashboard, the high number of station leaks and Deficient/Non-critical Work Orders stood out.
as warranting increased attention. The Fact-finding Team concluded that the Department’s initiatives were appropriate and the focus areas were correctly targeted toward the recently-identified weaknesses.

Conclusions:

DCPP has identified several low-level concerns with Maintenance Department Performance, and Maintenance Department leadership is taking action to address the issues. DCISC should review the performance of the Maintenance Department in late 2018 to evaluate the effectiveness of the actions to improve performance.

Recommendations:

None

3.5 Foreign Material Exclusion Program

The DCISC Fact-finding Team (FFT) met with Craig Stolz, Work Week Manager and Foreign Material Exclusion (FME) Program Coordinator, for an update on DCPP’s FME Program. The DCISC last reviewed FME Program performance during its December 2014 Fact-finding Meeting (Reference 6.6), when it concluded the following:

*Station performance with respect to Foreign Material Exclusion appears to be generally sustained, following an improving trend that was noted during the DCISC’s January 2012 Fact-finding Visit. Actions taken with respect to emerging issues appear to be appropriate. Positive engagement with the work force appears to be a significant contributor to this improvement.*

DCPP’s FME Program is governed by procedure AD4.ID6, “Foreign Material Exclusion Program,” a copy of which was provided and reviewed by the Fact-finding Team. The purpose of the FME Program is to prevent the undesired and potentially harmful intrusion of foreign materials into plant systems or components. Situations in which this intrusion can most likely occur are during maintenance when normally closed systems and environments are open or during inspections or tests under those same types of conditions. In such situations, it is important to maintain control of tools, fasteners, repair parts, replaced parts, safety items, and residue resulting from the work, items attached to clothing, and anything else that could become loose and enter a system or environment. The vast majority of FME problems typically occur during plant outages when many system repairs, modifications, inspections, and tests are performed.

Mr. Stolz reported that the FME Program was generally healthy, although there was an identification of a negative trend (documented in SAPN 50920493) late during the recent 1R20 Refueling Outage. This SAPN had not yet been fully closed.
Mr. Stolz provided a list of all of the FME events that occurred during the outage. The overall number of low-level events identified, approximately 26, was typical for an outage. The low-level events include such events as loss of FME barriers, small debris found when systems were opened, and small items found in the reactor or reactor cavity during refueling.

The negative trend identified late in the outage was driven primarily by two major FME events. First, during refueling a synthetic hood was dropped into the reactor cavity and could not be retrieved before being drawn into the suction of the operating Residual Heat Removal pump. Analysis after the event determined that the hood would have easily disintegrated in the pump without causing damage and any remaining material would dissolve in the Reactor Coolant System upon plant heatup. Second, a box of rivets was dropped from a scaffolding, fell several levels in the Turbine Building, and scattered inside sections of a Main Feedwater Pump turbine casing that was open for maintenance. Open areas of the turbine casing were inspected in detail to identify and retrieve the dropped rivets. The 1R20 events drove the monthly PPIR FME Program Health indicator for May to drop from Green to Red, but the indicator recovered to Yellow in June and to Green in July.

Regarding FME Program performance during the recent outage, Mr. Stolz noted that most events in past outages were associated with work performed by PG&E employees. However, during the 1R20 outage, the majority of events were associated with work performed by contract employees. Consideration of this trend had found that recent changes to move pre-outage training for contract employees off site had resulted in contract employees not being required to participate in an on-site FME Dynamic Learning Activity as was required prior to past outages. Mr. Stolz reported that DCPP will be taking action to re-establish the requirement for contract employees to complete the FME Dynamic Learning Activity during pre-outage training.

Conclusions:

DCPP’s recent FME Program performance has been generally good, except for several FME events which occurred during the 1R20 Refueling Outage. Actions taken with respect to those events were appropriate.

Recommendations:

None

3.6 Institute for Nuclear Power Operations Evaluation Preparations

(Because of the confidential nature of INPO information, no details are presented.)

The DCISC Fact-finding Team with Paula Gerfin, Station Director, to review
DCPP's preparations for the September 2017 Institute of Nuclear Plant Operators (INPO) biennial evaluation. The DCISC last reviewed INPO performance during its September 2015 Fact-finding Meeting (Reference 6.7), when it concluded the following:

DCPP shared the results of its World Association of Nuclear Operators (WANO)/Institute of Nuclear Plant Operators (INPO) August biennial evaluation with the DCISC. (Because of its privacy agreement with DCPP, the DCISC cannot share the details of the evaluation.)

Ms. Gerfin reviewed DCPP’s preparations for the September 2017 INPO evaluation, including the results of the recently completed Crew Performance Evaluations and DCPP’s understanding of the focus areas to be reviewed in depth by INPO during the upcoming evaluation.

Conclusions:

DCPP reviewed its preparations for its Institute of Nuclear Plant Operators September biennial evaluation with the DCISC. (Because of its privacy agreement with DCPP, the DCISC cannot share the details of the preparations for the evaluation.)

Recommendations:

None

3.7 Local Intense Precipitation Analysis

The DCISC Fact-finding Team met with DCPP personnel to discuss the current status of DCPP’s work on understanding the risk arising from potential Local Intense Precipitation (LIP) that might affect the DCPP site. The following DCPP personnel were in attendance: Brendan Dooher, Senior Mechanical Engineer (and primary tsunami analyst); Scott Maze, Fukushima Project Manager; Nozar Jahangir, Seismic Engineering Manager; Nathan Barber, Seismic PRA Engineer; and William Horstman, Senior Consulting Civil Engineer. The DCISC last reviewed PG&E’s LIP Analysis during its May 2016 Fact-finding Meeting (Reference 6.8), when it concluded the following:

Concerning LIP (local intense precipitation), the FF team is satisfied that PG&E has done a thorough analysis of potential LIP impacts. The NRC’s review concurs. The next step will be for PG&E to develop specific mitigating measures to assure that LIP is not an important safety concern. The DCISC should review the PG&E proposals after they are developed.

This Fact-finding Meeting’s objective was to understand the additional analysis that PG&E recently completed to understand the risk to the plant from LIP.
The background is that after the 2011 nuclear accident at Fukushima in Japan, NRC made an industry-wide information request in a 50.54(f) letter of March 2012 (Reference 6.9) that, among other issues, covered risk from external flooding. In response, PG&E performed an external-flooding analysis and submitted it to the NRC (Reference 6.10). That submittal identified the potential that an LIP event could give rise to unusually large flooding arising in Diablo Creek within the plant site. That flooding could, under some circumstances, produce flood waters that would enter into the lower areas of the turbine building and the auxiliary building.

In response, DCPP implemented some interim safety measures, including a plan to deploy sandbags to protect against intrusion in some of the identified locations. The sandbags were then pre-deployed close to the potentially affected locations for ready access.

The above was, as noted, an interim measure. The NRC guidance suggested that one approach to a permanent resolution could be to develop a probabilistic analysis that could support the argument (if true) that the likelihood of the underlying LIP event, combined with its consequences in the plant, would present only a very minor likelihood of a core-damage accident. In response, the DCPP team performed the initial phases of such an analysis.

At this Fact-finding Meeting, the DCPP team presented the results of a new analysis, which it has recently submitted to the NRC for review (Reference 6.11). In this new submittal, DCPP concluded that the flooding resulting from the postulated LIP event is already covered (that is, bounded deterministically) by provisions in the plant for coping with certain design-basis internal flooding scenarios. Specifically, the design-basis flooding scenario for this region of the plant is an internal flood resulting from failure of the circulating-water-system piping. The plant design incorporates provisions (drains, flow paths, etc.) that are already capable of mitigating such an internal flood, if it were to occur, in a passive matter, relying on no active components nor on any human actions.

The new analysis that was described qualitatively during this Fact-finding Meeting demonstrates that the flooding resulting from the potential LIP event is “smaller” in its size and its effects than the internal flood described above that is already included in the plant’s regulatory design basis. It is therefore concluded that the LIP flood does not require that the plant implement any additional protection measures. (Specifically, the sandbags are not required, because the LIP flood waters can drain away with a smaller impact than the impact from the internal flooding scenario.)

If this analysis is accepted by the NRC, then NRC would be in a position to resolve the LIP issue on the basis that it is already accommodated by the plant’s current configuration.

The plant’s recent NRC submittal (Reference 6.11) with the above analysis was not
available to the DCISC FF team at the time of the FF meeting. However, it was made available to the DCISC the next day. The DCISC has reviewed the DCPP analysis (as submitted), and finds that the DCPP technical analysis appears to be adequate for the purpose of the argument it makes. This LIP issue can therefore be closed.

Conclusions:

The recent DCPP analysis of the effects of potential severe local intense precipitation demonstrates that those effects can be accommodated by the existing plant design as it sits. Therefore, the plant states that the risks from those LIP scenarios are acceptable. The DCISC concurs, and this issue can be closed.

Recommendations:

None

3.8 Tsunami Hazard Analysis

The DCISC Fact-finding Team met with PG&E personnel to discuss the current status of PG&E’s work on understanding the risk to plant safety from tsunamis that might affect the DCPP site. The following DCPP personnel were in attendance: Brendan Dooher, Senior Mechanical Engineer (and primary tsunami analyst); Norm Abrahamson, Chief Seismologist (via conference call); Scott Maze, Fukushima Project Manager; Nozar Jahangir, Seismic Engineering Manager; Nathan Barber, Seismic PRA Engineer; and William Horstman, Senior Consulting Civil Engineer. The DCISC last reviewed PG&E’s Tsunami Hazard Analysis during its August 2016 Fact-finding Meeting (Reference 6.12), when it concluded the following:

The discussion during the fact-finding meeting covered possible approaches to performing additional tsunami-hazard and tsunami-PRA analyses to supplement those already performed. PG&E agreed to give consideration to how to accomplish more analysis, using the information already in-hand. The DCISC Fact-finding Team concludes that the PG&E tsunami analysis group is doing excellent work. The DCISC should continue to follow developments in this area closely.

Additionally, following the August 2016 Fact-finding Meeting, the following recommendation was made:

PG&E should perform additional study of submarine landslide-induced tsunami hazards at DCPP and its environs.

This review was a follow-up to several earlier DCISC reviews and meetings. Its objective was to understand what additional analysis work PG&E was now doing on the subject of understanding the risk to the plant, and especially to explore any
progress on a probabilistic tsunami hazard analysis.

The DCPP team reported that in May the DCPP seismic PRA (SPRA) analysis had been subjected to an outside peer review by a team of experts, as part of its program to assure that their SPRA was in conformance with the ASME-ANS PRA Standard (Reference 6.13). These PRA peer reviews generally result in a few Findings and Observations (F&Os), and this peer review was no exception. It is necessary that each F&O be resolved before the PRA (in this case, the SPRA) can be submitted to the NRC for its acceptance. After NRC acceptance, the PRA can then be used in regulatory applications.

The analysis presented to the Fact-finding Team is still a work-in-progress, which the DCPP team was not ready to offer as its final work product. The team said that they expect this work to have been completed and subjected to internal review by the late fall, at which time it would be sent to the DCISC for its review. Nevertheless, the work so far is very useful, and the DCPP staff that presented the work sounded highly confident as to the validity of their overall conclusions, even if the results are still tentative.

The analysis examined tsunamis caused by offshore landslide events, meaning "nearby" landslides, which in turn are caused by nearby earthquakes. No other tsunami scenarios were examined in this analysis. However, it has been understood and accepted for some time that these scenarios probably represent the largest tsunami risk to the plant. (Tsunamis arising at great distances, such as from Alaska or Japan or Chile, which comprise the current design-basis tsunamis in their Safety Analysis Report, have always been understood to be unimportant contributors to overall plant risk. This understanding remains true today.)

The analysis that was presented during this Fact-finding Meeting (using slides that they are not yet ready to distribute) performed the following separate analyses, some of which were somewhat conservative analyses rather than fully realistic in character:

1. The analysis works out the likelihood per year of a tsunami going high enough onshore to reach 44 feet (so as to inundate the snorkel-air-intakes), and separately the likelihood per year that a tsunami will reach the 85-foot level at plant grade. This likelihood is a combination of the annual likelihood of an earthquake of a given "size" and the conditional likelihood of a tsunami of 44 feet (or 85 feet) given that earthquake. The DCPP team did this analysis for many different earthquake "sizes," with accelerations ranging from 0.2g (at 5 hertz spectral acceleration) to over 2g. The earthquake likelihood is taken from the seismic-hazard study (the "SSHAC" study) that has been submitted to the NRC, reviewed extensively, and accepted by the NRC (Reference 6.14). Norm Abrahamson of PG&E made this part of the presentation to the Fact-finding Team.
2. The analysis then works out likelihood of a tsunami of 44 feet (or of 85 feet), conditional on the earthquake of each given "size." This is based on their tsunami submittal of March 2015, which is the one that the NRC is still reviewing. (Reference 6.15). This is the analysis that the DCISC reviewed earlier. The analysis assumes that every earthquake greater than about magnitude 6 produces an offshore landslide. The spectrum of landslide sizes is then taken from the earlier PG&E analysis.

3. Next, the DCPP team worked out the likelihood of a core-damage accident conditional on the tsunami getting to 44 feet (or 85 feet.) This is the so-called Conditional Core Damage Probability (CCDP) analysis that the DCISC urged them to do over a year ago. This CCDP analysis is a straightforward PRA analysis. The analyst assumes that with a 44-foot tsunami the tsunami causes the loss of the snorkel intakes and the equipment associated with it. The analysis then works out the likelihood of a core damage accident, using event trees and fault trees. This CCDP analysis, although it has important numerical uncertainties, is straightforward once the analyst postulates the loss of the equipment that the tsunami takes out. (The analysis is performed separately for an 85-foot tsunami, including which equipment will be damaged by that tsunami.)

The combination of the likelihood of an earthquake-generated tsunami getting to 44 feet [see (1) above] and the CCDP [see (3) above] provides a number for Core Damage Frequency (CDF) for the following scenario: an earthquake causes an offshore landslide that causes a tsunami; the tsunami damages equipment; the PRA then provides a value for CDF given that damage, including uncertainties.

4. The CDF number has broad uncertainties, at least a factor of plus or minus 10 and perhaps a factor of plus or minus 30. The DCPP team did not quote an uncertainty, but they indicated that they are working on differentiating the aleatory from the epistemic components of the uncertainty in the probabilistic hazard. In any event, they are still working on that aspect of their analysis. However, the DCISC Fact-finding Team knows that the uncertainty is roughly in this range, namely a plus-minus factor of 10 to 30.

5. The analysis team then works out the CDF for the following scenario, which does not involve a tsunami, but only an earthquake: (i) a large earthquake damages the same equipment that the tsunami would damage in the above analysis; (ii) the conditional probability CCDP is worked out for the core damage accident that arises if that equipment is damaged. (Note that this is the same CCDP as for the tsunami scenario, see above.)

The DCPP team told us that they are taking no credit in this analysis for FLEX equipment.

The end-points of these two analyses are the same—either the
earthquake-caused tsunami damages the equipment, or the earthquake damages it directly.

6. The DCPP team presented the ratio of these two results, the “CDF ratio”. There is broad uncertainty, but the CDF ratio is about a factor of 1000 to 10,000, depending on how large a "size" the earthquake is, with the tsunami-caused scenarios being 1000 to 10,000 times less likely to cause core-damage CDF than the direct CDF from the earthquake all by itself.

7. Of course, the CDF from the earthquake itself (no tsunami) is simply one part of the larger seismic PRA, which produces CDF numbers in the range around $10^{-5}$ per year. These CDF numbers are broadly "acceptable" to the NRC.

Summary: The CDFs for the tsunami-caused scenarios, for either a 44-foot or an 85-foot tsunami, are tentatively found to be a very large factors smaller than the CDF for direct earthquake-caused core damage. If so, one can on this basis dismiss the CDF for the earthquake-tsunami-CDF scenarios as unimportant to plant risk. The ratio, 1000 or 10,000 to 1, is robust despite the uncertainties.

Conclusions:

The preliminary analysis of risk from tsunamis caused by offshore landslide events presented to the DCISC Fact-finding Team indicates a low probability of plant damage. The DCISC should review the final version of this preliminary analysis once it has been completed.

Recommendations:

None

3.9 Meet with Senior NRC Resident Inspector

The DCISC Fact-finding Team (FFT) met with Chris Newport, Senior NRC Resident Inspector, for an update. The DCISC last met with the NRC in August 2017 (Reference 6.16), when it concluded the following:

*The DCISC Fact-finding Team concluded that the meeting with NRC resident inspector was beneficial and that the DCISC should continue them.*

The participants discussed the following topics:

1. Status of NRC reviews of DCPP’s Seismic PRA and External Flooding analyses
2. Upcoming NRC inspection of FLEX systems and procedures.
3. The recent “Alert” emergency declared in response to a reduction in containment atmosphere oxygen levels
4. NRC 95001 Inspection of the Residual Heat Removal Valve White Finding corrective actions – the inspection has been completed, awaiting final results from NRC Headquarters.

5. Recent activities with regards to the Joint Proposal for DCPP to cease operations in 2025

6. DCPP’s completion of implementation of the NFPA-805 Fire Protection Program

Conclusions:

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings.

Recommendations:

None

3.10 Seismic Probabilistic Risk Assessment Program

The Fact-finding Team met with Nozar Jahangir, Seismic Engineering Manager, and Nathan Barber, Senior PRA Engineer, to discuss the current status of DCPP’s Seismic Probabilistic Risk Assessment (SPRA) Program. The DCISC last reviewed PG&E’s SPRA Program during its August 2016 Fact-finding Meeting (Reference 6.17), when it concluded the following:

*The DCPP Probabilistic Risk Assessment (PRA) group’s development work on the fragilities aspects of the Seismic PRA is proceeding well, with a strong analysis team supplemented by an outstanding group of outside consultants. Various models are being upgraded and important new data are being incorporated. The DCISC Fact-finding Team concludes that the Seismic PRA fragilities team is doing competent work. The DCISC should continue to follow developments in this technical area closely over the next year. PG&E’s use of magnitude saturation to describe one important aspect of the behavior of seismic ground motions in the vicinity of the DCPP site is appropriate.*

The background of this discussion is that after the 2011 nuclear accident at Fukushima in Japan, NRC made an industry-wide information request in a 50.54(f) letter in March 2012 (Reference 6.18) that, among other issues, covered asking the plants to perform some additional analyses of the risk from earthquakes. In response, PG&E has been working ever since on a long series of studies, based on probabilistic methods, to provide an up-to-date SPRA.

At this Fact-finding Meeting, the DCPP team presented a progress report. The SPRA is almost complete, and the DCPP team reported that in May the SPRA analysis had been subjected to an outside peer review by a team of experts, as
part of its program to assure that their SPRA was in conformance with the ASME-ANS PRA Standard (Reference 6.19). These PRA peer reviews generally result in a few Findings and Observations (F&Os), and this peer review was no exception. It is necessary that each F&O be resolved before the PRA (in this case, the SPRA) can be submitted to the NRC for its acceptance. After NRC acceptance, the PRA can then be used in regulatory applications.

The peer review resulted in a few dozen F&Os. Some of these cover documentation, and will be resolved easily. Among the F&O issues that will require some extra analysis or other work are issues involving so-called 2-over-1 configurations in the plant, where a non-seismically-designed item might fall during a postulated earthquake and damage an important item needed to respond to the earthquake. The F&O involved assuring that these items are walked down after the analysis to verify their configuration. Another F&O involved the vulnerability of a slope on the site to seismic-caused slumping. This will require further checking in the field. Still another one involves whether the list of equipment being studied in the SPRA is in fact complete, especially in regards to certain portable generators.

Other issues identified by the peer review team involve analysis of the potential for seismic-induced internal flooding, the potential for a seismic-caused fire due to high-energy electric arcing in a cabinet, and the potential for seismic-caused damage to a lubrication-oil reservoir.

The DCPP team reported that these issues should not be difficult to resolve and that they believe none of them is important to overall plant seismic risk. The Fact-finding Team concurs in this evaluation. However, the additional work will delay the schedule. The DCPP team is now pointing toward a submittal to the NRC in April 2018.

Conclusions:

The DCPP Probabilistic Risk Assessment (PRA) Group’s development work on the Seismic PRA is proceeding well. A recent outside peer review provided some review comments that will require resolution before the analysis can be considered complete and ready to submit to the NRC. The DCISC Fact-finding Team concludes that the Seismic PRA team is doing competent work. The DCISC should continue to follow developments in this technical area closely over the next year.

Recommendations:

None

3.11 Auxiliary Saltwater System Health
The DCISC Fact-finding Team met with Danielle Fogg, Auxiliary Saltwater (ASW) System Engineer to review the health of the ASW System. The DCISC last reviewed this system during its April 2016 Fact-finding Meeting (Reference 6.20), when it concluded the following:

The Auxiliary Saltwater Systems continue to be given close attention by the DCPP staff. The rated Health of the systems in both Units is generally "Healthy." However, a potential issue is being examined with regard to operating limits for this system pertaining to ocean water temperature, which could affect the ability of the system to provide adequate cooling to the Component Cooling Water System. A vendor is being employed to examine this issue, with results expected in 2016. The DCISC should reexamine the status of this issue prior to the end of 2016.

The ASW System is a safety-related, Design Class 1 System. It provides the heat sink required for the safe shutdown of the plant. The system in each unit provides cooling water from the Pacific Ocean (the Ultimate Heat Sink) to the Component Cooling Water (CCW) heat exchangers, through which CCW is pumped and, in turn, serves to remove heat from various plant systems. In the event of an accident involving a significant loss of reactor coolant, the ASW System is relied upon to function so that the CCW System can cool the Residual Heat Removal system and Containment Spray System, which, in turn, cool the nuclear fuel in the reactor and the containment, respectively. There are two ASW Pumps for each unit, and each pump can supply sufficient cooling water through each of two redundant trains to either of the two CCW heat exchangers for each unit. In addition, an ASW cross-tie exists between Units 1 and 2 so that the standby ASW Pump from one unit can supply ocean water to either CCW heat exchanger of the other unit. This cross tie is modeled in the PRA for DCPP. The ASW System simplified schematic is shown below:
The ASW Pumps in each unit are electric motor driven 100 percent capacity pumps and are powered from separate vital power 4kV electrical buses. In the case of a loss of offsite power, the pump motors are powered by electricity supplied by DCPP’s Emergency Diesel Generators. The pumps are physically located in the intake structure. Each pump is located in a separate watertight compartment with drainage to prevent motor damage as a result of flooding. Backflow check valves are located in each compartment drain to prevent flooding in the compartment from external sources. The water level in the compartments is monitored and an alarm is provided in the control room to alert the operators of increasing level. Additionally, snorkels with intakes located at the 45-foot level are installed to maintain compartment ventilation should the intake structure be flooded. Bar racks are installed at the inlets to the intake structure to keep large debris out of the system. The seawater then passes through an ASW System traveling screen. One traveling screen filters the seawater for two ASW Pump suction bays. The traveling screen filters keep smaller debris and most sea life from entering the ASW suction bays.

The ASW System also serves as a major element of the post-Fukushima FLEX strategy. As the Ultimate Heat Sink providing ocean-cooling water for normal and accident shutdowns, ASW must be functional following beyond-design-basis events, including loss of all electric power. DCPP has procured four Diesel-driven Emergency ASW Pumps, two per unit, which are designed to take suction from the...
ocean and be tied into the ASW with portable piping.

In 2016, DCPP completed significant upgrades to the traveling screens including the installation of variable frequency drives and digital control systems which allow for more flexible and reliable operations as the amounts of debris impacting the screens vary widely with ocean conditions. The System Engineer provided the Fact-finding Team a copy of a presentation on Storm Preparedness which is presented annually to Station Leadership and others who are affected when storms increase ocean wave action and/or debris deposits at the Intake Structure. The presentation contained information on weather predictions, expectations for gelatinous organism concentrations, DCPP and industry operating experience, DCPP equipment readiness (including the recent upgrades), applicable procedures, and the status of training. The presentation was well organized and informative.

The System Engineer reviewed the status of the system and open issues with the Fact-finding Team. Auxiliary Saltwater System Health is rated as Green (Healthy) for both Units 1 and 2. Each Unit is also rated on the following additional Performance Categories: Reliability, Maintenance Rule Compliance, Material/Equipment Condition and Corrective Actions, Operations Concerns, and Performance Monitoring. All of those performance categories were also rated as Green (Healthy) for both Units 1 and 2. In the performance category of Material/Equipment Condition and Corrective Actions, both Units were rated as Yellow, or Deficient, in the performance subcategory of “Degraded/Non-conforming Condition.” The degraded condition related to recurring corrosion on the ASW Pump packing studs. When the studs were replaced with a more corrosion resistant material, the ASW Pump packing glands began to corrode. Evaluations are ongoing to identify a more suitable material for the packing studs.

In the performance category of Operations Concerns, both Units were rated as Yellow, or Deficient, in the performance subcategory of “Operability Issues in the Past 180 days.” This long-standing issue stems from high ocean (i.e. Ultimate Heat Sink) temperatures of greater than 64 degrees F that were experienced during the summer and fall of 2014, with a peak temperature of 68.2 degrees F being reached on October 15, 2014. Inlet temperatures above 64 degrees F require that the Unit operate with two Component Cooling Water Heat Exchangers in service in order to guarantee that adequate cooling is provided to the safety related equipment that is being served by the Component Cooling Water System. The Technical Specification Basis limit for continued operation, even in that configuration, is 70 degrees F, above which the system design has not been validated and operations would be outside the current licensing basis. A technical vendor has been engaged to perform a revised calculation to demonstrate that plant Technical Specifications could be adjusted to use a higher ocean inlet temperature limit while continuing to preserve the required margin of safety.

The Fact-finding Team accompanied the System Engineer on a walkdown of Intake Structure for both Units. Major components observed included the intake traveling
screens, screen wash systems, Circulating Water Pumps, and ASW Pumps. The areas both above and below sea level were clean and material condition appeared good overall.

DCPP ASW Pump 1-1 Compartment Door, Inside the Intake Structure

Conclusions:

The Auxiliary Saltwater Systems continue to be given close attention by the DCPP staff, and the systems in both Units continue to be rated as “Healthy.” An issue regarding the potential for ocean water operating temperatures above the original design and licensing basis limits is still being evaluated. The Intake Structure area appeared clean and well maintained.

Recommendations:

None

3.12 DCISC Member Meeting with DCPP Officer

The DCISC Fact-finding Team met with Jon Franke, Vice-President, Generation Technical Services, to discuss the items in this fact-finding meeting and other items of mutual interest.

Conclusions:

The regular meetings between DCISC Members and DCPP Officers and Directors continue to be beneficial for both organizations.

Recommendations:

None

4.0 Conclusions

4.1

The September 6, 2017, DCPP Plant Health Committee meeting was performed efficiently and effectively with clear and concise system
and equipment reports, good participation and discussion by members, and clear actions and assignments.

4.2

The DCPP Probabilistic Risk Assessment (PRA) group’s development work today is emphasizing the support of various applications, such as resolving generic issues and modifying technical specifications, and the use of the PRA for these purposes continues effectively. The DCISC Fact-finding Team concludes that the PRA group is doing excellent work. The DCISC should continue to follow developments in this area closely.

4.3

DCPP has satisfactorily completed its implementation of NFPA-805, with the NRC-approved exception of one remaining Unit 2 modification (incipient fire detection) to be completed in the next outage. DCPP is currently working to implement the self-approval process for Unit 1 and plans to complete that work by November 2017. The DCPP should next review this issue in late 2018 following implementation of the Unit 2 self-approval process, which is planned for June 2018.

4.4

DCPP has identified several low-level concerns with Maintenance Department Performance, and Maintenance Department leadership is taking action to address the issues. DCISC should review the performance of the Maintenance Department in late 2018 to evaluate the effectiveness of the actions to improve performance.

4.5

DCPP’s recent FME Program performance has been generally good, except for several FME events which occurred during the 1R20 Refueling Outage. Actions taken with respect to those events were appropriate.

4.6

DCPP reviewed its preparations for its Institute of Nuclear Plant Operators September biennial evaluation with the DCISC. (Because of its privacy agreement with DCPP, the DCISC cannot share the details of the preparations for the evaluation.)

4.7

The recent DCPP analysis of the effects of potential severe local intense precipitation demonstrates that those effects can be coped with by the existing plant design as it sits. Therefore, the plant states that the risks from those LIP scenarios are acceptable. The DCISC
concurs, and this issue can be closed.

4.8
The preliminary analysis of risk from tsunamis caused by offshore landslide events presented to the DCISC Fact-finding Team indicates a low probability of plant damage. The DCISC should review the final version of this preliminary analysis once it has been completed.

4.9
The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings.

4.10
The DCPP Probabilistic Risk Assessment (PRA) Group’s development work on the Seismic PRA is proceeding well. A recent outside peer review provided some review comments that will require resolution before the analysis can be considered complete and ready to submit to the NRC. The DCISC Fact-finding Team concludes that the Seismic PRA team is doing competent work. The DCISC should continue to follow developments in this technical area closely over the next year.

4.11
The Auxiliary Saltwater Systems continue to be given close attention by the DCPP staff, and the systems in both Units continue to be rated as “Healthy.” An issue regarding the potential for ocean water operating temperatures above the original design and licensing basis limits is still being evaluated. The Intake Structure area appeared clean and well maintained.

4.12
The regular meetings between DCISC Members and DCPP Officers and Directors continue to be beneficial for both organizations.

5.0 Recommendations:
None

6.0 References

6.1

6.2
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6.4


6.5


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6.7


6.8

Ibid, Exhibit D.11, Section 3.7, “Flood Causing Mechanism Re-evaluation Review by NRC.”

6.9


6.10

PG&E Letter to NRC, DCL-15-034, "Final Response to Request for Information
Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 Flooding,” March 11, 2015.

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1.0 Summary

The results of the October 30–31, 2017 fact-finding trip to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows and primarily selected based on interests/requests of the California Energy Commission (CEC) in their upcoming November 2017 meeting with Dr. Lam:

1. Meet with Senior NRC Resident Inspector
2. Joint Proposal, Staff Retention, and Decommissioning Status
3. Plant Performance Indicators: NRC and Industry
4. Dry Cask Storage Loading
5. DCISC Member Lam Meeting with Jon Franke
6. Plant Affordability
7. Employee Concerns Program
8. NRC Information Notice 2017-4, High Energy Arcing Faults in Electrical Equipment Containing Aluminum Components

2.0 Introduction

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if PG&E’s performance is appropriate and whether any areas revealed observations which are important enough to warrant further review, follow-up, or presentation at a Public Meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4—Conclusions highlights the conclusions of the Fact-finding Team based on items reported in Section 3—Discussion. These highlights also include the team’s suggested follow-up items for the DCISC, such as scheduling future fact-
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Finding meetings on the topic, presentations at future public meetings, and requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations lists specific recommendations to PG&E proposed by the Fact-finding Team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the Fact-finding Report, including its recommendations, is provided to PG&E. The Fact-finding Report will also appear in the DCISC Annual Report.

3.0 Discussion

3.1 Meet with Senior NRC Resident Inspector

The DCISC Fact-finding Team (FFT) met with Chris Newport, Senior NRC Resident Inspector, for an update. The DCISC last met with the NRC in September (Reference 6.1), concluding the following:

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings.

The participants discussed the following topics:

1. NRC 95001 Inspection of the Residual Heat Removal Valve White Finding corrective actions – the inspection has been completed, and NRC closed some of the items and left several open, pending re-inspection, which is expected to occur within a few weeks.

2. The NRC independent evaluation of DCPP’s tsunami and local intense precipitation submittal is expected by the end of 2017.

3. NRC’s DCPP FLEX inspection will occur in November and will take about one week. Mr. Newport will participate in this inspection.

Conclusions:

The DCISC Fact-finding Team concluded that the meeting with the NRC resident inspector was beneficial and that the DCISC should continue them.

Recommendations:

None

3.2 Joint Proposal, Staff Retention, and Decommissioning Status

The DCISC Fact-finding Team (FFT) met with Tom Jones, DCPP Director of Strategic Initiatives, for an update on the Joint Proposal, Employee Retention, and
Decommissioning. The DCISC last reviewed the Joint Proposal at the June 2017 DCISC Public Meeting (Reference 6.2).

The participants discussed the following:

- Oral arguments will be heard November 28, 2017 on the proposed Preliminary Decision proffered by the lead CA Public Utilities Commission hearing officer.
- DCPP is participating in the establishment of a Decommissioning Engagement Panel, which would be made up of local citizens and be an information source for the public.
- DCPP’s employee retention plan has not changed since the last update at the June 2017 DCISC Public Meeting. The FFT did note that the Preliminary Decision cut back significantly funds for employee retention; however, DCPP had not had a chance to review and comment on it.
- DCPP has put out a request for proposals to have a contractor perform a decommissioning cost estimate. This would be followed by a request for proposals to actually perform the work of decommissioning.

Conclusions:

**DCPP is following and participating in the CA Public Utilities Commission proceeding on the Joint Proposal and is moving ahead on its plans for decommissioning.**

Recommendations:

None

3.3 Plant Performance Indicators: NRC and Industry

The DCISC Fact-finding Team met with various representatives of DCPP Regulatory Services and Performance Improvement to discuss DCPP’s NRC and Industry Performance Indicators. The CEC had asked Dr. Lam about these indicators in advance of his November 2017 meeting with them.

DCPP discussed its NRC Performance Indicators, which were all Green (good). These are published on the NRC website and are shown below.
Shown below is the plant’s performance using performance indicators developed by the nuclear industry itself, which differ in both scope and detail from the NRC’s performance indicators. For those areas where the indicators have the same or a similar scope, the industry’s indicators often have a lower threshold, and sometimes a significantly lower threshold, so that a plant performance that is rated “green” by the NRC might have a lower-level rating using the industry indicator scheme.
The colors below indicate in which industry quartile DCPP performance falls. Green is top quartile, Yellow is second and third quartiles, and Red is fourth or lowest quartile.

DCPP also discussed its Industry Performance Indicators, which were mostly Green (good). Indicators which were red or yellow were driven primarily by a reduced capacity factor due to the recent 1R20 Refueling Outage, unplanned short curtailments, and by the identification in 2016 of an inoperable valve in the high pressure safety injection system.

Conclusions:

DCPP’s NRC performance indicators are all Green, and industry performance indicators are needing improvement in several areas.

Recommendations:

None

3.4 Dry Cask Storage Loading

The DCISC Fact-finding Team met with Rich Hagler, Used Fuel Storage Supervisor, for an update on DCPP’s Independent Spent Fuel Storage Installation (ISFSI) loading campaigns and status. The DCISC last reviewed this subject in August 2017 (Reference 6.3), concluding the following:

DCPP continues to manage its spent fuel satisfactorily in both the Spent Fuel Pool (SFP) and Independent Spent Fuel Storage Installation (ISFSI). As part of its decommissioning activities required by the Joint Proposal, DCPP is investigating accelerated movement of its spent fuel from the SFP to the ISFSI.
Because there are no changes in status of spent fuel since the August 2017 DSISC Fact-finding Meeting, the August status is presented below. The material for the August report is all in *italics*.

**Independent Spent Fuel Storage Installation (ISFSI)**

*The DCISC Fact-finding Team met with Rich Hagler, Used Fuel Storage Supervisor; Mark Mayer, Nuclear Fuels Procurement and Storage Manager; and John Harmon, Reactor Engineering Manager, for an update on the DCPP ISFSI. The DCISC last reviewed the ISFSI during its July 2017 Fact-finding Meeting (Reference 6.9), when it concluded the following:*

The 2016 ISFSI cask loading campaign was successfully completed. An issue with cask overpack thread stud engagement was appropriately resolved. DCPP will be submitting a request for license renewal for the ISFSI in 2022, two years before its scheduled expiration in 2024. Acceleration of the movement of spent fuel to dry storage at the ISFSI will be considered as required by the Joint Proposal and as a part of the decommissioning planning process. Such acceleration could require changes to the current DCPP or ISFSI licenses.

During the 2016 ISFSI loading campaign, a total of 12 casks were successfully loaded with 32 spent fuel assemblies each and moved to the ISFSI. This brought the total of loaded casks at the ISFSI to 49. Plans call for loading and moving nine casks in 2018, and eight casks each in 2020 and 2022. The campaigns were scheduled such as to fall into years where the station planned only one refueling outage during the year. It takes about one week to load, transport, and secure each cask.

The current license for the DCPP ISFSI was obtained as a site-specific license under 10 CFR Part 72 and issued by the NRC in 2004. The 20-year license expires in 2024. Licensees are required to submit any renewals within 24 months of expiration. DCPP plans to submit a request for license renewal for the ISFSI in 2022. One factor that may affect license renewal is the need for additional inspection requirements to address stress corrosion cracking concerns. [Stress corrosion cracking concerns were most recently reviewed by the DCISC at its December 2016 Fact-finding Meeting (Reference 6.10).] The Electric Power Research Institute and the American Society of Mechanical Engineers are continuing to work on preparing acceptable cask surface inspection methods and acceptance criteria.

The Joint Proposal includes a requirement that DCPP prepare a plan for expedited post-shutdown transfer of spent fuel to dry cask storage as promptly as is technically feasible using the plans of San Onofre Nuclear Generating Station as a benchmark. This activity would be a part the
DCPP decommissioning planning process. DCPP is just beginning to assemble the staff to begin decommissioning planning. The current ISFSI pad contains enough space for storage of all the spent fuel that would be present at the end of the license both in terms of physical space and total fuel burnup concentration as allowed by the ISFSI license.

The current facility licensing requirements for the Spent Fuel Pool include Technical Specification requirements for minimum durations that spent fuel must be stored in the pool before moving to dry cask storage as well as requirements for the mixing of older and newer spent fuel assemblies in the pool to maintain thermal inertia requirements that are assumed in analyses used to meet the NRC requirements for events involving large fires or explosions (the ‘beyond design basis’ program). Additionally, the ISFSI license contains requirements for the mixing of older and new spent fuel assemblies in individual storage casks to minimize the radiation dose surrounding the casks. With these requirements, it could take approximately 12 years after the end of operations for all spent fuel assemblies to be moved from the pool to dry cask storage. As a part of the evaluation required under the Joint Proposal, DCPP will review what actions and associated licensing changes could be made to accelerate the spent fuel offload from the pool to dry storage casks. It was noted that any necessary changes to the licenses could require several years to obtain approval and that the needed licensing changes could be subject to external interventions that could further slow the process.

Conclusions:

DCPP continues to manage its spent fuel satisfactorily in both the Spent Fuel Pool (SFP) and Independent Spent Fuel Storage Installation (ISFSI). As part of its decommissioning activities required by the Joint Proposal, DCPP is investigating accelerated movement of spent fuel from the SFP to the ISFSI.

Recommendations:

None

3.5 DCPP Member Lam Meeting with Jon Franke

Dr. Lam met with Jon Franke, DCPP Vice-President of Generation Technical Services, to discuss the agenda items in this fact-finding meeting and other items of mutual interest.

Conclusions:

The regular meetings between DCISC Members and DCPP Officers and Directors appear to be beneficial for both organizations.
Recommendations:

None

3.6 Plant Affordability (Review of Long-Term Capital Spending Under the Joint Proposal)

The DCISC FFT met with Tom Baldwin, Director of Site Services, to discuss DCPP plant affordability (review of long-term capital spending under the Joint Proposal). The DCISC’s interest in this subject was the possible effect on nuclear safety if capital projects were to be cancelled due to the short duration before the plant’s closing eight years hence. The California Energy Commission asked Dr. Lam to be prepared to discuss “plant affordability” with respect to the Joint Proposal. This fact-finding meeting was used to update Dr. Lam on this topic.

The DCISC last reviewed plant affordability relative to the DCPP Engineering Excellence Plan in August 2017 (Reference 6.4), concluding the following:

_The DCPP Engineering Excellence Plan appears appropriate for achieving and maintaining excellence in engineering support to the plant._

The DCISC also reviewed the DCPP Excellence Plan and Plant Investment Review Process at the June 2017 Public Meeting (Reference 6.5) and the Long Term Capital Project Planning Under the Joint Proposal in December 2016 (Reference 6.6), concluding the following:

_DCPP has formed a Project Review Working Group using experienced staff from Operations, Engineering, and Work Control to perform an initial review of the entire portfolio for future capital projects in light of the Joint Proposal. The working group had divided the current portfolio into three categories of projects: Required, Recommended and Prioritized, and Not Recommended. No final decisions would be made on the future of any projects until late 2017. The DCISC should continue to follow this area closely in future Fact-finding and Public Meetings._

The 2018 PG&E Corporate Initiatives include the Key Strategy “Execute Generation Operating and DCPP Excellence Plans.” DCPP initiated the Project Review Working Group (PRWG) to develop and implement a project review process that promotes plant safety and reliability while optimizing the capital and expense budgets through 2025. The PRWG consists of members from Design and System Engineering, Outage Management, Strategic Projects, Regulatory Projects, and Business and Finance. The Group is to review all Plant Health Prioritization Committee (PHC)-approved projects to ensure the financial and technical arguments supporting them are still valid, considering the decision not to relicense DCPP.
Projects are classified into one of the following categories:

- **Regulatory** – any project required by a regulatory commitment. These are considered “must do.”
- **Plant Reliability** – equipment reliability challenges with consequences which include a reactor scram/trip, transient greater than 20%, MSPI (Mitigating Systems Performance Index) failure or complete loss of critical safety function or loss of Maintenance Rule (MR) high-safety significant MR function.
- **Bridging Strategy** – enhancement of equipment reliability or mitigation of vulnerability consequences until a long-term solution is implemented.
- **Broken/Fix** – projects necessary to restore a plant function lost due to failure or degradation.
- **Core Damage Frequency** – projects which affect Core Damage Frequency.
- **Enterprise Risk** – projects which are high consequence, low probability, station operational and project risk that could affect the viability of the plant. Examples include core damaging events and extended shutdown events.

The portfolio review was a starting point, and no final decisions were to be made on the future of any projects until late 2017 primarily for two reasons. First, the capital budget for 2017 was already set and there were no current plans for cuts. And second, it was not appropriate for PG&E to make any final decisions until the review and approval process for the Joint Proposal at the Public Utilities Commission was complete.

The DCISC had two major projects of interest: the Unit 2 Main Generator Stator replacement and the Eagle 21 Plant Protection System upgrade. The Generator Stator was currently fourth on the Recommended and Prioritized list and was currently still funded and planned for replacement in 2R21 in 2019.

The Eagle 21 upgrade is an expensive project and one that could not be completed for several years. DCPP decided not to proceed any further with the Eagle 21 upgrade based partly on the fact that the proposed change was intended to improve reliability and was not intended to improve nuclear safety and replacement parts for the system were expected to remain available from the original vendor for the remaining period of the DCPP operating licenses. The DCISC plans to review the existing Eagle 21 Plant Protection System at its November 14-15, 2017 Fact-finding meeting.

Other large capital projects being considered for cancellation include the following:

- **Condenser Replacement**
- **Radiation Monitoring System Upgrade**
- **Intake Bar Rack Replacement**
Fuel Handling Building Fan Replacement
- Auxiliary Building Fan Replacements
- High Pressure Turbine Retrofit
- 12kV Protective Relay Replacements
- SCW Tank and Piping Replacement
- Main Generator Output Breaker Replacement
- Pressurizer Heater Replacement
- Power Block Lighting Replacement
- Containment Fan Cooler Unit Cooling Coil Replacement

To assure that nuclear safety is maintained, the Fact-finding Team recommends that the DCISC review the above list of cancelled projects and continue to monitor DCPP’s decisions to cancel or postpone capital projects

Conclusions:
The DCPP Joint Proposal Capital Project review process appears satisfactory for reducing capital spending not needed for operation beyond 2025, which is the proposed end of operations. The DCISC should continue to monitor the process and review cancelled projects for potential impact on plant safety.

Recommendations:
None

3.7 Employee Concerns Program

The DCISC FFT met with Rick Burnside, Manager of the Employee Concerns Program (ECP), and Donna Wells, ECP Investigator, for an update of the Program. The DCISC last reviewed the ECP in March 2017 (Reference 6.7), concluding the following:

DCPP’s Employee Concerns Program is effectively organized and managed to provide all employees the ability to report safety concerns without fear of retaliation. The numbers of concerns reviewed internally was relatively low, and the number of allegations received by the NRC appeared to be typical for the industry.

The ECP group consisted of two investigators and a manager. The group’s purpose was to be an independent and impartial investigator of concerns raised by employees. The group formed an alternative avenue for employees who for any reason did not wish to report concerns directly to supervisors or managers. The group reported directly to the Chief Nuclear Officer (CNO), and met periodically.
with the CNO when warranted by the results of a formal investigation.

The two procedures governing the ECP (OM3.ID3, Employee Concerns Program, and OM3.NQ1, Employee Concerns Investigations and Reporting) contained extensive guidance on implementing the program to providing all employees an ability to raise quality or safety concerns without fear of retaliation. Confidentiality of any reporting individual’s identity is assured, unless precluded by lawful requests for information from the NRC or a court. There is also means for reporting concerns anonymously via hotline or drop box; typically there have not been many anonymous concerns submitted. The previous 2016 NRC inspection noted no deficiencies in administration of the ECP.

Mr. Burnside had previously completed the certification process as a Senior Reactor Operator, which helps him to understand technical issues and concerns. In addition, the Training Department Director is a backup resource for providing technical reviews of concerns.

The ECP group participates in the exit interview process for six-months-plus employees leaving DCPP to ensure that they had the opportunity to express any safety concerns. The ECP group investigates concerns referred to PG&E from the NRC as a part of its program for processing allegations of wrongdoing or safety issues and concerns received. Industry statistics on the NRC’s processing of allegations showed that the numbers of allegations received for DCPP were typical for the industry and had declined in recent years.

Thus far in 2017 the ECP has investigated 30 concerns and performed one formal investigation. This was slightly lower number than that for 2016: 42 concerns, and 4 formal investigations. These numbers were less than most previous years, during which the group typically investigated 50 – 80 concerns. In general, some of the concerns were technical in nature, but the majority involved leadership or communications issues. There have been no concerns regarding the Joint Proposal or Employee Retention Plan.

DCPP’s separate Differing Professional Opinions (DPOs) Program provides a formal process for resolving differences in technical opinions between employees/supervision over issues possibly affecting nuclear safety or licensing. The DPO process has not been frequently used, with only one DPO case having been processed in the last three years.

Conclusions:

The DCPP Employee Concerns Program appeared appropriate for receiving and investigating employee concerns in a confidential manner. During 2017, as in past years, there have been no significant concerns regarding nuclear safety.

Recommendations:
3.8 NRC Information Notice 2017-4, High Energy Arcing Faults in Electrical Equipment Containing Aluminum Components

The Fact-finding Team met with Joe Goryance, Electrical Systems Engineer; Stefan Bednarz, Senior Advising Engineer; and Michael Richardson, Nuclear Regulatory Services Supervisor, for an update on an item of interest to the California Energy Commission: NRC Information Notice 2017-4, “High Energy Arcing Faults in Electrical Equipment Containing Aluminum Components.” The DCISC last reviewed this issue at the June 2000 DCISC Public Meeting (Reference 6.M).

In May 2002 DCPP reported to the NRC that Unit 1 had tripped due to a 12kV electrical fault resulting in a loss of power to the non-vital 4kV buses. A Notice of Unusual Event was declared by DCPP due to a fire in the 12kV ductwork and switchgear room and for loss of a 4160V vital power source. DCPP reviewed and discussed with the DCISC the sequence of events, cause, corrective actions, lessons learned and conclusions from the event.

The cause was overheating in the center phase aluminum bar connection to a 12kV bus. An overheated PVC boot created smoke and was consumed. A phase-to-phase arc from the center to the southern bus bar occurred across all three phases. The cause of overheating was inconsistent thickness of silvering on the splice plates. This particular bus is heavily loaded and has mainly large loads. Connections may have operated in excess of capacity.

Corrective actions included replacing all four 12kV buses from the transformer into the 12kV Switchgear Room using copper (versus the original aluminum) and increasing the current capacity the bus will carry. The remaining unaffected connections were verified to be satisfactory.

Similar events involving aluminum connections were reported at several other plants, prompting NRC to issue the Information Notice in 2017. No action was required by DCPP because they had resolved the issue back in 2000. The California Energy Commission had received the 2017 Information Notice and wished to discuss it when meeting with DCISC Member Dr. Lam in early November.

Conclusions:

The NRC Information Notice 2017-4, “High Energy Arcing Faults in Electrical Equipment Containing Aluminum Components,” was an item the California Energy Commission wished to discuss with DCISC Member Dr. Lam at their November 2017 meeting. DCPP had satisfactorily addressed this issue back in 2000, and with this October 2017 Fact-finding Meeting, Dr. Lam was up-to-date on the issue.
Recommendations:

None

4.0 Conclusions

4.1

The DCISC Fact-finding Team concluded that the meeting with the NRC resident inspector was beneficial and that the DCISC should continue them.

4.2

DCPP is following and participating in the CA Public Utilities Commission proceeding on the Joint Proposal and is moving ahead on its plans for decommissioning.

4.3

DCPP’s NRC performance indicators are all Green, and industry performance indicators are needing improvement in several areas.

4.4

DCPP continues to manage its spent fuel satisfactorily in both the Spent Fuel Pool (SFP) and Independent Spent Fuel Storage Installation (ISFSI). As part of its decommissioning activities required by the Joint Proposal, DCPP is investigating accelerated movement of spent fuel from the SFP to the ISFSI.

4.5

The regular meetings between DCISC Members and DCPP Officers and Directors appear to be beneficial for both organizations.

4.6

The DCPP Joint Proposal Capital Project review process appears satisfactory for reducing capital spending not needed for operation beyond 2025, which is the proposed end of operations. The DCISC should continue to monitor the process and review cancelled projects for potential impact on plant safety.

4.7

The DCPP Employee Concerns Program appeared appropriate for receiving and investigating employee concerns in a confidential manner. During 2017, as in past years, there have been no significant concerns regarding nuclear safety.

4.8

The NRC Information Notice 2017-4, “High Energy Arcing Faults in Electrical Equipment Containing Aluminum Components,” was an
item the California Energy Commission wished to discuss with DCISC Member Dr. Lam at their November 2017 meeting. DCPP had satisfactorily addressed this issue back in 2000, and with this October 2017 Fact-finding Meeting, Dr. Lam was up-to-date on the issue.

5.0 Recommendations:

None

6.0 References

6.1


6.2


6.3


6.4

Ibid., Section 3.4, “Independent Spent Fuel Storage Installation (ISFSI) Loading Campaigns.”

6.5

Ibid., Exhibit B.9, “Update on the Joint Proposal to Retire DCPP at the Expiration of its Current Operating Licenses Joint Proposal), the DCPP Excellence Plan, and Plans for Retention of Employees After Year Four.”

6.6


6.7
6.7 Ibid., Exhibit D.7, Section 3.10 “Employee Concerns Program.”
1.0 Summary

The results of the November 14–15, 2017 fact-finding trip to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Observe Auxiliary Feedwater Pump Control Valve Periodic Test
2. Observe FLEX Training for Licensed Operators
3. Meeting with Three Performance Improvement Coordinators
4. Results of August 2017 INPO (Institute of Nuclear Power Operations) Evaluation
5. Meeting with NRC Senior Resident Inspector
6. Plant Protection System Review with System Engineer
7. Meeting with DCPP Station Director
8. Fire Doors Status
9. NRC 95001 Inspection of Residual Heat Removal System Valve Operator White Finding
10. NRC 2017 Inspection Report for 2010 Event

2.0 Introduction

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if PG&E’s performance is appropriate and whether any areas revealed observations which are important enough to warrant further review, follow-up, or presentation at a Public Meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4—Conclusions highlights the conclusions of the Fact-finding Team based
on items reported in Section 3—Discussion. These highlights also include the team’s suggested follow-up items for the DCISC, such as scheduling future fact-finding meetings on the topic, presentations at future public meetings, and requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations lists specific recommendations to PG&E proposed by the Fact-finding Team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the Fact-finding Report, including its recommendations, is provided to PG&E. The Fact-finding Report will also appear in the DCISC Annual Report.

3.0 Discussion

3.1 Observe Auxiliary Feedwater System Pump Control Valve Periodic Test

The DCISC Fact-finding Team (FFT) met with Stephanie Barnes, Auxiliary Feedwater (AFW) System Engineer, to review the AFW System and observe the quarterly DCPP Surveillance Test STP V-3P6B, “Exercising Valves LCV-115 and 113 Auxiliary Feedwater Pump Discharge,” Revision 27, November 14, 2017. This is the first review of this particular surveillance test; however, the DCISC observed a Chemistry Reactor Coolant sample process in August 2017 (Reference 6.1) when it concluded the following:

The DCPP Reactor Coolant System chemistry sampling process was performed by a Chemistry technician and observed by a member of the DCISC Fact-finding Team. The Chemistry technician correctly followed proper Chemistry, Radiation Protection and Human Performance practices in obtaining the pressurized sample. The plant and Chemistry Laboratories appeared orderly and clean.

The purpose of the surveillance test is “...to measure and record the stroke times of Valves LCV-115 and LCV-113, [control valves on the discharges of the Auxiliary Feedwater Pumps.] The test consists of timing the rapid closure of the LCVs when a deviation exists between valve standby position full open and valve demand position full closed prior to actuator energization and a fail-safe test when the LCV actuators are de-energized and the valves are allowed to fail open from a full closed position.” Operations is responsible for coordination of the test, operation of equipment as required by the procedure, obtaining test data, and determination of operability.

Accompanied by Ms. Barnes, the DCISC FFT processed through Security and through Radiation Protection into the Radiation Control Area (RCA) to observe the surveillance test. Upon arriving at the valve location, the FFT observed a two-person Maintenance team in the process of cleaning and adjusting the valves. Maintenance was performing normal, scheduled preventive maintenance on the
valves, and the testing was required as a post-maintenance test to ensure the maintenance operation did not adversely affect the valves. Because this operation was to take over an hour, delaying the surveillance test, the FFT decided to walk down various components of the AFW System instead. This included the Unit 1 AFW Pumps and related valves, instrumentation and piping.

Conclusions:
The DCISC Fact-finding Team’s (FFT’s) plans to observe a valve surveillance test were cancelled due to a delay in Maintenance valve preparation. The FFT instead performed a system review and component walkdown with the System Engineer. The system components and plant itself appeared to be in good condition.

Recommendations:
None

3.2 Observe FLEX Training for Licensed Operators

The DCISC FFT met with Glenn Robinson, Senior Licensed Operations Instructor, to observe his class on FLEX Operator Training. The DCISC last reviewed FLEX training in August 2012 (Reference 6.2), concluding the following:

The training and procedures for installing the Emergency Auxiliary Saltwater Pumps and associated components appeared satisfactory, although there was no apparent provision for practicing or test-installing the extensive run of piping and operating the system. The portable equipment and piping may be difficult to install and operate, so practice and testing are important, and further modifications should be considered that could simplify and speed up installation. The DCISC should follow up on these topics.

The training observed in this November 2017 FF meeting was for the following FLEX support guides:

- DCPP FLEX Support Guideline FSG 05, “Initial Assessment and FLEX Equipment Staging,” providing actions for the initial assessment of plant equipment and system status, and for staging FLEX equipment in preparation for use in plant recovery.
- DCPP FLEX Support Guideline FSG 43, “Staging FLEX Equipment,” used to direct staging of FLEX equipment at the applicable staging areas.
The FSGs included the following major steps:

1. Scope
2. Symptoms or Entry Conditions
3. Instructions
4. Ensure Security Response
5. Extending Coping Time of Vital 125Vdc Power During ELAP
6. Deploy FLEX 480Vac/275kW Diesel Generator and Load Center
7. Deploy FLEX 480Vac Power to Battery Charger
8. Place in Service FLEX 480Vac/275kW Diesel Generator and Load Center
9. Place in Service FLEX 480Vac Power to Battery Charger
10. Deploying FLEX 480Vac Power to Alternate Feed
11. Auxiliary Building and Fuel Handling Building Initial Assessment
12. Turbine Building and Control Area Initial Assessment
13. Outside Area Initial Assessment
14. Staging and Deployment Status Control
15. ERCS [Emergency Reactor Coolant System] Pump Electrical Equipment Staging (SGs) [Steam Generators] Available on Unit 1 or 2)
16. Unit 1 EAFW [Emergency Auxiliary Feedwater] Equipment Staging (SGs Available on Unit 1)
17. Unit 2 EAFW Equipment Staging (SGs Available on Unit 2)
18. Emergency RWR [Raw Water Reservoir] Pump Staging (Units 1 & 2)
19. Emergency Battery Charger and Communication Equipment Staging (Units 1 & 2)

These steps were discussed in an interactive fashion with good class participation. The training guides included many detailed steps with good diagrams and graphics. Following the classroom session, the participants were instructed to perform walkthroughs on their own following the included “In Plant Walkdown Guide.”

Conclusions:

The DCISC Fact-finding Team observed DCPP FLEX Training for Licensed Operators, and concluded that the training, training materials, and instructor were satisfactory.

Recommendations:

None
3.3 Meeting with Three Performance Improvement Coordinators

The DCISC FFT met with the following Department Performance Improvement Coordinators (PICOs) to discuss their roles:

1. James Silva, PICO for Corrective Action Program [CAP]
2. Dustin Yancey, PICO for Performance Improvement
3. Derek Schmidt, PICO for Performance Improvement

This was the first review of DCPP PICOs. The DCPP Performance Improvement Department is comprised of the following groups (functional areas):

- Corrective Action Program
  - Nuclear Review Team (NRT)
  - Cause Evaluation Subject Matter Experts (SMEs)
  - Corrective Action Review Board (CARB)

- Performance Programs
  - Self-Assessments
  - Benchmarking
  - Operating Experience
  - ICES (INPO Consolidated Event System)
  - Plant Performance Improvement Report (PPIR)

- PI Process
  - Department PICOs
  - Trending
  - Clock Resets

- Human Performance
  - Subject Matter Experts

The PI Department measures, monitors, trends, and reports on plant performance with the intent of continuous improvement. PICOs reside both within the PI Department (as heads of the groups and functional areas shown above) and within the line departments, e.g., Operations, Maintenance, Engineering, etc., to coordinate performance within their departments. The DCISC reviews these functional areas regularly and has found them satisfactory in the past.

The PICOs described their work, with an emphasis on their interfaces with the
technical staff doing the actual work whose performance improvement is being evaluated. They emphasized how important it is that the individual PICO residing within a given line department maintain coordination with other PICOs throughout the plant, so that the work of all of the PICOs remains as effective as it needs to be. From the discussions in this November Fact-finding Meeting, it appears that the PICO organization is performing satisfactorily for DCPP.

Conclusions:

DCPP’s Performance Improvement Department, along with its Performance Improvement Coordinators (PICOs) appears to be an effective asset for plant problem solving and continuous improvement.

Recommendations:

None

3.4 Results of August 2017 INPO (Institute of Nuclear Power Operations) Evaluation

(Because of the confidential nature of INPO information, no details are presented.)

The DCISC FFT met with Paula Gerfen, Station Director, and Susan Westcott, Director, Organizational Effectiveness, for a report on the August 2017 Institute of Nuclear Power Operations (INPO) evaluation of DCPP. The DCISC last reviewed DCPP INPO items in August 2016 (Reference 6.3), concluding the following:

DCPP shared the results of its World Association of Nuclear Operators (WANO)/Institute of Nuclear Power Operations (INPO) August 2015 biennial evaluation with the DCISC. (Because of its privacy agreement with DCPP, the DCISC cannot share the details of the evaluation.)

After reviewing and discussing the results of the evaluation, the DCISC FFT concludes that the evaluation was positive with areas for improvement which appeared appropriate.

Conclusions:

The Institute of Nuclear Power Operations biennial August 2017 evaluation of DCPP appeared to have been positive overall with some areas for improvement that seemed appropriate. (Because of its privacy agreement with DCPP, the DCISC cannot share the details of the evaluation.)

Recommendations:

None

3.5 Meet with Senior NRC Resident Inspector
The DCISC FFT met with Chris Newport, Senior NRC Resident Inspector, for an update. The DCISC last met with the NRC in September 2017 (Reference 6.4), concluding the following:

_The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings._

The participants discussed the following topics:

1. Decommissioning and DCISC’s role and NRC’s Decommissioning Office
2. Spent fuel storage and transportation
3. NRC independent evaluation of DCPP tsunami
4. Probabilistic Risk Assessment use of FLEX
5. NRC FLEX inspection currently in process
6. White Finding re-inspection following Thanksgiving
7. Joint Proposal update – less money for employee retention

**Conclusions:**

_The DCISC Fact-finding Team concluded that the meeting with the NRC resident inspector was beneficial and that the DCISC should continue them._

**Recommendations:**

None

3.6 Plant Protection System Review with System Engineer

The DCISC FFT met with Jose Medina, Plant Protection System (Eagle 21) and AMSAC (Anticipated Trip without Scram Mitigating System Circuitry) System Engineer, for a review of Eagle 21. The DCISC last reviewed this system in December 2014 (Reference 6.5), when it concluded the following:

_DCPP is proceeding with the replacement of its Eagle 21, Plant Process Protection System (PPS). Its design is under review by NRC, which approval is expected by the end of 2014. Installation is planned for Refueling Outages 1R21 and 2R21 (2019). The replacement appears prudent for improved reliability, maintenance, and nuclear safety._

The Eagle 21 Plant Protection System (PPS) is part of the original Westinghouse Nuclear Steam Supply System (NSSS), which includes the Reactor Coolant System (RCS). The PPS consists of four separate independent full function protection sets, which provide trip and actuation signals to the Solid State Protection System.
(SSPS) for use by the Reactor Trip System (RTS) and Engineered Safety Features Actuation System (ESFAS). Output signals of the PPS parameters (temperature, pressure, level, neutron flux, and flow) are provided to the Main Control Room for indication and recording, to the Plant Process Computer for monitoring, and to the Main Annunciator System, for alarming. The PPS also provides input sensor signals to various plant control systems. These signals are electrically isolated from the PPS and are not processed by the PPS instrumentation (with the exception of RCS Delta-T and Tavg channels). The PPS also provides isolated signals to the Anticipated Trip Without Scram (ATWS) Mitigation System Actuation Circuitry (AMSAC) and other such control systems as the Control Rod Control System and Digital Feedwater Control System. Each protection set is physically and electrically separated from the other three sets. The PPS was updated in the mid-1990s.

DCPP had submitted a License Amendment Request (LAR) to the NRC for an upgraded PPS but has now decided to keep the current system in light of the proposed early plant shutdown in 2025 in the Joint Proposal. The current system has been operating reliably, and service and spare parts are readily available. It is expected to operate reliably through 2025. This November 2017 Fact-finding review concentrated on the current system performance.

The PPS health is Green – good – and there are no significant issues. DCPP is a member of the Westinghouse Owners’ Group (WOG) on Eagle 21 and stays current including attending WOG meetings twice per year. DCPP performs full train tests and calibrations each six months, and the system has built-in testing capability which provides regular performance reports.

The PPS is subject to full DCPP Cyber Security Program requirements and has no connections outside the plant.

Conclusions:

The DCPP Eagle 21 Plant Protection System is in good (Green) health with no significant issues. The system operates reliably enough and support and parts are readily available such that DCPP has decided not to upgrade it due to the early plant shutdown as per the Joint Proposal. The DCISC believes this is satisfactory.

Recommendations:

None

3.7 Meeting with DCPP Station Director, Paula Gerfe

The DCISC FFT met with Paula Gerfen, DCPP Station Director, on the following matters:

1. Agenda items in this fact-finding meeting
2. DCISC’s Annual Report recommendation for further DCPP tsunami analysis
3. DCISC is looking at its role in the DCPP post-shutdown decommissioning phase
4. The preliminary findings and conclusions of the CA Public Utilities Commission Joint Proposal proceeding

Conclusions:

The meetings between the DCISC Fact-finding Teams and DCPP Plant management continue to be useful for both organizations.

Recommendations:

None

3.8 Fire Doors

The DCISC FFT met with Jeremy Hartley, Project Manager; Al Clark, Design Engineer; Janis Bailey, System Engineering Supervisor; and John Cote, Fire Protection Engineer for an update on DCPP fire doors. The DCISC last reviewed fire doors in July 2017 (Reference 6.6), when it concluded the following:

DCPP is making good progress in repairing and/or replacing its impaired fire doors, while maintaining compensatory measures as long as the doors remain impaired. The schedule and budget for fire doors appears appropriate.

DCPP has the following numbers of doors in the Power Block:

- 967 total ECG Equipment Control Guideline* (ECG) and Non-ECG doors
- 414 ECG doors, including 280 fire, 83 HVAC (ventilation system), 26 HELB (high energy line break), and four combination flood and fire doors
- 148 doors with security functions

*Equipment Control Guidelines are similar to Technical Specifications in that they specify requirements for items, although ECGs do not require NRC approval for changes.

Door impairments include problematic hinges, handles, skin failures, locks, closers, etc. Such impairments typically result from normal use as plant doors typically experience tens of thousands of openings and closings per year.

History: After a slow start on repairing or replacing impaired doors, which were subject to compensatory actions such as fire watches, a new “Power Block Door Project” was presented on July 15, 2014 to the Project Review Committee for funding. This Project included replacement of all 94 doors in the Power Block.
because they had outlived their useful life, i.e., they had degraded to the point where they could no longer be repaired without difficulty to meet the design safety function. (Note that later, in 2016, DCPP decided to repair as many doors as possible [see below]). The Project Review Committee, in its July 15, 2014 meeting, approved including the 2015 Power Block Project scope in the DCPP Five Year Plan and funding for an additional four years in the future.

In the July 2016 Fact-finding Meeting the DCISC concluded that DCPP was making good progress with its impaired fire doors. Impaired doors are included on a prioritized list and are repaired/replaced in that order in numbers dictated by the budget. The numbers of fire doors that have been or are scheduled to be replaced are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>9</td>
</tr>
<tr>
<td>2015</td>
<td>18</td>
</tr>
<tr>
<td>2016</td>
<td>11</td>
</tr>
<tr>
<td>2017</td>
<td>11</td>
</tr>
<tr>
<td>2018</td>
<td>5</td>
</tr>
<tr>
<td>2019</td>
<td>7</td>
</tr>
</tbody>
</table>

DCPP is looking more at door repair than replacement to speed up fixes and to keep costs down. Approximately one-half of impaired doors will be repaired and one-half replaced. The DCISC FFT believes that adequate safety can be achieved short of full replacement of a door if one of the other measures is done correctly. The Fix It Now Team is the primary organization assigned to repair and replace doors.

The purpose of this November 2017 Fact-finding Meeting was partially to follow up on the following two concerns by a member of the public at the DCISC October 17, 2017 Public Meeting:

1. The first concern was “... why isn’t the DCISC expressing concern about spending money to replace doors that latch properly rather than expressing concern that spending $100,000 is too great a cost to replace a $5000 door?”

   **Response**: The DCISC isn’t concerned about spending money on properly-latching doors because DCPP is not spending money on doors that latch properly. These doors are not impaired and do not need repair or replacement. The DCISC is interested in seeing that employees check each door when opened to assure the door latches properly.

   The DCISC’s concerns are about impaired doors being corrected on a timely basis whether replaced or repaired. The DCISC concerns regarding cost are not the actual cost of repair or replacement per se but about DCPP being able to repair as many doors as practicable within budget, human resource and time restraints. This is the reason the DCISC was pleased to learn that DCPP
was placing more emphasis on repairs than replacements. In fact, at this November 2017 Fact-finding Meeting DCPP reported that all fire protection impairments, including doors, had been resolved such that there were no current compensatory roving fire watches. The DCISC believes this is good performance.

2. The second concern “...blaming ‘corporate overhead’ does not get at the root of why the degraded fire door situation was allowed to linger as long as it has, or why ‘work around’ fire watch strategies persisted. The DCISC should seek and present clarification of and remedy for their explanations.”

Response: The history of this issue shows that when the DCISC began looking at fire doors in 2013, it concluded the following:

*The DCISC learned in December 2013 that 16 impaired fire doors would not be repaired or replaced until 2017 due to funding deferrals and found this unacceptable. Following up in March 2014, the DCISC found that six doors had been repaired or replaced, and the remaining ten were the highest priority on the Plant Door Life Cycle Management Plan. The ten impaired doors are compensated for by fire watches, which, while acceptable, are not desirable. This is an acceptable start, and the DCISC should follow up on this issue near the end of 2014.*

The DCISC’s concern was that, regardless of funding deferrals, the fire door correction schedule was unacceptable, and DCPP moved quickly to improve their timeliness. Regarding the impact of corporate overhead on the cost of fire door replacement, the DCISC did not believe that DCPP was blaming corporate overhead for the timing of fire door replacements. Rather, the DCISC was listing it as one of several components of the high cost of door replacement, and acknowledging that there had been a change in corporate cost allocation at DCPP which increased the replacement cost. The DCISC did not further pursue the cost or corporate overhead cost because they are outside DCISC’s approved scope. The DCISC will continue to follow the DCPP fire door issue.

DCPP reported at the time of this fact-finding meeting that there were no impaired fire doors, (although the number varies from time-to-time) and that it has reduced to zero the number of roving fire watches used for compensatory actions for impaired fire doors. This is good performance.

Conclusions:

**DCPP is moving ahead satisfactorily with its impaired fire door repair/replacement program and is focusing more on repairs than replacements. This should permit them to correct more doors within given budget, human resource, and time constraints. DCPP reported**
that it has reduced to zero the number of impaired fire doors and the number of roving fire watches used for compensatory actions for impaired fire doors. This is good performance.

Recommendations:

None

3.9 NRC 95001 Inspection of Residual Heat Removal System Valve Operator White Finding

The DCISC FFT met with Hossein Hamzehee, Regulatory Services Manager, and Mark Fraunheim, Performance Improvement Department Manager, for an update on the NRC 95001 Inspection of Residual Heat Removal System Valve Operator White Finding. The DCISC last reviewed this issue at its June 7-8, 2017 Public Meeting (Reference 6.7) and at its December 2016 Fact-finding Meeting, concluding the following:

The PG&E PRA analysis to determine the increase in CDF associated with the inoperability of valve RHR-2-8700B appeared to be methodical and technically sound. However, it was also clear that there were numerous fine points that might or might not be acceptable for consideration by the NRC for its purpose of enforcement. Regardless, the event was serious in that if an accident had occurred along with a second failure on the opposite train, significant manual actions would have had to be performed within several hours of the accident in order to prevent core damage.

History: On May 17, 2016, a limit switch failure was discovered on valve RHR-2-8700B on Unit 2. This is a normally open valve, which allows water from the Refueling Water Storage Tank (RWST) to flow to the suction of Residual Heat Removal (RHR) Pump B. If a Loss of Coolant Accident (LOCA) were to occur, a safety injection actuation signal would actuate to start the Emergency Core Cooling System (ECCS) pumps. The ECCS pumps include both RHR pumps, both Safety Injection (SI) pumps, and both Charging pumps. These pumps would take suction from the RWST, pump water into the Reactor Coolant System, which would leak out of the break and into the Containment where it would collect in the Containment Recirculation Sump. When the RWST level reaches 33 percent level, operators would secure the RHR pumps and perform valve manipulations to swap the suction of the ECCS pumps from the RWST to the Containment Recirculation Sump. The limit switch failure on valve RHR-2-8700B would have prevented valve SI-2-8982B from opening as the two valves are interlocked to prevent simultaneous opening. Valve SI-2-8982B is the first valve in the ECCS flowpath leading from the Containment Recirculation Sump to the RHR pumps. The inability to open valve SI28982B would therefore render the B train of ECCS pumps inoperable during the recirculation phase of a LOCA.
The failure was discovered during an outage, and the limit switch was repaired shortly after discovery, on May 20. An Apparent Cause Evaluation was performed which identified the underlying cause as inadequate maintenance instructions. This inadequacy was also promptly remedied and, because Unit 2 was in an outage, there was no safety compromise between the discovery of the problem and its remedy. An extent-of-condition study was done that found no other similar failures at the plant. In particular, there was no corresponding problem with the identical valve in Train A (SI-2-8982A), nor with identical valves in Unit 1. The last maintenance surveillance on that valve was on October 22, 2014, during which the valve worked correctly. This 572-day interval exceeded the allowable outage time under the plant’s Technical Specifications. The NRC reviewed the event and identified a preliminary White finding associated with an apparent violation of Technical Specification 5.4.1.a, Procedures, for the licensee’s failure to develop adequate instructions for the installation, adjustment, and testing of limit switches. Specifically, PG&E failed to provide site-specific instructions for limiting the travel of these external limit switches when installed on safety-related motor operated valves.

As a part of its enforcement activities, the NRC uses a Significance Determination Process (SDP) to provide a structured template for the NRC’s evaluation of events that represent safety compromises, allowing the NRC to assign a significance to each event. The SDP guidance has specific criteria for assigning significance (red, yellow, white, green). It uses PRA methods, along with other engineering analyses, to support the staff SDP determination, on a case-by-case basis. On October 3, 2016, the NRC notified PG&E of the apparent violation and of the results of its SDP analysis. The NRC’s conclusion, using its model and also its own thermalhydraulic calculations about the timing of the depletion of the vessel inventory and of the ECCS water source, was that the increase in Core-damage Frequency (CDF) was 7.6x10^-6 per year. This increase in CDF was in the range that supported a “white” finding (between 1x10^-6 and 1x10^-5), as opposed to a “green” finding if the increase in CDF were lower (below 1x10^-6). The NRC’s results were considered draft as the enforcement process allows for both the licensee and the public to review the analysis and provide comments before the SDP determination is finalized. PG&E accepted an opportunity to review and comment on the SDP determination at a public meeting, which was held at the NRC regional office in Arlington Texas on November 15, 2016. Both a DCISC member and consultant observed the November 15 public meeting via teleconference. During the meeting, PG&E presented the results of their PRA analysis regarding the significance of the event, which concluded that the increase in CDF was 5.3x10^-7, which would support a green finding.

The NRC subsequently issued a letter informing PG&E of its final significance determination of a White Finding for the event. In short, the NRC accepted some but not all of PG&E’s points in its analysis. As a result, the NRC concluded that the lower range of the increase in core damage frequency associated with the
performance deficiency was $1.3 \times 10^{-6}$ per year (reduced from $7.6 \times 10^{-6}$ per year). But because the NRC’s calculated lower and upper estimations of the increase in core damage frequency of the performance deficiency were both greater than $1 \times 10^{-6}$ per year but less than $1 \times 10^{-5}$ per year, the NRC determined the finding continued to be one of low-to-moderate safety significance (white).

NRC subsequently performed a 95001 Inspection, which is a follow-up inspection to the White Finding received. DCPP had completed all root cause evaluations and corrective actions, and the NRC visited the plant during the week of June 12, 2017 for that inspection. The resulting NRC inspection report accepted some, but not all of DCPP’s analyses and corrective actions. Interestingly, the NRC report included a dissenting opinion by one of the inspectors supporting DCPP’s full submittal; however, it was overruled by the NRC Branch Chief. The purpose of this November 2017 Fact-finding Meeting was to review the inspection report and DCPP’s follow-up plans.

DCPP initiated a new Root Cause Evaluation (RCE) from scratch, reviewing everything related to the event. The original RCE identified procedure non-adherence as the root cause in that technicians did not correctly follow the procedure for returning the subject plant components to service. The new RCE identified that contract motor-operated-valve technicians, experienced experts, used their “skill of the craft” rather than following each procedure step to perform their work. This meant final inspections were not performed, inspections which would have identified the damaged valve operator switch. The root cause in this case was failure of the temporary DCPP supervisor to provide directions and expectations to the contract technicians and that there was no DCPP procedure for same. DCPP is revising its management procedure to include this requirement and is revising its RCE procedure with lessons learned. This appeared acceptable to the DCISC FFT. NRC will perform a follow-up inspection on these DCPP actions, and the DCISC should follow this as well.

Conclusions:
The NRC 95001 inspection of the “White Finding” (on undetected Residual Heat Removal valve operator instrument damage) did not accept all of DCPP’s root cause evaluation (RCE) and corrective actions. DCPP initiated another RCE and corrective actions for a future NRC inspection. The DCPP actions appeared satisfactory to the DCISC Fact-finding Team. The DCISC should follow up on the NRC re-inspection.

Recommendations:
None

3.10 NRC 2017 Inspection Report for 2010 Event
The DCISC FFT met with Hossein Hamzehee, Regulatory Services Manager, regarding an NRC Non-Cited Violation (NCV) involving an occurrence in 2010, which was reported to the DCISC at its June 7-8, 2017 Public Meeting (Reference 6.8). This was the first DCISC review of this item.

Instrumentation devices used for post-accident, wide-range, performance monitoring were found in 2017 to have been operating outside the requirements of Technical Specification 3.3.3 since 2010. These devices monitor temperature in the Reactor Coolant System’s hot and cold legs, and a number of devices were determined to have been operating outside their environmental temperature range due to incorrect installation of insulation which trapped heat inside the thermatic tension pipe. As a result temperatures exceeded normal allowed temperature; however, the required number of channels remained functional. This issue was self-identified by DCPP, placed in the plant’s Corrective Action Program, and reported to the NRC which, after review in the last NRC’s Integrated Inspection Report, issued an NCV for violation of technical specifications. The NRC considered the event to be of “very low safety significance.”

DCPP’s root cause evaluation established that the maintenance package had insufficient guidance and in the future when the instrumentation is maintained procedures will be improved to ensure the insulation is installed properly.

DCPP replaced the eight wide-range temperature instruments, restored the insulation per design requirements, and revised the appropriate drawings. This appeared satisfactory to the DCISC FFT.

**Conclusions:**

DCPP appropriately identified and reported to NRC an event involving incorrect installation of post-accident Reactor Coolant System temperature instruments in 2010. DCPP’s cause analysis and corrective actions appeared satisfactory.

**Recommendations:**

None

4.0 Conclusions

4.1

The DCISC Fact-finding Team’s (FFT’s) plans to observe a valve surveillance test were cancelled due to a delay in Maintenance valve preparation. The FFT instead performed a system review and component walkdown with the System Engineer. The system components and plant itself appeared to be in good condition.

4.2
The DCISC Fact-finding Team observed DCPP FLEX Training for Licensed Operators, and concluded that the training, training materials, and instructor were satisfactory.

4.3

DCPP’s Performance Improvement Department, along with its Performance Improvement Coordinators (PICOs) appears to be an effective asset for plant problem solving and continuous improvement.

4.4

The Institute of Nuclear Power Operations biennial August 2017 evaluation of DCPP appeared to have been positive overall with some areas for improvement that seemed appropriate. (Because of its privacy agreement with DCPP, the DCISC cannot share the details of the evaluation.)

4.5

The DCISC Fact-finding Team concluded that the meeting with the NRC resident inspector was beneficial and that the DCISC should continue them.

4.6

The DCPP Eagle 21 Plant Protection System is in good (Green) health with no significant issues. The system operates reliably enough and support and parts are readily available such that DCPP has decided not to upgrade it due to the early plant shutdown as per the Joint Proposal. The DCISC believes this is satisfactory.

4.7

The meetings between the DCISC Fact-finding Teams and DCPP Plant management continue to be useful for both organizations.

4.8

DCPP is moving ahead satisfactorily with its impaired fire door repair/replacement program and is focusing more on repairs than replacements. This should permit them to correct more doors within given budget, human resource, and time constraints. DCPP reported that it has reduced to zero the number of roving fire watches used for compensatory actions for impaired fire doors and other fire components. This is good performance.

4.9

The NRC 95001 inspection of the “White Finding” (on undetected Residual Heat Removal valve operator instrument damage) did not accept all of DCPP’s root cause evaluation (RCE) and corrective actions. DCPP initiated another RCE and corrective actions for a
future NRC inspection. The DCPP actions appeared satisfactory to the DCISC Fact-finding Team. The DCISC should follow up on the NRC re-inspection.

4.10

DCPP appropriately identified and reported to NRC an event involving incorrect installation of post-accident Reactor Coolant System temperature instruments in 2010. DCPP’s cause analysis and corrective actions appeared satisfactory.

5.0 Recommendations:

None

6.0 References


6.6 “Diablo Canyon Independent Safety Committee Twenty-Eighth Annual Report
6.7


6.8

Ibid., “Regulatory Update.”
1.0 Summary

The results of the December 13–14, 2017 fact-finding trip to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Spent Fuel Inspections after Transfer to the Independent Spent Fuel Storage Installation (ISFSI)
2. Meet with NRC Senior Resident Inspector
3. Unit 1 Increased Radiation Levels
4. Emergency Diesel Generator System Health
5. Observe Corrective Action Review Board Meeting
6. Operations Department Performance
7. 230kV/500kV Switchyards and Offsite Power Lines Health
8. Use of Portable Electronic Devices in the Power Block
9. Electronic Work Management System
10. Management of Data in the Performance Improvement Program
11. DCISC Member Meet with DCPP Office

2.0 Introduction

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if PG&E’s performance is appropriate and whether any areas revealed observations which are important enough to warrant further review, follow-up, or presentation at a Public Meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4—Conclusions highlights the conclusions of the Fact-finding Team based
on items reported in Section 3—Discussion. These highlights also include the team’s suggested follow-up items for the DCISC, such as scheduling future fact-finding meetings on the topic, presentations at future public meetings, and requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations lists specific recommendations to PG&E proposed by the Fact-finding Team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the Fact-finding Report, including its recommendations, is provided to PG&E. The Fact-finding Report will also appear in the DCISC Annual Report.

3.0 Discussion

3.1 Spent Fuel Inspections after Transfer to the ISFSI

The DCISC Fact-finding Team met with Rich Hagler, Supervising Engineer, for an update on options for Spent Fuel inspection and/or repackaging after transfer to the Independent Spent Fuel Storage Installation (ISFSI).

A brief summary of the Spent Fuel storage and transfer components is as follows: After a period of storage in the Spent Fuel Pools (SFPs) to allow for decay heat to be reduced, the process for handling Spent Fuel (Figure 1) starts with a transfer of assemblies into a stainless steel Multi-Purpose Canister (MPC), which has been lowered into the SFP. A lid is placed on the MPC, the MPC is removed from the SFP, and the lid is seal welded onto the MPC. The interior of the MPC, containing the fuel assemblies, is then completely drained and purged with dry helium until all moisture is removed. The MPC is placed in a Transfer Cask, the Transfer Cask lid is installed, and the loaded Transfer Cask is lifted and placed onto the Cask Transporter (Figure 2) for transport to the Cask Transfer Facility (CTF). The Transporter then transports the Transfer Cask approximately one mile over site roads to the CTF, which is located adjacent to the ISFSI. At the CTF, the Cask Transporter positions the Transfer Cask above an empty concrete and steel Holtec International Storage Module (HI-STORM) that has been previously placed in a below-grade vault at the CTF (Figure 3). The MPC is lowered from the transfer cask into the HI-STORM and the Transfer Cask is lifted above the HI-STORM (Figure 4) so the HI-STORM lid can be installed. The Cask Transporter is then used to lift the HI-STORM out of the CTF and transport it to its designated storage location on the ISFSI storage pad, where it is anchored in place.

The HI-STORM has screened vents in its bottom and top to allow natural convection air flow upward around the outside of the stainless steel MPC to carry away decay heat being produced by the nuclear fuel. In general, the MPCs and HI-STORMs are intended not to require any maintenance until such time as the Spent Fuel is transferred from the ISFSI to an off-site storage facility at a future date. Recently, concerns have arisen that the MPCs could undergo Chloride-induced
Stress Corrosion Cracking (CSCC) to such an extent that a crack could develop. The potential for CSCC is being followed closely by DCPP and the DCISC. Efforts are under way to develop inspection and monitoring techniques to confirm that the MPCs remain fully intact, and to understand if and how radioactive material in the casks might be released if a through-wall crack occurs. These efforts have been reviewed by the DCISC during past Fact-finding Meetings when it concluded that the issue is of concern, but there were no immediate concerns with canister corrosion and that DCPP was addressing the longer-term issue. (Reference 6.1).

Figure 1 – Dry Cask Movement and Storage Components

Figure 2 – Cask Transporter and HI-TRACK (Generic)

Figure 3 – Cask Transporter at Cask Transfer Facility (Generic)
The Fact-finding Team inquired as to what options were available for inspection of Spent Fuel after transfer to the ISFSI. This inquiry was based on concerns from both the DCISC and members of the public that inspections and repackaging of the Spent Fuel or MPCs would no longer be feasible following decommissioning of the SFPs. Mr. Hagler began his response by first updating the Fact-finding Team on recent industry efforts regarding Spent Fuel canister inspections. In mid-2017, the Electric Power Research Institute (EPRI) issued several new guidelines, one of which was “Aging Management Guidance to Address Potential Chloride-Induced Stress Corrosion Cracking of Welded Stainless Steel Canisters,” (Reference 6.2). The document provides detailed guidance for developing a formal aging management program for Spent Fuel canisters, such as the MPCs at DCPP. Additionally, EPRI was continuing its efforts to develop inspection techniques and equipment and issued a new guideline titled “Inspection and Delivery System Development and Field Trials for Dry Canister Storage System Evaluation”
Reference 6.3). Mr. Hagler noted that as a part of activities associated with NRC license renewal for the ISFSI, due in 2024, DCPP will be required to provide a plan for MPC inspections for review and approval by the NRC. Mr. Hagler expressed confidence that during the intervening five-year period, technology should be developed to facilitate complete inspections of the weld-affected zones of an MPC (the areas most susceptible to CSCC) while the MPC remained at its normal storage location in the ISFSI and inside of a HI-STORM unit.

Regarding the specific question of options for additional inspections and repackaging, Mr. Hagler stated that there were several options available for such inspections or repackaging after SFP decommissioning. As discussed above, the DCPP ISFSI installation includes an area for transferring the MPC from the cask transporter to the HI-STORM, the CTF area. The existing Cask Transporter and the CTF could be used to remove the MPC from the HI-STORM and allow a 100% inspection of the surface of the MPC, if needed. Additionally, the MPC vendor is currently reviewing the possibility of making available for installation an intermediate overpack for the MPC should one be needed. Such an overpack would consist of a metal cylinder that could be placed around the MPC between it and the HI-STORM. Although an overpack would occupy the interstitial space between the MPC and the HI-STORM that is currently relied upon for cooling the MPC, the lower amounts of decay heat that would be present at such time in the future would not require as much cooling as was required by the original design. Such an overpack could serve a number of functions such as allowing leak testing of an MPC on a routine basis or providing another barrier to contain leakage from a defective canister. None of these options had yet been analyzed in detail, but they represented the fact that options do exist that could be considered for detailed inspections or repairs to an MPC should they be necessary in the future even if the SFPs are no longer available.

Additionally, Mr. Hagler briefed the Fact-finding Team on several aspects of the design of the Holtec International Storage, Transport and Repository (HI-STAR) Transportation Cask (Figures 1 and 5) that would be used to transport the MPC from the ISFSI to an offsite storage or disposal facility in the future. The HI-STAR Transportation Cask is engineered to store spent nuclear fuel in the vertical orientation and to transport it horizontally, and it contains an innermost shell that acts as a pressure vessel and containment boundary in its own right. Mr. Hagler stated that the Transportation Cask does not rely on the leak tightness of the MPC cask to assure containment of the radioactive materials during transportation. A review of the publicly-available Safety Analysis Report for the HI-STAR Cask (Reference 6.4) confirmed this statement. The Transportation Cask itself is required to be leak tested both prior to and after transport. As a result, any defects that might affect MPC integrity would not prevent the MPC and its spent fuel from being transported off site for future storage. Provision of the Transportation Cask and its transfer from the site to an offsite storage or disposal facility is the responsibility of the U. S. Department of Energy.
Mr. Hagler also updated the Fact-finding Team regarding ongoing industry efforts to further characterize the possible radiological consequences of a release of radionuclides from a cask should a through-wall crack actually occur. In general, such cracks would have small apertures. Although the consensus of the industry is that such releases and their consequences would be small, more study is needed to fully quantify the effects. In 2017, EPRI completed a study titled, “Dry Cask Storage Welded Stainless Steel Canister Breach Consequence Analysis Scoping Study,” (Reference 6.5) which provided recommendations for additional research needed and described potential approaches for developing a consequence analysis for a scenario in which CSCC grows through the wall of a dry cask storage system canister. It is anticipated that EPRI will soon move forward with developing such a detailed study of the consequences.

Conclusions:

DCPP is continuing to participate in industry initiatives to address the issue of possible corrosion of Multi-Purpose Canisters (MPCs) stored at the Independent Spent Fuel Storage Installation (ISFSI). As a part of ISFSI relicensing, DCPP will need to develop an aging management plan to include MPC inspections, and the DCISC should continue to follow work in the area closely. The Cask Transfer Facility located at the ISFSI provides options for more detailed inspections or repairs to an MPC should such be necessary in the future after the Spent Fuel Pools are no longer available.

Recommendations:

None

3.2 Meet with Senior NRC Resident Inspector

The DCISC Fact-finding Team (FFT) met with Chris Newport, Senior NRC Resident Inspector, for an update. The DCISC last met with the NRC in November
2017 (Reference 6.6), when it concluded the following:

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue them.

The participants discussed the following topics:

1. Recent Public Utilities Commission activities with regards to the Joint Proposal for DCPP to cease operations in 2025.
2. DCPP’s process for reviewing future plant investments in light of the Joint Proposal.
3. Status of NRC reviews of DCPP’s External Flooding analyses – report to be issued soon.
4. Results of the NRC 95001 Inspection of the Residual Heat Removal Valve White Finding corrective actions – report to be issued soon, and white finding to be closed.
5. Results of the NRC inspection of FLEX systems and procedures – report to be issued soon with no issues.
6. The recent identification of a failed bearing on the 2-1 Centrifugal Charging Pump.

Conclusions:

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings.

Recommendations:

None

3.3 Unit 1 Increased Radiation Levels

The DCISC Fact-finding Team met with Matt Hayes, Radiation Protection Manager for an update on a recent issue where the general radiation levels present in the Unit 1 Containment rose to significantly higher values than usually present during shutdown conditions. This was the DCISC’s first review of this issue.

Mr. Hayes reported that the issue was first reviewed by DCPP in late 2015 when several notifications were written concerning upward trends in Unit 1 cobalt-60 (Co-60) concentrations. During the early investigations, the evaluations identified a valve treated with Stellite, a cobalt-chromium alloy material used on surfaces for wear resistance, as a presumptive cause. [Stellite contains cobalt-59 (Co-59) which if released due to friction between surfaces will undergo neutron activation to become highly radioactive Co-60.] Later, projections for dose during the
upcoming 1R19 outage began to project slightly higher radiation fields in containment compared to Outage 1R18. During Outage 1R19 in November 2015, actual average dose rates were greater than 40% higher than those experienced during the previous outage. In mid-2016, during the station’s Institute of Nuclear Power Operations (INPO) mid-cycle self-assessment, it was identified that there had been three separate notifications written regarding the elevated dose rates, but no true cause evaluation had been performed and no single, comprehensive plan had been put in place to address the problem. The problem was placed on the station Emerging Issues list, and a Root Cause Evaluation (RCE) was initiated.

In March 2017, an RCE specific to the increased radiation levels was completed (SAPN 50888276). The RCE determined that the root cause was the misalignment of the 1-3 Reactor Coolant Pump (RCP) shaft during Outage 1R18, which resulted in mechanical wear of the shaft surfaces which are coated with Stellite. Following 1R18, the misalignment and wear also resulted in failure of an RCP seal O-ring and excessive seal leak-off requiring repair. Unit 1 was shut down to allow inspection and replacement of the seal package. During replacement of the seal package, maintenance personnel found the pump shaft/seal to be misaligned due to the use of a shim package improperly installed during pump alignments in 1R18. The shim package caused a misalignment between the pump shaft and the seal package. The RCP vendor later confirmed that the improper shaft alignment resulted in wear of the bearing and cartridge assembly resulting in removal of some of the Stellite coating.

Following the RCP Seal replacement in 2014, an RCE was performed for the RCP Seal failure (SAPN 50617408), and several corrective actions were taken to improve maintenance practices. As a part of that RCE, the failed O-ring was examined by an independent laboratory in 2014. The laboratory analysis found anomalous ‘shiny inclusions’ with ‘relatively large amounts of cobalt’. However, neither the presence of cobalt nor its possible impact on radiological dose was addressed at that time. The 2017 RCE reviewed this shortcoming of the 2014 RCE and identified several safety culture issues as well as organizational and programmatic issues for which corrective actions were implemented.

With the root cause of the radiation increase identified and corrected by the RCP Seal replacement, several actions were also initiated to reduce the resulting radiation dose. Zinc injection into the Reactor Coolant System (RCS) was increased. The zinc preferentially deposits in fuel corrosion layers resulting in lower rates of activation of Co-59 to Co-60. Additionally, flow rates to RCS filters were increased, and filters sized to capture finer particles were installed. It is expected that over time, these actions will serve to slowly reduce the Unit 1 radiation levels. However, it is believed that it could take up to three cycles before significant reductions will be achieved.

Mr. Hayes also provided a brief update on other activities within the Radiation Protection Department. He reported that current authorized staffing in the
Department had been reduced from 89 to 83 and that there had been an increase in losses due to transfers from the Department to other DCPP departments such as Quality Verification, Operations, Chemistry and Decommissioning. Historically, the Department has been a source of supplying personnel to other departments at the station, but the number of recent transfers was higher than typical historical numbers. The Department would be continuing to hire new employees with a new training class to start in July 2018. Mr. Hayes noted that the hiring of new employees would be made more difficult by the planned shutdown of the facility, but also noted that the need for Radiation Protection personnel would continue to remain high during the decommissioning phase after plant shutdown. A strategy that the Department was currently taking was to increase efficiency through the use of wireless portable radiation monitors to track real-time dose in lieu of periodic surveys and the use of portable gamma ray cameras for contamination surveys.

**Conclusions:**

**DCPP has identified the cause of increased radiation levels in Unit 1 containment and has initiated appropriate corrective actions.**

**Recommendations:**

None

### 3.4 Emergency Diesel Generators System Health

The DCISC Fact-finding Team met with Jim Wiggin, Emergency Diesel Generator System Engineer, for an update on the health of the Emergency Diesel Generators (EDGs). The DCISC last reviewed EDG System Health during its January 2017 Fact-finding Meeting (Reference 6.7), when it concluded the following:

*DCPP has resolved most significant issues with its Emergency Diesel Generators (EDGs) and reports the health of Unit 1 as Green and Unit 2 as White (and almost Green.) This is good progress. Additionally, DCPP has implemented an impressive EDG Reliability Improvement Plan, which the DCISC should follow closely.*

The EDGs are safety-related pieces of equipment whose functions are as follows:

- To furnish sufficient electric power to mitigate a design basis accident in one unit and safely bring the other unit to cold shutdown when both the 230kV and 500kV offsite power sources are unavailable.
- To act as a backup source of power to enable the reactor to continue to produce power for 72 hours whenever there is no accident condition, but one of the two offsite power sources is inoperable.
- To furnish power sufficient for an emergency shutdown of the plant whenever
the offsite power sources are not available.

The system has no direct non-safety-related function.

The EDG fuel oil supply system has enough fuel capacity to provide seven days of onsite power generation in order to operate: (a) the minimum required Engineering Safety Features (ESF) equipment following a design basis loss-of-coolant accident (LOCA) for one unit, and the equipment in the second unit is in either the hot or cold shutdown condition, or (b) when the equipment for both units is in either the hot or cold shutdown condition. Each nuclear operating unit is supported by three EDGs dedicated to the respective unit; however, the EDGs can be cross-connected to the other unit. Each diesel-generator set is provided with two 100% capacity starting air trains, with each train having two starting air motors.

The DCISC Fact-finding Team (FFT) reviewed the latest System Health Reports for the three Unit 1 and three Unit 2 EDGs.

Unit 1 was in White health with the following issues challenging system health:

- Sustained high winds could impact the ability of the EDG radiators to adequately cool the jacket water and engine compartment components. This affects only Unit 1 and is being evaluated. A Prompt Operability Assessment has been written to permit continued operation with compensatory actions until this issue is resolved. It is currently expected that a calculation revision will resolve this concern.
- Fuel Priming Solenoid Valves have insufficient voltage ratings. This has resulted in Operations performing component walkdowns once per shift until the valves can be replaced.
- Adverse trends identified with Fuel Oil Transfer Pump start and stop level switches.
- Recurring failures of Air Start Pressure Control Valves (PCVs).

Unit 2 was in White health with the following issues challenging system health:

- Adverse trend on Fuel Oil Booster Pump failures.
- Adverse trends identified with Fuel Oil Transfer Pump start and stop level switches.
- Recurring failures of Air Start Pressure Control Valves (PCVs).

In the opinion of the Fact-finding Team, reasonable action plans were in place for all of the above issues. Additionally, it was noted in the System Health Reports that corrective actions have been implemented and effectiveness monitoring is in progress for numerous past issues, including:
- Correction of an adverse trend in Digital Start Timer performance.
- Resolution of an issue regarding high delta-T on exciter field leads in excitation cabinets.
- Resolution of problems with spurious actuations of Fuel Oil Day Tanks level alarms.
- Replacement of Fuel Priming Solenoid Valves on Unit 2 to resolve concerns with insufficient voltage ratings.

Regarding the recurring failures of Air Start PCVs, the PCVs had failed several times following maintenance. During maintenance, the air start system would be depressurized. Upon re-pressurization after maintenance, the PCV would fail to properly control pressure. While this did not result in a functional failure of the EDG, the repairs required additional outage time and disrupted the planned return to service of the EDGs after maintenance. The PCVs currently in use at the plant were purchased as non-safety related PCVs and approved for safety-related service through a Repair Parts Evaluation (RPE). RPEs are detailed assessments performed for alternative parts supply that may be used when the original equipment parts become difficult to obtain due to obsolescence or other factors. The Fact-finding Team was provided a copy of the applicable RPE (8000001030). The RPE was performed due to obsolescence of the original regulator and concluded that: “The only difference between the old E-55 series regulator (D943587) and the new (D968026) is the part number change and that they are set to different setpoint pressures by the manufacturer. The pressures may be reset to values within the spring range which are within those required for this application. Therefore there is no change to the actual form, fit and function of the regulators.” The System Engineer noted that the procurement of the PCVs was being reviewed and that DCPP may need to find an alternative source of safety-related PCVs in the future. The Fact-finding Team concluded that the actions appeared appropriate but the DCISC should review the RPE process during a future fact-finding meeting.

The DCISC FFT received a copy of and reviewed the DCPP EDG Reliability Improvement Plan, which was initially issued in April 2016 and updated in July 2017. The goals of this plan are to achieve “zero equipment failures,” which will improve reliability. The goals were planned to be achieved through a combination of more targeted maintenance at the appropriate intervals, implementation of overdue design changes for known deficiencies, increasing critical spare parts stocking levels, changing when and how EDG maintenance is performed, and enhancing operating and maintenance procedures. The updated plan listed approximately 15 major activities which had been completed and seven which remained in progress. There were 14 additional recommended action items, several of which involved capital projects to improve portions of the EDG systems such as turbocharger support upgrades, controls upgrades, fuel injection pump refurbishment/replacements, procuring new Air Start PCVs, etc. In the opinion of
the Fact-finding Team, the plan continued to appear impressive, and the DCISC should continue to review it about every twelve months. During its future reviews, the DCISC should confirm that items on the Reliability Improvement Plan are not inappropriately being cancelled due to spending reductions in response to the Joint Proposal for DCPP to cease operations at the expiration of its current operating license.

Accompanied by the EDG System Engineer, the DCISC Fact-finding Team entered the plant power block area and went to the 2-2 EDG Room to observe the material condition of the 2-2 EDG. The machine appeared to be in good condition with no observed leaks or other problems. The system engineer appeared to be very knowledgeable of his system and proactive in resolving EDG issues.

Emergency Diesel Generator 2-2

The Fact-finding Team also observed that covers had been installed over the three Unit 2 EDG trip pushbuttons (see picture below) located in the access hall outside of the EDG Rooms, which was the topic of a previous concern expressed by the DCISC during a March 2016 Fact-fining Meeting (Reference 6.8).

Emergency Diesel Generator 2-2
Emergency Trip Pushbutton with Cover Installed
Conclusions:

DCPP has resolved many significant issues with its Emergency Diesel Generators (EDGs) and reports the health of Unit 1 as Green and Unit 2 as White. Additionally, DCPP has implemented an impressive EDG Reliability Improvement Plan, the implementation of which the DCISC should review again in about one year. During its future reviews, the DCISC should confirm that capital project items on the Reliability Improvement Plan are not inappropriately being cancelled due to spending reductions in response to the Joint Proposal. Regarding a Repair Parts Evaluation (RPE) performed related to the EDG, the Fact-finding Team concluded that the evaluation appeared appropriate but the DCISC should review the RPE process during a future Fact-finding Meeting.

Recommendations:

None

3.5 Observe Corrective Action Review Board Meeting

The Fact-finding Team attended a Corrective Action Review Board (CARB) meeting to observe the conduct of the meeting. Tom Baldwin, Director of Business Improvement, facilitated the meeting, with Ken Johnston, Operations Director, and Bob Waltos, Assistant Engineering Director, as the two other voting members attending the meeting. The DCISC last observed a CARB meeting during its June 2007 Fact-finding Meeting (Reference 6.9), when it concluded the following:

An agenda had been distributed and all participants had reviewed the actions to be taken at the Corrective Action Review Board (CARB) meeting. The members were well prepared to discuss each of these agenda items. CARB members discussed each of these items in detail and reached an agreement as to what actions needed to be taken. The CARB appeared to be performing their function well.
The CARB is governed by DCPP Procedure OM4.ID15, “Corrective Action Review Boards” and its purpose is to provide a significant venue for station personnel to demonstrate commitment to Corrective Action Program (CAP) excellence. The CARB fulfills a need for senior management oversight of the CAP and this oversight function includes:

- Reviewing Root Cause Evaluations (RCEs) for accuracy, completeness and alignment of the problem, causes and corrective actions.
- Approving extensions to the due dates for Corrective Actions to Prevent Recurrence.
- Approving effectiveness evaluations for CAP documents.
- Periodically reviewing CAP metrics to ensure the CAP is meeting management expectations.
- Reviewing and disposition requests for Cause Evaluation downgrades.
- Reviewing notifications screened by the Notification Review Team

The membership of the CARB consists of regular and alternate members designated in writing by the Station Director. CARB meetings are held as necessary, typically on a weekly meeting.

The agenda for this meeting included the following:

- Safety Assignments
- Facilitative Leadership Minute
- Review Desired Outcomes
- Verify Quorum
- Review and Approve Minutes from Previous Meeting
- Review of Action Items
- Review of Overdue Notifications
- Review of CARB Products
- Review Condition Reports
- Additional Reviews as Needed
- Actions and Meeting Evaluation

The meeting was conducted with efficiency; however, it was recognized shortly after the start of the meeting that the minimum quorum of four members or alternates was not present. As such, the CARB was unable to approve documents as planned by the agenda, and a Corrective Action Program Notification was written to document the failure to achieve a quorum (SAPN 50954497). The CARB
did make an effort to discuss items for which approval was not required. In particular, the CARB reviewed one Cause Evaluation (SAPN 50948863) with a presenter and provided feedback that would be useful in revising the Cause Evaluation prior to returning to the CARB for approval at a later date. This review was an appropriate and productive use of the time despite the absence of a quorum.

Conclusions:

The Fact-finding Team’s observation of a Corrective Action Review Board (CARB) meeting was hindered by the fact that a quorum was not present for the meeting. A Corrective Action Program Notification was submitted for the lack of a quorum, and those present at the meeting made a productive use of the time. The DCISC should attempt again to observe a CARB meeting during a future visit.

Recommendations:

None

3.6 Operations Department Performance

The DCISC Fact-finding Team with Dan Streamer, Operations Performance Shift Manager, for an update on Operations Human Performance and the Operations Excellence Plan. The DCISC last reviewed Operations Department Performance during its August 2016 Fact-finding Meeting (Reference 6.10), when it concluded the following:

*External organizations have noted a recent increase in the occurrence of low level human errors in Operations Department status control and tagging. The Department has also recognized this trend and is moving to implement appropriate corrective actions, including those contained in the Department Excellence Plan. The DCISC should reexamine performance in these areas no later than the second quarter of 2017.*

Mr. Streamer briefed the Fact-finding Team regarding a current focus area of the Operations Department and its Excellence Plan which was to review and implement corrective actions for two Areas for Improvement that were noted during a recent external evaluation of the Operations Department. The first area was a lack of formality in shift operations in that foremen dispatching operators may ask them to perform tasks for which no pre-work brief was performed and for which no procedure was provided. Although such tasks were considered minor, DCPP acknowledged the risk that such practices presented and was taking steps to raise the standards. In the future, operators would be required to always have a procedure in hand when performing any task unless timeliness of the task was critical to plant operations. The second area was a lack of full and proper
operational risk assessments by the shift operations staff when reviewing notifications (reports of equipment problems). This concern arose in part from recent events involving extended degraded conditions for nitrogen leakage in containment and for stator cooling water tank level indication. Steps were being taken also in this area to raise the standards for shift operators.

An additional focus area of the Operations Excellence Plan was Institute of Nuclear Plant Operators Event Report (IER) 17-005, regarding “Line of Sight to the Reactor Core.” This area concerned ensuring that all Operations personnel remain focused on protecting the integrity of the reactor core at all times. To that end, DCPP was implementing several initiatives to emphasize conservative decision making and ensure proficiency in individuals performing operations tasks. The initiatives included assessing performance by leveraging crew notebooks and integrating them with critiques and observations. Also, an additional focus was being placed on watchstation ownership through training on the attributes of watchstation excellence and the issuance of written expectations for watchstanders and supervisors. Lastly, efforts were underway to assess and reinforce proper fundamental Operator behaviors.

In response to questions from the Fact-finding Team, Mr. Streamer noted that the Joint Proposal for DCPP to cease operations at the end of its current operating license was a large distraction to Operators. This was particularly true at the time of the Fact-finding Team’s visit when it had just been learned that the California Public Utilities Commission might not approve full retention bonuses as anticipated for DCPP staff. Mr. Streamer stated that the Department was working to set aside such distractions when on shift at the plant and remain focused. Additionally, Mr. Streamer confirmed with the team that DCPP had not been requested by the California Independent System Operator to implement any procedures for load following.

Conclusions:

External organizations have noted areas for improvement in the Operations Department, and DCPP has moved to implement appropriate corrective actions and include those actions in the Department Excellence Plan. The DCISC should reexamine performance in these areas in approximately one year. DCPP had not been requested by the California Independent System Operator to implement any procedures for load following.

Recommendations:

None

3.7 230kV/500kV Switchyards and Offsite Power Lines Health

The DCISC Fact-finding Team met with Sam Waters and Jason Cook, System
Engineers, for an update on the health of 230kV/500kV Switchyards and Offsite Power Lines. The DCISC last reviewed 230kV Systems during its December 2016 Fact-finding Meeting (Reference 6.11), when it concluded the following:

*The DCPP 230kV System health has improved, and several corrective actions made to date to address system problems have been successfully completed.*

The Fact-finding Team first inquired into the status of the stability of the overall PG&E Transmission System. Mr. Waters replied that the system was generally very stable with occasional temporary line outages most often induced by lightning strikes or fires near power lines. Typically, fires or lightning do not damage the power line but do sometimes initiate protective relay actuations. A major solar project had recently been completed and connected to the Transmission System on the far side of the Morro Bay substation on the transmission line connecting Morro Bay to the Midway substation. The project was required to install robust breaker-and-a-half interconnections with the Transmission System to ensure that no single component fault could take out other components in the system. With two solar projects now installed on the far side of the Morro Bay substation from DCPP, there have continued to be no issues with fluctuations in grid frequency or voltage attributable to the operation of energy facilities. However, PG&E was still concerned about the long-term effects that additional renewable energy facilities may have on the stability of the Transmission System.

The System Engineers also provided a brief update on the health of the 500kV switchyard. All switches and insulators have now been replaced, and one of two breakers has been replaced. The remaining breaker would be replaced during the upcoming 2R20 Refueling Outage. Roadway repairs had been completed, and the 500kV relays to the Midway and Gates substations had been replaced. The 500kV system health on both units was rated at healthy or “Green”. The only notable equipment issue on Unit 1 was a hot connection on the neutral connection of C Main Bank Transformer. Temperature monitoring has established that the trend is stable, and repairs are planned to be performed during the next unit shutdown, possibly in the first half of 2018. On Unit 2, the only notable issue was the poor reliability of the winding and temperature switch connectors on the C Main Bank Transformer, which had caused multiple cooling fan and pump trips. Repairs are planned to be performed in the upcoming 2R20 Refueling Outage. A proposed project to replace three motor-operated disconnect switches with spring-loaded automatic breakers, which would allow the 500kV System to remain available following a main generator trip without the need to manually switch to 230kV power, was on hold in light of the pending Joint Proposal for DCPP to cease operations at the end of its current license.

Regarding the status of the 230kV Switchyard, the System Engineers reported that DCPP had completed all projects to replace the existing aging components such as switches and relays. Currently, there were no plans to replace the breakers which
were old but in good shape. Plans to add Static Volt-Ampere Reactive (VAR) Compensators for improved voltage regulation than was available with the current capacitor banks were still moving forward for implementation in 2019. However, the decision had been made to move the location of the new Static VAR Compensators to the Mesa Switchyard southeast of DCPP due to space constraints in the DCPP 230kV Switchyard. The proposal to perform a full 230kV switchyard renovation including adding SF6 gas breakers and converting the switchyard to a breaker-and-a-half arrangement was on hold in light of the pending Joint Proposal for DCPP to cease operations at the end of its current license.

Conclusions:

The Offsite Power System connecting DCPP to the Transmission System has remained stable following the addition of recent renewable energy projects in the area. The DCISC should continue to review the stability of the Transmission System annually. DCPP’s 230kV and 500kV Switchyards are in good health, and multiple projects to replace aging equipment have been successfully completed. Some projects for switchyard and system upgrades have been placed on hold in light of the pending Joint Proposal for DCPP to cease operations at the end of its current license.

Recommendations:

None

3.8 Use of Portable Electronic Devices in the Power Block

The DCISC Fact-finding Team met with Jim Brosseau, Supervisor, Information Technology (IT) Engineering; Susan Trempler, Senior Manager, IT Applications Nuclear; and Olin Gillis, Programmer/Analyst, for an update on the use of portable electronic devices in the power block. The DCISC last reviewed this topic during its December 2015 Fact-finding Meeting (Reference 6.12), when it concluded the following:

DCPP appears to be appropriately expanding its use of electronic and wireless technology with its Electronic Work Packages in its Electronic Work Management Project and its Wireless in the Power Block Project by carefully considering the impact on safety-related instrumentation and control systems. These projects have significant potential for improved efficiency and human performance. The DCISC should continue to follow this project.

Ms. Trempler first provided an overview of the status of various efforts that were or have been underway at DCPP related to the use of electronic information in the power block. Two years ago, DCPP began projects to implement Electronic Work Management tools (“eWM”, see Section 3.9 below) and to improve Operator
electronic logs. Also, at that time, plans were being made to move to “Smart Procedures” which are electronic procedures that are interactive in nature; meaning, the electronic document can be used to record the performance of individual steps and/or provide reference information via active links to other electronic documents. The Smart Procedures project was scoped and found to be a major effort for both the station and IT departments which would require about three years to complete along with significant funding. At the same time, the process for funding IT projects changed to one requiring proposed projects to be judged on their merit as a part of the IT funding across the entire PG&E company, and not just based on individual departmental needs or funds availability. As a result of those changes as well as the pending Joint Proposal for DCPP to cease operations at the end of its current license, the Smart Procedures project was placed on hold. IT was continuing to support further implementation of the Electronic Work Management initiative and upgrades to the software and platforms for operator electronic log keeping.

Regarding the status of improving the availability and reliability of wireless networks in the power block area, Ms. Trempler and Mr. Brosseau stated that such initiatives were also on hold pending the Joint Proposal for DCPP to cease operations at the end of its current license. A project to expand wireless networks in the power block was scoped, and it was estimated that it would require approximately two years and require significant funding to make wireless networks available in all parts of the power block. The project was made complex and expensive by the high standards required for running power and data cables in the power block areas to avoid impacts to safety related systems. Additionally, 500 to 600 access points would be required to be installed due to the size of the power block area and the general impermeability of the areas to wireless signals due to the large amounts of concrete and steel.

Conclusions:

Projects for implementing Smart Procedures and for expanding wireless network access in the power block have been placed on hold due to IT funding constraints and in light of the pending Joint Proposal for DCPP to cease operations at the end of its current license. Existing uses of electronic information such as Electronic Work Management and operator electronic log keeping continue to be fully supported. The implementation of Smart Procedures can bring significant benefits, so continuing some level of investment could be worthwhile.

Recommendations:

None

3.9 Electronic Work Management System
The DCISC Fact-finding Team met with Mike Brass, Planning Manager, Maintenance Planning Department, for an update on the implementation of an Electronic Work Management process at DCPP. The DCISC last reviewed this topic during its August 2016 Fact-finding Meeting (Reference 6.13), when it concluded the following:

DCPP’s use of electronic work orders is just beginning in 2016. These work orders are primarily used for preventive maintenance and simpler work not involving many drawings. Although not used extensively, the electronic work orders appear to be a step in the direction of a more effective and efficient process of work direction.

Mr. Brass provided an update on the overall status of implementation of an Electronic Work Management process at DCPP. The program was started in early 2014 in response to similar initiatives elsewhere in the industry. DCPP purchased hardware and created software to manage work packages electronically. The software created has been titled “eWM” and is unique to DCPP. Much of the industry uses another software product, but that product does not integrate with SAP, DCPP’s business information management system. In early 2017, the program was piloted and implementation began across the Maintenance Department. As of the end of 2017, implementation was not as far along as desired, with usage of the eWM system by most groups standing at less than 10% of work packages, except for the T-COM group for which usage of the eWM system was 56% of its work packages. Initiatives were underway to encourage more use of the eWM process, and the Fact-finding Team was provided with a copy of a presentation used to update stakeholders recently at a ‘brown bag’ lunch meeting. Ultimately, DCPP’s goal is for 75% of work packages to utilize the eWM process, but no target date has been set for achievement.

The eWM system uses Windows-based tablets and is primarily a tool to index and manage multiple pdf documents that form a maintenance work package. The system also provides layers that can be used to record data into the pdf files to document completion of tasks in the work document or to record numerical values from the maintenance activity. One of the major advantages of the eWM process is the reduction in work for planners who assemble the work packages. The use of eWM allows planners to skip the steps of printing and assembling work packages as well as to skip the steps of manually scanning and entering completed records into the station Records Management System. One other advantage is that the use of eWM avoids the need to carry large amounts of paper into and out of the Radiologically Controlled Areas of the plant. Currently, the eWM system does not automatically transfer numerical data into the SAP system for use in trending equipment performance. Instead, the system still relies on reviewers of a completed package, such as System Engineers, to pull the desired data from the maintenance package and place it elsewhere in SAP or other analytical programs for trending.
Conclusions:

DCPP is continuing to implement the process for Electronic Work Management, but implementation has been slow. The DCISC should review the status of implementation again in early 2019.

Recommendations:

None

3.10 Management of Data in the Performance Improvement Program

The Fact-finding Team met with Anna Shatara, Performance Improvement (PI) Supervisor, to discuss the uses of data gathered from PI Programs at DCPP. The DCISC last reviewed the PI Program during its November 2017 Fact-finding Meeting (Reference 6.14), when it concluded the following:

DCPP’s Performance Improvement Department, along with its Performance Improvement Coordinators (PICOs) appears to be an effective asset for plant problem solving and continuous improvement.

Ms. Shatara began by outlining that the five coordinators in the PI Department serve as the core group to review all performance data inputs obtained through the Corrective Action Program (CAP) and look for trends. The coordinators come from Operations, Maintenance, Engineering, Work Management, and Radiation Protection/Chemistry. When trends are found, they document the trends and enter the existence of the trend back into the CAP. On a quarterly basis, Integrated Performance Monitoring (IPM) meetings are held with each department to review trends, and the results of the meetings are documented in an IPM quarterly report for the department. The results of all IPMs are rolled up to a Station-level IPM.

The trending done by the PI Department is mostly cognitive trending (meaning, using individual judgement to review data and identify trends) and not statistical trending. In the past, more statistical trending had been done by the PI Department, but it was found that such trends were delayed indicators and not useful for identifying problems at an early stage. Most data analysis that is done at DCPP uses manual processes to pull data from the SAP system and uses other analytical programs to analyze the data. One small exception would be the recent implementation of the eCAP program, a web-based portal to the CAP data in SAP which is accessible to everyone. That program includes a ‘dashboard’ which provides a small amount of front-end analytics of CAP data.

Detailed equipment data such as process data (pressure, temperature, flow, vibration, etc.) are captured in the Plant Computer System, and the Engineering Department is responsible for analyzing and trending that data as needed. In some cases, the retention of data may be too short, as in the case of the primary coolant.
pump vibration data collected when a misaligned bearing was being damaged (Section 3.3 above), where the data had been deleted by the time the problem had been discovered and a root cause evaluation was conducted. The Fact-finding Team believes that given the rapid decrease in data storage costs, a review of instrument data retention policies appears to be warranted.

Industry data on operating events that are reported to the station are analyzed using a detailed form which is intended to ensure that any possible applicability to DCPP is recognized and entered into the CAP for review. For the year to date at the time of the meeting, 135 of 1038 industry events had been found possibly to be applicable to DCPP.

Regarding human performance error tracking, Ms. Shatara stated that DCPP used the "Human Factors Analysis Categorization System," (HFACS) to place human performance events into categories for trending and review. The HFACS system is intended to be a supplement to the Root Cause Evaluation process and uses a check list that is ‘why?’ based to ensure that the appropriate underlying reasons for a human error are identified and corrected. The results of the HFACS analysis are captured in the SAP system. The results also provide input into Department level ‘clock resets’ for human performance.

Conclusions:

The DCPP Performance Improvement Department effectively reviews information from the Corrective Action Program to identify adverse trends and initiate appropriate corrective actions. The DCISC should review the trending of plant data by the Engineering Department during a future Fact-finding Meeting.

Recommendations:

DCPP should review policies for retention times for instrument data related to equipment performance to assure data are available for analysis following equipment performance problems.

Basis for Recommendation:

The current retention of instrument data may be too short, as in the case of the primary coolant pump vibration data collected when a misaligned bearing was being damaged, where the data had been deleted by the time the problem had been discovered and a root cause evaluation was conducted. Longer retention times would ensure data are available for later event analysis as well as additional trending. The DCISC will review and confirm the scope of this issue during a future Fact-finding Meeting.

3.11 DCISC Member Meeting with DCPP Officer

DCISC Fact-finding Member Peterson met with Jim Welsch, Vice President
Nuclear Generation and Chief Nuclear Officer, to discuss the items in this fact-finding meeting and other items of mutual interest.

Conclusions:

The regular meetings between DCISC Members and DCPP Officers and Directors continue to be beneficial for both organizations.

Recommendations:

None

4.0 Conclusions

4.1

DCPP is continuing to participate in industry initiatives to address the issue of possible corrosion of Multi-Purpose Canisters (MPCs) stored at the Independent Spent Fuel Storage Installation (ISFSI). As a part of ISFSI relicensing, DCPP will need to develop an aging management plan to include MPC inspections, and the DCISC should continue to follow work in the area closely. The Cask Transfer Facility located at the ISFSI provides options for more detailed inspections or repairs to an MPC should such be necessary in the future after the Spent Fuel Pools are no longer available.

4.2

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings.

4.3

DCPP has identified the cause of increased radiation levels in Unit 1 containment and has initiated appropriate corrective actions.

4.4

DCPP has resolved many significant issues with its Emergency Diesel Generators (EDGs) and reports the health of Unit 1 as Green and Unit 2 as White. Additionally, DCPP has implemented an impressive EDG Reliability Improvement Plan, the implementation of which the DCISC should review again in about one year. During its future reviews, the DCISC should confirm that capital project items on the Reliability Improvement Plan are not inappropriately being cancelled due to spending reductions in response to the Joint Proposal. Regarding a Repair Parts Evaluation (RPE) performed related to the EDG, the Fact-finding Team concluded that the evaluation appeared appropriate but the DCISC should review the RPE process during a future Fact-finding Meeting.
4.5

The Fact-finding Team’s observation of a Corrective Action Review Board (CARB) meeting was hindered by the fact that a quorum was not present for the meeting. A Corrective Action Program Notification was submitted for the lack of a quorum, and those present at the meeting made a productive use of the time. The DCISC should attempt again to observe a CARB meeting during a future visit.

4.6

External organizations have noted areas for improvement in the Operations Department, and DCPP has moved to implement appropriate corrective actions and include those actions in the Department Excellence Plan. The DCISC should reexamine performance in these areas in approximately one year. DCPP had not been requested by the California Independent System Operator to implement any procedures for load following.

4.7

The Offsite Power System connecting DCPP to the Transmission System has remained stable following the addition of recent renewable energy projects in the area. The DCISC should continue to review the stability of the Transmission System annually. DCPP’s 230kV and 500kV Switchyards are in good health, and multiple projects to replace aging equipment have been successfully completed. Some projects for switchyard and system upgrades have been placed on hold in light of the pending Joint Proposal for DCPP to cease operations at the end of its current license.

4.8

Projects for implementing Smart Procedures and for expanding wireless network access in the power block have been placed on hold due to IT funding constraints and in light of the pending Joint Proposal for DCPP to cease operations at the end of its current license. Existing uses of electronic information such as Electronic Work Management and operator electronic log keeping continue to be fully supported.

4.9

DCPP is continuing to implement the process for Electronic Work Management, but implementation has been slow. The DCISC should review the status of implementation again in early 2019.

4.10

The DCPP Performance Improvement Department effectively reviews
information from the Corrective Action Program to identify adverse trends and initiate appropriate corrective actions. The DCISC should review the trending of plant data by the Engineering Department during a future Fact-finding Meeting.

4.11

The regular meetings between DCISC Members and DCPP Officers and Directors continue to be beneficial for both organizations.

5.0 Recommendations

5.1

DCPP should review policies for retention times for instrument data related to equipment performance to assure data is available for analysis following equipment performance problems (Section 3.10).

6.0 References

6.1


6.2


6.3


6.4


6.5


6.6

6.7


6.8


6.9


6.10


6.11

Ibid., Exhibit D., Section 3.3, “230kV Electrical System Health.”

6.12


6.13


6.14

1.0 Summary

The results of the January 17–18, 2018 fact-finding trip to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Observe Operator Rounds in Plant
2. Meet with NRC Senior Resident Inspector
3. Radiation Monitoring System
4. Quality Verification Assessment of Outage 1R20 Seismically Induced System Interactions
5. Quality Assurance 2017 Audits and 2018 Audit Plans
6. NRC Evaluation Report of DCPP Flood Hazard Reevaluation
7. NRC Regulatory Issues Status
8. Meet with DCPP Officer, Jim Welsch, Vice President, Nuclear Generation and Chief Nuclear Officer
9. Capital Projects Review Status
10. Equipment Reliability Process Status

2.0 Introduction

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if PG&E’s performance is appropriate and whether any areas revealed observations which are important enough to warrant further review, follow-up, or presentation at a Public Meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4—Conclusions highlights the conclusions of the Fact-finding Team based on items reported in Section 3—Discussion. These highlights also include the
team’s suggested follow-up items for the DCISC, such as scheduling future fact-finding meetings on the topic, presentations at future public meetings, and requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations lists specific recommendations to PG&E proposed by the Fact-finding Team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the Fact-finding Report, including its recommendations, is provided to PG&E. The Fact-finding Report will also appear in the DCISC Annual Report.

3.0 Discussion

3.1 Observe Operator Rounds in Plant

Mr. Wardell of the DCISC Fact-finding Team (FFT) met with Dean Rupprecht, Nuclear Operator, to join him on his rounds of the DCPP Emergency Diesel Generators (EDGs). The DCISC last observed DCPP work activities in August 2017 (Reference 6.1), when it concluded the following:

The DCPP Reactor Coolant System chemistry sampling process was performed by a Chemistry technician and observed by a member of the DCISC Fact-finding Team. The Chemistry technician correctly followed proper Chemistry, Radiation Protection and Human Performance practices in obtaining the pressurized sample. The plant and Chemistry Laboratories appeared orderly and clean.

The particular round of interest was the daily recording of data from instruments for the DCPP EDGs, in this case EDG 1-3. DCPP has six EDGs to supply emergency A/C power in the event of an offsite power loss. The EDGs start automatically upon loss of power and can also be started manually by operators.

Messrs. Wardell and Rupprecht held a “pre-job brief” in which they discussed the requirements and steps of the activity about to take place. They then donned personal protective equipment and proceeded into the powerhouse and down into EDG 1-3 Room. There were two special precautions in this room: (1) the possibility of a CO2 fire extinguisher discharge, and (2) the possibility of an EDG start. There are sound and light alarms for the former, and special hearing protection for the latter.

Inside the room the team performed a general observation walkdown around EDG 1-3 looking for leaks or other off-normal conditions. Then, using his handheld portable digital assistant (PDA, a Hewlett-Packard IPAC), Mr. Rupprecht proceeded to record data from various instruments and gauges associated with the EDG. The data were comprised mostly of temperatures and pressures of EDG pre-start and startup components such as engine oil and air start equipment. All readings were...
in the normal range. Had any readings been off-normal, the PDA would have flagged them for follow-up. Mr. Rupprecht was careful to ascertain that he was reading and recording the correct data from the appropriate instrument. The full list of readings is as follows:

1. Annunciator panel lamp test
2. Lube oil pressure
3. Lube oil and jacket water temperature
4. Turbocharger air pressure
5. Starting air pressure
6. Starting air compressor oil level
7. Starting air compressor pre filter
8. Governor oil level
9. Air motor oiler meter knob locking ring down
10. Turbo air compressor oil level
11. Starting air receiver pressure
12. Oil level dipstick
13. Jacket water expansion tank
14. Priming tank fuel oil level
15. Transfer control and priming pump control switch positions
16. Day tank fuel oil level
17. Pre-circulation pump running
18. Pre-circulation pump discharge pressure
19. “Heater enabled” light on
20. Lube oil heater outlet temperature

Upon completing this activity, the team walked back into the Administration Building. Mr. Rupprecht then downloaded his PDA into the Plant Computer for trending and record-keeping.

Conclusions:

The DCISC Fact-finding Team’s observation of an operator on data recording rounds in an Emergency Diesel Generator room was positive in that the operator stressed personnel safety as well as good human performance practices in ascertaining that he was recording the correct data from the appropriate instruments. All data were in the normal range.
Recommendations:

None

3.2 Meet with the NRC Senior Resident Inspector

The DCISC FFT met with Chris Newport, NRC Senior Resident Inspector for an update. The DCISC last met with the Senior Resident Inspector in December 2017 (Reference 6.2), concluding the following:

_The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings._

The group discussed the following items:

1. Small leak in DCPP Main Feedwater Pump 2-2 suction (see below)
2. NRC flooding hazard reevaluation released in late December 2017 affirming the DCPP design basis
3. GSI-191, Containment Debris Issue, is still open but is close to being closed
4. DCPP has eliminated all roving fire watches for impaired fire doors. There are five impaired doors none of which required fire watch compensatory measures.
5. DCPP’s License Event Report (LER) regarding Pressurizer Relief Valve (NRC Green Non-cited violation)
6. DCPP White Finding re-inspection by NRC clears the issue and returns DCPP to Column 1 (normal) for inspections
7. NRC FLEX inspection contained no findings or concerns
8. Main Feedwater Pump (MFW) 2-2 Suction Piping Leak - At 0857 hours on January 16, 2018 DCPP personnel discovered “lightly wisping” steam coming from insulation on MFW Pump 2-2 suction piping, which is non-nuclear-safety-related but essential for power operation. A Corrective Action Program Notification was initiated. Engineering verified the structural adequacy of the pump pressure boundary, and the plant continued to operate safely while corrective action was being determined. The plant brought in a leak repair contractor who repaired the hole for continued operation until the Unit 2 refueling outage 2R20, which is to begin in three weeks, when the final repair will be performed.

Conclusions:

_The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and the DCISC should continue the meetings._
Recommendations:

None

3.3 Radiation Monitoring System

The DCISC FFT met with Kevin O’Neill, Radiation Monitoring System (RMS) Engineer, and Alan Wilson, Instrument and Controls Supervisor, for an update on the system. The DCISC last reviewed the RMS in March 2016 (Reference 6.3), concluding the following:

The DCPP Radiation Monitoring System Long Range Plan for the current licensing period (2016-2023) appears to be well thought out and practical. It incorporates plans to systematically replace/improve the system monitors with current designs, which would address issues with obsolescence and limited spare parts. The plan appears appropriate.

The existing Radiation Monitoring System (RMS) consists of 101 channels of radiation detectors and associated electronic components, and wiring located all around the plant. The system components come primarily from four manufacturers. The system ranges in age from the 1970s to the 1990s and consists of both analog and digital components. Although there is a good supply of spare parts for many components, there have been enough maintenance, reliability and availability problems for DCPP to develop a long-range radiation monitoring strategy. DCPP believes the performance of the system is currently acceptable, and the system is rated Satisfactory (White). Following earlier corrective actions, both the reliability and availability improved noticeably in the fourth quarter of 2013 and were very good during 2014 and subsequent years.

The DCISC Fact-finding Team received and reviewed the DCPP Radiation Monitoring System Long Range Strategy. The general strategy for the current licensing period consists of three major points:

1. Continue to maintain and improve existing equipment
2. Modify and replace selected equipment in accordance with the Long Range Plan
3. Plan for an entire system asset replacement concurrent with the plant relicensing period.

These upgrades were to have been installed through 2023; however, because of the capital review process associated with the Joint Proposal (and decision not to pursue license extension), these upgrades were cancelled. In this fact-finding meeting the DCISC was interested in assessing the viability of the current system to operate up to 2025, when the plant would cease operation.

Along with the above review was another to determine the availability of spare
parts. There appear to be adequate spare parts from the original manufacturers (several of which have been bought up by other major suppliers), other nuclear plants which are upgrading their RMSs or shutting down and then have old system parts available, and from third party suppliers who have found a market in these systems. Mr. O’Neill believed that the existing RMS is reliable enough, that DCPP Maintenance is competent enough, and spare parts available enough to proceed with the current system through 2025 and beyond. The RMS is included in the Maintenance Rule (MR), which has been beneficial in maintaining good system health.

Although system health reports are no longer generated for the RMS, the latest one, June 2017, showed White (satisfactory) health with a plan to improve that using the MR. DCPP plans to complete the MR action items in 2018.

Conclusions:

DCPP plans to keep its current Radiation Monitoring System instead of making major upgrades to it. This is due to the Joint Proposal decision to not pursue license extension and the corresponding capital projects review to reduce capital spending. More importantly, DCPP indicated that with availability of spare parts and with good maintenance practices, DCPP believes the system will operate satisfactorily even without the upgrades until 2025 when DCPP will cease operations.

Recommendations:

None

3.4 Quality Verification Assessment of Outage 1R20 Seismically Induced System Interactions

The DCISC FFT met with Pat Nugent, Director of Quality Verification (QV), and Ray Robins, Audit and Assessment Manager, to review the QV assessment of Refueling Outage 1R20 (April to July 2017), which included a review of Seismic Induced System Interaction Program (SISIP). The DCISC last reviewed SISIP in May 2017 (Reference 6.4), concluding the following:

DCPP is dealing with degraded performance in its Seismically Induced Systems Interaction Program (SISI) Program during the early stages of Outage 1R20. Causes were procedural in nature rather than physical interactions. Assessments and inspections have been performed with initial corrective actions taken and the resulting reports are expected by the end of May. The DCISC should follow up on this issue at the July 2017 Fact-finding Meeting to assess the actions taken to correct SISI Program events.
Station performance with respect to Seismically Induced Systems Interaction is governed by procedure AD4.ID3, “SISI Housekeeping Activities.” The procedure specifically notes that SISI applies to any of the following:

- Transient equipment being brought into the plant
- Component parts of systems, structures, or components being brought into the plant
- Non-design change alterations of systems, structures, or components

The objective of the SISI Housekeeping Program is to ensure that safe-shutdown systems, structures, and components, as well as certain accident-mitigating systems, will function properly during and following an earthquake. The procedure’s intent is to ensure that needed components and equipment will not be impacted during an earthquake by improperly positioned or restrained transient equipment or alterations made to systems, structures, or components.

SISI performance and health had degraded significantly (from Green to Red performance) early in Outage 1R20 with the three following events occurring in March 2017:

1. A scaffold was found erected in the CCW Heat Exchanger Room by a contractor without the procedurally-required SISI review. An engineering review determined that the violation would not result in a SISI problem. This event was identified as a minor violation by NRC.
2. An uninspected scaffold was identified; however, engineering review determined there was no SISI problem.
3. A required SISI walkdown was missed.

Other outage problems, e.g., improperly restrained items, were found and documented with Corrective Action Program Notifications. Causes for these problems were generally procedural (e.g., missed transient item reviews, failure to perform walkdowns, etc.) rather than actual physical SISI interaction problems. The immediate corrective action was to perform an “observation blitz” to determine the extent of condition and to address SISI requirements in all pre-outage orientation meetings and selected pre-job briefs. The most problematic organization, Electrical Maintenance, received formal training on SISI requirements. Quality Verification has performed an assessment of SISI, and their report is expected soon. This assessment should lead to improvements to the SISI procedure and program. The DCISC should follow up soon to assess these corrective actions.

One purpose of this January 2018 Fact-finding visit was to review QV’s assessment of Outage 1R20 SISI, including scaffolding. The QV report, dated July 19, 2017, reported a Finding of “...inconsistent understanding of AD4.ID3 [“SISI...
Housekeeping Activities”] resulted in storage of transient equipment that was not in accordance with site requirements.” The report included a Recommendation to “Clarify SISIP procedural requirements.” QV performed a walkdown of Outage 1R20 SISIP in August 2017. The walkdown found that all SISIP requirements were met, including scaffolding.

Procedure AD4.ID3 was updated as Revision 15 on October 11, 2017 with the following changes to SISI housekeeping standards:

- Added additional standards for transient equipment over 200 pounds and rope restraint sizing.
- Added additional standards for transient equipment movements and instruction for handling transient equipment movement.

**Conclusions:**

DCPP Quality Verification issued a Finding on the Seismic Induced System Interaction Program (SISIP) that inconsistent understanding of the SISIP procedure resulted in storage of transient equipment that was not in accordance with site requirements and also issued a Recommendation that procedural requirements be clarified. This was performed with a procedure revision. This appeared satisfactory to the DCISC Fact-finding Team.

**Recommendations:**

None

### 3.5 Quality Verification 2017 Audits and 2018 Audit Plan

The DCISC FFT met with Pat Nugent, Director of Quality Verification (QV), and Ray Robins, Audit and Assessment Manager, to review 2017 audits and the 2018 audit plan. The DCISC last reviewed QV audits in November 2016 (Reference 6.5), concluding the following:

*The DCPP Audit Program procedures appeared satisfactory as did program implementation. The DCISC reviewed nine 2016 audits with associated findings, deficiencies and recommendations and found that the audits appeared effective with no issues of significance.*

DCPP’s QV audit schedule by function/department is as follows:

<table>
<thead>
<tr>
<th>Function/Department</th>
<th>Frequency</th>
<th>Audit Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Nuclear Industry Evaluation</td>
<td>6 mos. before NIEP</td>
<td>April 2017</td>
</tr>
<tr>
<td>Program (NIEP) Assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Quality Assurance Program</td>
<td>24 months</td>
<td>June 2017</td>
</tr>
<tr>
<td>ISFSI Security Program</td>
<td>24 months</td>
<td>June 2017</td>
</tr>
</tbody>
</table>
The DCISC FFT reviewed the 2017 audit of the DCPP and ISFSI Engineering and Maintenance Rule Programs, which was performed in November and December 2017. The audit team concluded that all of the audited areas were effectively implemented with the exception of equipment reliability being effective with concerns. The audit team identified three findings as follows:

1. Some Preventive Maintenance (PM) changes were processed without documented technical justification and without reviewing the PM basis as required by procedure.

2. Some PMs for safety-related equipment were incorrectly classified as Priority 2, which incorrectly gave approval to Maintenance.

3. A PM change request was approved for a reactor trip bypass breaker that was contrary to a regulatory commitment. This PM was incorrectly classified as Priority 2.

These findings were entered into the Corrective Action Program, but actions were
not yet complete. The DCISC should follow up on these items in a future fact-finding meeting.

The audit team performed follow-up reviews for the following findings created during the 2015 Engineering and Maintenance Rule Programs Audit:

1. The temporary modification process is not being implemented in accordance with procedure requirements and management expectations.
2. Maintenance Rule Functional Failure evaluations were not performed for some items that document problems with structures, systems, and components within the scope of the Maintenance Rule.
3. Some software quality assurance plans were not in accordance with procedures.

The audit team concluded that these findings were satisfactorily addressed.

Conclusions:

The DCISC Fact-finding Team concludes that the DCPP Quality Verification Audit Program appears to be effectively designed and implemented.

Recommendations:

None

3.6 NRC Evaluation Report on DCPP Flood Hazard Reevaluation

The DCISC FFT met with Jearl Strickland, Director, Technical Services; Scott Maze, Fukushima Project Manager; and Brendan Dooher, Senior Mechanical Engineer (and primary tsunami analyst), for a review of the NRC’s Final Staff Assessment of the DCPP Flood Hazard Reevaluation Report (FHRR) released on December 18, 2017. The DCISC last reviewed DCPP tsunami status in September 2017 (Reference 6.6), concluding the following:

*The preliminary analysis of risk from tsunamis caused by offshore landslide events presented to the DCISC Fact-finding Team indicates a low probability of plant damage. The DCISC should review the final version of this preliminary analysis once it has been completed.*

The NRC hired Taylor Engineering as a consultant to perform an independent evaluation of the risk of Tsunamis for DCPP. DCPP had submitted its evaluation of these items to the NRC in March 2015.

The NRC evaluation concluded that the tsunami values reported in the FHRR “... are an appropriate representation of the reevaluated tsunami hazard at the Diablo Canyon site.” The NRC recognized the Taylor evaluation as overly conservative but...
as an independent confirmatory analysis, and concluded that the DCPP analysis was also conservative and acceptable.

Conclusions:

The Nuclear Regulatory Commission in its December 17, 2017 final “Staff Assessment (SA) of the FHRR (Flood Hazard Reevaluation Report) concluded that DCPP’s analyses “…are an appropriate representation of the reevaluated tsunami hazard at the Diablo Canyon site.” This concludes NRC’s review of the DCPP flood hazard.

Recommendations:

None

3.7 NRC Regulatory Issues Status

The DCISC FFT met with Jim Morris, Supervisor, Regulatory Services and Michael Robinson, Supervisor of Regulatory Services, for an update about major NRC regulatory issues. The DCISC last reviewed these issues in March 2017 (Reference 6.7), concluding the following:

DCPP has satisfactory plans and actions which should resolve its major regulatory issues in 2017.

Below in italics are the regulatory items from the March 2017 Fact-finding Meeting with January 2018 updates shown in bold.

1. **Containment Debris**: The issue of potential debris blockage of a containment sump during a potential loss of coolant accident (LOCA) has been the subject of detailed and lengthy research by the industry and the NRC (Generic Safety Issue 191). Extensive enlargements and modifications have been made to DCPP’s containment sump screens in order to substantially reduce the risk of interrupting recirculation to the Reactor Vessel during a Loss of Coolant Accident. PG&E’s decision to pursue resolution of this long-standing industry issue through a risk informed process appears to be a reasonable and achievable approach, recognizing that the deterministic approach is well established practice. [January 15-15, 2014 Fact-finding Meeting]

   **March 2017 Update**: DCPP has removed/replaced substantial amounts of containment insulation and other materials which could have blocked/clogged sump screens and pumps. It is waiting for the completion and approval of a Westinghouse topical report documenting the final testing performed on the ability of containment sump screens and Residual Heat Removal pumps to handle expected containment sump
mixtures. The topical uses a risk-informed approach to the debris problem. The final resolution will require Technical Specification changes.

**January 2018 Update:** No changes. Pending final generic resolution for Technical Specifications.

2. **EDG Health and Performance:** DCPP has resolved most of the significant issues with its Emergency Diesel Generators (EDGs) and reports the health of Unit 1 as Green and Unit 2 as White (and trending towards Green). This is good progress. Additionally, DCPP has implemented an impressive EDG Reliability Improvement Plan, which the DCISC should follow closely. [January 18-19, 2017 Fact-finding meeting.]

**March 2017 Update:** The EDGs exhibit good health resulting from DCPP’s recent and current actions. The DCISC FFR received and reviewed the DCPP EDG Reliability Improvement Plan, dated March 10, 2017. The plan is comprehensive and action-based. The Plan implements more targeted maintenance at appropriate intervals, completion of overdue design changes for known deficiencies, increasing critical spare parts stocking levels, and enhancing operating and maintenance procedures.

**January 2018 Update:** No changes. EDG performance indicators for Units 1 and 2 are both NRC Green and meeting plant goals (MSPI > 3.0x10^{-7}, NRC Green > 1.0x10^{-6}).

3. **230kV Emergency Power:** The DCPP 230kV System health has improved, and several corrective actions made to date to address system problems have been successfully completed. [December 7-8, 2016 Fact-finding Meeting]

**March 2017 Update:** All 230kV disconnect switches have been replaced. Static VAR compensators at the Mesa Substation feeding DCPP have been added. Unit 1 circuit switches are being replaced in Outage 1R20, and Unit 2 switches are being replaced in Outage 2R20. This concludes the design and component upgrades for the 230kV System.

**January 2018 Update:** All actions have been completed. This item was closed.

4. **Open Phase Power:** DCPP has satisfactorily committed to and added temporary compensatory actions to deal with the Open Phase Electric Power Issue. It has also committed to and has plans and funds to add a permanent solution to be completed in the R21 refueling outages in 2018. [May 17-18, 2016 Fact-finding Meeting].
March 2017 Update: These design modifications will be installed in Outages 1R20 and 2R20. Unit 1 trip functions will be enabled by June 30, 2018. Unit 2 trip functions will be enabled by December 31, 2018.

January 2018 Update: The design modification has been installed for Unit 1 and will be installed for Unit 2 in upcoming Refueling Outage 2R20 beginning in February 2018. DCPP is considering replacing the power supplies for improved reliability. This may affect the date for full implementation.

5. Control Room Habitability: DCPP is making good progress in resolving issues with its Control Room Ventilation System (CRVS). The two remaining issues, upgrading the CRVS air conditioning system and NRC approval of Control Room Envelope accident radiation dose calculations using the Alternate Source Term, are on-track for completion in 2018 and 2017, respectively. [May 17-18, 2016 Fact-finding Meeting.]

March 2017 Update: DCPP expects NRC approval of its submittal in April 2017. [Note: the NRC approved this submittal on April 27, 2017 for use of the Alternate Source Term.] The Control Room Briefing Room shielding is currently being installed. The new Control Room air conditioning compressors have been funded and are scheduled for installation in 2018.

January 2018 Update: AST is on track to be implemented by the required date of 4/27/18. Procedure changes are in progress and final modifications are being performed in Outage 2R20.

6. NRC White Finding for Inoperability of Valve SI-1-8982B Interlock:

March 2017 Update: DCPP is preparing for the NRC 95-001 inspection in late May or early June 2017. If satisfactory, NRC will move DCPP inspection frequencies back to Column 1 (normal).

January 2018 Update: The NRC 95-001 inspection in June 2017 identified several open items; however, re-inspection in December 2017 resolved these open items, and NRC returned DCPP inspection frequencies to Column 1 (normal).

7. NRC Assessment of the DCPP March 2015 Local Intense Precipitation and Tsunami Analysis: DCPP’s Local Intense Precipitation analyses appear satisfactory to assure protection for safety-related equipment in the Auxiliary
Building either analytically or by pre-planned mitigation using sand bags. DCPP’s tsunami analyses were completed and submitted to NRC in March 2015, and they are awaiting NRC’s Final Safety Evaluation. Meanwhile, DCISC has requested a separate analysis for which DCPP is seeking funding. [January 18-19, 2017 Fact-finding Meeting.]

**March 2017 Update:** The NRC Final Safety Evaluation is expected by the end of May 2017. The DCISC-requested tsunami analysis should begin in August if funding is approved.

**January 2018 Update:** As reported in Item 3.6 above, the NRC found the DCPP flood and tsunami analyses acceptable and closed the items.


**Conclusions:**
DCPP has satisfactory plans and actions for 2018 which should resolve its major regulatory issues.

**Recommendations:**
None

**3.8 DCISC Member Peter Lam Meeting with Jim Welsch, DCPP Vice-President Nuclear Generation and Chief Nuclear Officer**

DCISC Member Peter Lam met with Jim Welsch, DCPP Vice-President Nuclear Generation and Chief Nuclear Officer to discuss items from this fact-finding meeting and items of mutual interest.

**Conclusions:**
The meetings between the DCISC Fact-finding Teams and DCPP Plant management continue to be useful for both organizations.

**Recommendations:**
None

**3.9 Capital Projects Review Status**
The DCISC FFT met with Mr. Jan Nimick, Senior Director of Nuclear Services, for an update on PG&E’s approach to long term capital project planning in light of PG&E’s participation in the Joint Proposal under which terms PG&E will retire Diablo Canyon in 2025 at the expiration of its current NRC operating licenses. The DCISC last reviewed this topic in October 2017 (Reference 6.8), when it concluded the following:

*The DCPP Joint Proposal Capital Project review process appears satisfactory for reducing capital spending not needed for current operation beyond 2025, which is the proposed end of operations. The DCISC should continue to monitor the process and review cancelled project for potential impact on plant safety.*

A Project Review Working Group (PRWG) was formed using experienced staff from Operations, Engineering, and Work Control. The PRWG had completed its review of the entire portfolio for future capital projects, which was subject to further review by the Executive Oversight Board of the Excellence Plan.

Each project was reviewed for importance using the following screening questions:

- Regulatory?
- Reliability?
- Bridging Strategy?
- Corrective Maintenance?
- Core Damage Frequency?
- Plant transient (Reactor Trip, Safeguards Initiation)?
- Enterprise Risk?
- Financial impact due to extended down power?
- Unmitigated Single Point Vulnerability?
- Plant vulnerability we cannot monitor or detect?
- Reduction of Regulatory Margin?
- Impact to Station/Industry/Regulatory Metrics?
- Enhancing the Decommissioning Project?

The resulting project portfolio was then divided into three categories:

1. Required by Regulatory Commitments (must-do projects)
2. Recommended and Prioritized (should-do projects according to priority)
3. Not Recommended (projects that should not be completed)

Category 1 (Required) included a total of 14 projects such as those related to...
spent fuel storage, Generic Safety Issue 191 (recirculation sump debris clogging), and the License Basis Verification Project. Category 3 (Not Recommended) included projects such as Containment Cooling Coil replacements and a new road for the 500kV switchyard. Regarding Category 2 (Recommended and Prioritized) projects, all projects currently are funded and the list was envisioned to be used as a tool in decision-making should funding become limited in the future. Examples of projects in Category 2 and with low priorities included upgrades to the Radioactive Effluent Management System, 230kV bushing replacements, and Diesel Fuel Oil Transfer Pump replacements.

There were two major projects of interest to the DCISC: the Unit 2 Main Generator Stator replacement and the Eagle 21 Plant Protection System upgrade. The Generator Stator was on the Recommended and Prioritized list and is currently funded and planned for replacement in 2R21 in 2019. The Eagle 21 upgrade, which was cancelled, is a very expensive project and one that could not be completed for several years. The proposed change was intended to improve reliability and was not intended to improve nuclear safety. Replacement parts for the existing system are expected to remain available from the original vendor for the remaining period of the DCPP operating licenses.

There were a total of 45 capital projects cancelled using the above process. Some significant examples were as follows:

- Replace Control Room Condenser
- Replace Eagle 21 Plant Protection System
- Upgrade Radiation Monitoring System
- Replace 12kV Bus D, E, F, and U Relays
- Upgrade Fuel Handling System
- Replace Main Generator Output Breaker
- Replace Pressurizer Heaters
- Replace Containment Fan Cooler Unit Cooling Coils

The DCISC FFT reviewed each cancelled project to ascertain its importance in maintaining nuclear safety and plant reliability. None had a significant impact on these attributes.

DCPP reported that it was beginning to review the Preventive Maintenance (PM) Program to optimize PM frequencies. The DCISC should review this activity during 2018.

**Conclusions:**

The DCPP review process and selection of capital projects to be cancelled with regard to the Joint Proposal 2025 plant shutdown were
comprehensive, hence they appeared to be satisfactory in maintaining plant safety and reliability.

Recommendations:
None

3.10 Equipment Reliability Process Status

The DCISC FFT met with Adam Peck, Director of Engineering Services, and Ken Bych, Manager of Technical Support Engineering, for an update on DCPP’s Equipment Reliability (ER) Process. The DCISC last reviewed Equipment Reliability in July 2015 (Reference 6.9), concluding the following:

*DCPP appears to have a strong and deep organizational commitment to achieving and maintaining high levels of equipment reliability, as evidenced by its recent decision to make equipment reliability management a director-level position. Previous recent issues affecting equipment reliability have been actively pursued, and results to date have been positive. DCISC should review this topic again in a few months after Unit 2 returns to power following Refueling Outage 2R19.*

As a station and its equipment age, there is an increasing focus on equipment reliability, and in DCPP’s case, the station’s heightened focus on equipment reliability appears to have been driven in large part by recurring losses of electric generation, a number of which resulted from flashovers on Unit 2’s 230 kV system. Until mid-2015, the individual at DCPP having direct responsibility for equipment reliability occupied the position of “Manager (emphasis added) of Equipment Reliability and Senior Consulting Engineer,” and was elevated to a higher position of “Director of Equipment Reliability,” that had not previously existed. The station’s approach to Equipment Reliability has expanded from being primarily Engineering-focused to a more integrated plant-wide approach that also involves the active participation of Operations and Maintenance as well as Engineering. All three station groups have active roles in overseeing and reporting equipment condition and performance and in ensuring that appropriate actions are planned and taken to maintain station equipment and systems in a healthy condition.

At this January 2018 Fact-finding Meeting the FFT learned that the ER process and results had improved substantially to the point where DCPP moved responsibility back to the Manager level. The following Equipment Reliability Index chart shows DCPP ER performance.

As can be seen from the chart DCPP scores full marks for all attributes, except the PM Change Request (PMCR) Backlog for which it scores one-out-of-two for each unit. DCPP expects to achieve full PMCR recovery by the end of the first quarter 2018. The DCISC FFT considers this to be good performance.
Conclusions:

DCPP Equipment Reliability performance is adequate in all but two categories, Unit 1 and Unit 2 Preventive Maintenance Change Request Backlog. DCPP expects to achieve full recovery by the end of the first quarter 2018. This is good performance.

Recommendations:

None

4.0 Conclusions

4.1

The DCISC Fact-finding Team’s observation of an operator on data recording rounds in an Emergency Diesel Generator room was positive in that the operator stressed personnel safety as well as good human performance practices in ascertaining that he was recording the correct data from the appropriate instruments. All data were in the normal range.

4.2

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue these meetings.
4.3

DCPP plans to keep its current Radiation Monitoring System instead of making major upgrades to it. This is due to the Joint Proposal decision to not pursue a 20-year license extension and the corresponding capital projects review to reduce capital spending. More importantly, DCPP indicated that with availability of spare parts and with good maintenance practices, DCPP believes the system, will operate satisfactorily even without the upgrades until 2025 when DCPP will cease operations.

4.4

DCPP Quality Verification issued a Finding on the Seismic Induced System Interaction Program (SISIP) that inconsistent understanding of the SISIP procedure resulted in storage of transient equipment that was not in accordance with site requirements and also issued a Recommendation that procedural requirements be clarified. This was performed with a procedure revision. This appeared satisfactory to the DCISC Fact-finding Team.

4.5

The DCISC Fact-finding Team concludes that the DCPP Quality Verification Audit Program appears to be effectively designed and implemented.

4.6

The Nuclear Regulatory Commission in its December 17, 2017 final “Staff Assessment (SA) of the FHRR (Flood Hazard Reevaluation Report) concluded that DCPP’s “…are an appropriate representation of the reevaluated tsunami hazard at the Diablo Canyon site.” This concludes NRC’s review of the DCPP flood hazard.

4.7

The meetings between the DCISC Fact-finding Teams and DCPP Plant management continue to be useful for both organizations.

4.8

DCPP has satisfactory 2018 plans and actions which should resolve its major regulatory issues.

4.9

The DCPP review process and selection of capital projects to be cancelled with regard to the Joint Proposal 2025 plant shutdown were comprehensive, hence they appeared to be satisfactory in maintaining plant safety and reliability.

4.10
DCPP Equipment Reliability performance is adequate in all but two categories, Unit 1 and Unit 2 Preventive Maintenance Change Request Backlog. DCPP expects to achieve full recovery by the end of the first quarter 2018. This is good performance.

5.0 Recommendations:

None

6.0 References

6.1


6.2

Ibid., Exhibit D.6, Section 3.2, “Meet with NRC Senior Resident Inspector.”

6.3


6.4

Ibid., Exhibit D.9, Section 3.2 “Seismically Induced System Interactions.”

6.5

Ibid., Exhibit D.4, Section 3.4, “DCPP Audit Program Update and Results of 2016 Audits.”

6.6


6.7


6.8

6.9

1.0 Summary

The results of the March 7–8, 2018 fact-finding trip to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

- Meet with NRC Senior Resident Inspector
- Software Quality Assurance Programs
- Non-Containment Outage Work Tour
- Nitrogen Leak in Containment Event
- 2018 Operating Plan
- Containment Outage Work Tour
- Decommissioning Planning
- Employee Retention Programs
- Meet with DCPP Officer
- Human Performance Data Inclusion into Probabilistic Risk Assessments

2.0 Introduction

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if PG&E’s performance is appropriate and whether any areas revealed observations which are important enough to warrant further review, follow-up, or presentation at a Public Meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4—Conclusions highlights the conclusions of the Fact-finding Team based on items reported in Section 3—Discussion. These highlights also include the team’s suggested follow-up items for the DCISC, such as scheduling future fact-finding meetings on the topic, presentations at future public meetings, and
requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations lists specific recommendations to PG&E proposed by the Fact-finding Team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the Fact-finding Report, including its recommendations, is provided to PG&E. The Fact-finding Report will also appear in the DCISC Annual Report.

3.0 Discussion

3.1 Meet with Senior NRC Resident Inspector

The DCISC Fact-finding Team (FFT) met with Chris Newport, Senior NRC Resident Inspector, for an update. The DCISC last met with the NRC in January 2018 (Reference 6.1), when it concluded the following:

*The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue them.*

The participants discussed the following topics:

- Refueling Outage 2R20 Activities
- Possible Effects of the Joint Proposal on DCPP Performance
- Generic Safety Issue 191 (Containment Sump Strainer Performance) Status
- Decommissioning Planning

Conclusions:

*The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings.*

Recommendations:

None

3.2 Software Quality Assurance Programs

The DCISC Fact-finding Team met with Dan Holland, Software Quality Assurance (SQA) Program Owner, Business Systems; Bill Brown, Engineer, Digital Systems; and Brian Maule, Supervisor, Digital Systems for an update on SQA Programs. The DCISC last reviewed SQA Programs its December 2010 Fact-finding Meeting (Reference 6.2), when it concluded the following:

*DCPP’s Software Quality Assurance Program appears to be*
comprehensive and well designed to assure computer software is developed, maintained, operated, and changed in an appropriately controlled fashion.

Mr. Maule reported that the program and its governing procedures were recently modified based on industry input and guidance from the Electric Power Research Institute, and the DCPP SQA Program was split into two significant parts. The first part of the SQA program is now administered by the Digital Systems group and manages digital assets that are a part of plant equipment. This plant equipment portion of the SQA program provides a comprehensive process to develop and manage individual system SQA plans which ensure quality and maintain configuration during the development and maintenance of power plant related software applications. Applications covered in this program include those such as Plant Process Monitoring (scan, log, and alarm), Plant Process Control, and any other application with a safety, security, or Emergency Planning function. The program is controlled by a plant procedure CF2.ID2, “Software Configuration Management for Plant Operations and Operations Support.”

The Fact-finding Team was provided a copy of and reviewed procedure CF2.ID2. The procedure was extensive and contained requirements both for the design and implementation of new digital systems as well as for the maintenance of existing digital systems. Newly developed software applications and revisions to existing plant applications are controlled by their individually prepared and approved SQA Plans. In the form of a procedure, a SQA Plan’s purpose is to provide requirements and guidelines for the design, development, modification, and documentation of the application software. It provides for the overall responsibilities, definition of terms, and general instructions for developing and maintaining the application software.

In general, if a change is required to an existing digital system, the change would be governed by a Design Change Procedure (DCP) that would be implemented by the Engineering Department. A part of the DCP would contain an implementation plan that would cover how verification and validation of software changes would be performed under the SQA Plan. If a software-related problem were to occur on an existing system, the Digital Systems group would be responsible for investigating the cause and determining the appropriate corrective action. Provided that the proposed corrective action did not change the scope or function of the software, it could be performed under controls specified in an associated Maintenance Work Order and the SQA Plan. If the scope or function of the software had to be changed, a DCP would be required. In either case and before implementing any software changes, any proposed change would be examined for possible adverse effects of the change and testing would be performed on a development system. Usually, the amount of testing required for any change would be based on a review of the verification and validation testing performed during the original installation of the system.
A development system contains hardware that duplicates that installed in the plant, but the development system is not connected to any actual plant equipment. Instead, the development system includes plant simulation equipment that provides any inputs needed to test the hardware throughout all of its functions and that measures outputs. The Fact-finding Team was informed that DCPP had many development systems on site to allow testing and validation of any proposed changes prior to installation in the actual plant. The team toured the Digital Systems Lab and observed that it contained development systems for the Plant Process Computer System, the Digital Electro-Hydraulic (Turbine Control) System, the Digital Feedwater Control System, and other systems along with their associated computers to generate simulated inputs and measure outputs.

The Fact-finding Team was also informed that DCPP was working to change its approach to software development to use vendors to perform most software-related activities. It had been found that vendors provided more reliable long-term availability for support as opposed to the individual experience of station employees. Accordingly, any required development of new software was now no longer performed by in-house personnel. However, there were some existing systems originally developed in house for which vendors were not readily available, and station resources were still being used to manage the software. An example of software developed and still being supported in house was the software contained in the Plant Operation of Ventilation System, which controls Auxiliary and Fuel Building Ventilation Systems. The engineers also noted that it was not easy to find qualified personnel to serve in their department due to the unique nature of the knowledge required to work with digital systems in a nuclear power plant environment.

The Fact-finding Team inquired as to DCPP’s recent experience with the reliability of digital systems. The engineers responded that the reliability of digital systems had been much improved over the last few years. Currently, most problems in digital systems were related to hardware issues and not software. An example of this was the unreliability of workstations for the Plant Process Computer System, where the original workstation hardware was not designed for continuous operation. The workstation hardware was being replaced with industrially hardened components that were designed to operate continuously and with minimal moving parts. The engineers stated that throughout the industry there had been some events in the industry due to software issues, but not many.

Mr. Holland then briefed the team on the second part of the SQA program which was managed by the Information Technology Department who are responsible for business-related software that is used in plant activities but does not directly support power plant operations. Examples of applications included in the program were commercial off-the shelf software, databases and spreadsheets, project management and work scheduling software, and other vendor-provided products. The program is controlled by a plant procedure CF2.ID3, “Software Management for Business Information Computer Systems.” The Fact-finding Team was provided
a copy of and reviewed procedure CF2.ID3. The procedure required that applications not considered related to plant systems should be screened to determine if a SQA Plan was required. The key criterion for determining if an SQA Plan was required was whether or not the application or system fulfilled a critical function. A critical function was further defined as one whose failure could: a) affect safety-related systems or functions, b) affect the quality of operational, engineering, or maintenance decisions, or, c) result in significant financial loss. SQA Plans prepared for business-related software were required to include many as the same components of the SQA Plans prepared for plant systems, as discussed above.

Conclusions:

DCPP’s Software Quality Assurance Program appears to be comprehensive and designed to assure computer software that could affect the safety of plant operations is developed, maintained, operated, and changed in an appropriately controlled fashion.

Recommendations:

None

3.3 Non-Containment Tour Outage Work Tour

The DCISC Fact-finding Team met with Hector Garcia, Integrated Planning Manager and DCPP Liaison, for a tour of non-Containment 2R20 Refueling Outage work in progress. The DCISC last toured and observed major non-Containment outage work during its May 2017 Fact-finding Meeting (Reference 6.3), when it concluded the following:

DCPP 1R20 Outage work was proceeding in a controlled, professional manner with careful pre-planning and management.

This tour included the following Unit 2 plant areas and components:

1. Outage Control Center
2. Turbine Building, with work in progress on the Main Generator Exciter
3. Control Room
4. Auxiliary Building
5. Fuel Handling Building

In the Outage Control Center, the Fact-finding Team observed that planning and coordinating activities were being managed in a controlled and professional manner. The team noted and obtained a copy of a flow chart of the outage which provided a high-level view of the outage critical path activities:
During the tour, the Fact-finding Team also observed several areas of preparation for the Containment Integrated Leak Rate Test (ILRT). The ILRT is a test required to be performed every ten years by NRC regulation 10CFR50, Appendix J. The ILRT requires the entire Containment to be pressurized to a peak containment internal pressure equivalent to the design basis accident as specified in the plant’s technical specifications, approximately 45 psig at DCPP. The team observed the setup and preliminary testing of the temporary data collection system used for the test, which was located in the Auxiliary Building penetration area. Additionally, the Team observed the setup of approximately 16 temporary air compressors and dryers that were required to supply the large volumes of air needed to pressurize the Containment. The Team noted that DCPP had chosen to obtain multiple compressors of medium sizes rather than a few large compressors. Mr. Garcia reported that using multiple compressors minimized the possible impact to the test and subsequent delays should a compressor fail during testing. Following the Fact-finding Meeting, the team confirmed that the ILRT was satisfactorily completed without any major issues.
Temporary Air Compressors for Containment Integrated Leak Rate Testing

Conclusions:

DCPP 2R20 Outage work was proceeding in a controlled, professional manner with careful pre-planning and management.

Recommendations:

None

3.4 Nitrogen Leak in Containment Event

The DCISC Fact-finding Team met with Brian Galvin, Operations Manager, and Mark Frantz, Shift Foreman, to review a July 2017 event in which a significant amount of nitrogen leaked into the Unit 2 Containment. This was the DCISC’s first review of this matter.

The DCPP Unit 2 pressurizer is equipped with three Power Operated Relief Valves (PORVs), two safety-related (PCV-455C and PCV-456) and one non safety-related (PCV-474). The pressurizer maintains Reactor Coolant System pressure and volume through the surge line during operation, and limits pressure changes during transients. The PORVs are normally operated by instrument air. When instrument air is isolated, as it is during an Emergency Core Cooling System (ECCS) actuation, the backup nitrogen supply (gas accumulators installed nearby) provides the motive force to operate the PORVs. The safety-related PORVs and associated backup nitrogen accumulators are credited to mitigate a number of design basis accident events. The backup Nitrogen accumulator is specifically designed to provide an adequate capacity to cycle the PORV at least 300 times following a Feedwater Line Break event. This provides adequate time for the operators to take action to terminate the ECCS injection flow, prevent overfilling of the pressurizer, and re-establish a bubble in the pressurizer.
On July 28, 2017, with DCPP Unit 2 operating at 100 percent power, an Alert notification was declared due to low oxygen levels inside the containment. The cause of the low oxygen level was a nitrogen leak inside the containment. The nitrogen source was isolated, the containment atmosphere was restored to normal conditions, and the Alert was terminated. During an investigation of the nitrogen leak inside the containment, relief valve RV-355 was found to be leaking. The leak caused the pressure in the back up nitrogen accumulator supply to PORV PCV-455C to decrease to a level that made the PORV inoperable. Based on a review of trend data for nitrogen usage in the containment, it was conservatively assumed that RV-355 had been degraded since December 1, 2016, rendering the PORV inoperable for a period longer than permitted by Technical Specifications.

The event was reported to the NRC under Licensee Event Report (LER) 2-2017-001. In the LER, DCPP reported that it had assessed the Unit 2 risk significance of the inoperability of PCV-455C using Probabilistic Risk Assessment and the Significance Determination Process. The assessment concluded that the PORV would be available for the most risk significant functions. An incremental conditional core damage frequency associated with this event was estimated to be less than 1.0E-06 per year. Subsequently, the NRC reviewed the event and assessed its significance. The NRC found the event to be a self-revealing, non-cited violation of Technical Specifications. The NRC concluded the finding was of low safety significance (Green) and had no cross-cutting aspects.

In October 2017, DCPP completed a Root Cause Evaluation (RCE) of the event (SAPN 50934855). The RCE concluded that station personnel inadequately evaluated and failed to elevate the priority of work to repair a nitrogen system leak which resulted in delayed actions to resolve the issue, impact to PCV-455C operability, and ultimately in the Alert declaration. Mr. Galvin reviewed the status of corrective actions with the Fact-finding Team. Numerous corrective actions were recommended in the RCE and have been implemented at the station. They include elevating the priority of work for any gaseous leaks from unidentified sources, adding additional requirements to procedures governing Shift Forman and Daily Review Team reviews of abnormal plant conditions, and adding additional requirements to procedures governing investigations and tracking of emerging issues. The Fact-finding Team was provided with copies of the applicable procedures, reviewed the changes, and concluded that they formed an appropriate response.

The Fact-finding Team inquired if any similar situations had occurred since the corrective actions had been put in place. Mr. Galvin responded that in October 2017, it was discovered that the Service Water head tank level was increasing due to unknown reasons (SAPN 50946491). In response to that report, extensive investigations were initiated to find what were ultimately determined to be multiple sources of leakage in condensate sample coolers. Those investigations took a significant amount of effort and time and were ultimately successful in
correcting the problem in February 2018. The efforts were tracked by use of an Emergent Issue Summary, a copy of which was provided to the Fact-finding Team.

In addition to the items contained in the RCE, Mr. Galvin reported that other actions had been taken with regards to the periodicity and criteria used in Containment atmospheric sampling. These actions were initiated under SAPN 50934898, which was written to specifically cover the impact of the nitrogen release into the Containment atmosphere. Over the past years during which the station had operated, the periodicity of atmospheric sampling had been relaxed to quarterly based on experience and changes in confined space classification. As a result of this event, procedures were changed to require weekly sampling of the Containment atmosphere. Additionally, an earlier warning threshold has been established to trigger investigations and corrective actions at a level prior to exceeding criteria that would require declaration of an Alert. Lastly, DCPP is considering initiating revisions to the Emergency Plan to incorporate lessons learned from the event.

**Conclusions:**

DCPP identified the cause of the July 2017 event in which a nitrogen leak in Containment resulted in the declaration of an Alert. Appropriate corrective actions have been initiated and appear to be effective.

**Recommendations:**

None

**3.5 2018 Operating Plan**

The Fact-finding Team met with Cary Harbor, Nuclear Planning Director, for an update on DCPP’s 2018 Operating Plan. The DCISC was last briefed on the preliminary 2018 Operating Plan at its February 2018 Public Meeting (Reference 6.4).

Mr. Harbor provided the Fact-finding Team with updated copies of the 2018 Operating Plan, the purpose of which was to provide a roadmap for the organization and a strategy to align staff to work collectively toward PG&E’s overall goal to provide safe, reliable, affordable and clean energy to its customers. For 2018, the Operating Plan was separated for the nuclear division of the company from the other generation divisions. However, all parts of the company shared common Mission, Vision and Culture statements. The six key focus areas for the 2018 Operating Plan in nuclear were:

- Safety
- Reliability
- Affordability
Risk, Compliance and Ethics
People
Regulatory, External, Strategy

In each of the above focus areas, the plan detailed key work and initiatives as well as key metrics to measure success. Highlights of the 2018 Operating Plan included initiatives to:

- Improve behaviors to standards to prevent personnel and nuclear safety events
- Improve engagement in the use of Performance Improvement processes
- Efficiently perform the right work at the right time
- Implement a workforce management analysis
- Implement actions required by the Joint Proposal

Mr. Harbor also explained that the next steps in planning process were efforts aimed at achieving vision and alignment of the Operating Plan with station personnel. Station Alignment Workshops would be held to make employees knowledgeable of the Operating Plan such that they will work and make decisions in alignment with the Operating Plan.

Conclusions:

The 2018 Operating Plan contained appropriate focus areas with initiatives and key metrics. The DCISC should continue to monitor implementation of the Operating Plan and its progress against metrics in future meetings.

Recommendations:

None

3.6 Containment Outage Work Tour

The DCISC Fact-finding Team met with Brian McQuade, who was serving as a Containment Coordinator, for a tour of the Unit 2 Containment and Containment outage work. The tour was possible because the Containment was open for major maintenance and other work during the 2R20 Outage. The DCISC last toured and observed major Containment outage work during its May 2017 Fact-finding Meeting (Reference 6.5), when it concluded the following:

The DCISC tour of DCPP Containment was well planned and executed, permitting the DCISC Fact-finding Team to observe practically all outage work in progress while achieving essentially no radiation dose (< 1.0 mrem each). This was a good opportunity for the DCISC to observe
firsthand the magnitude and complexity of Containment outage activities and how effectively DCPP carried it out.

The group dressed out in proper protective clothing and received the appropriate Radiation Protection briefing and radiation dosimetry prior to entering Containment through the Personnel Air Lock. This tour included the following Containment levels and components:

1. Refueling Deck – Refueling Canal, Reactor Head, and Containment Fans
2. Mid Level – Reactor Loop Rooms and Seal Table
3. Lower Level – Accumulators, Containment Recirculation Sump Strainers, and Various Storage Areas.

The group observed preparations being made to begin the tensioning of the Reactor Head studs. Also, the installation of temporary instrumentation in preparation for the ILRT was noted. Most other work in the Containment consisted of removal of equipment, tools, and scaffolding in preparation for Containment closeout. Upon exiting the area, dosimetry indicated that the individuals had received less than 1.0 mrem dose, which indicated that the radiological environment that was very clean.

Conclusions:

The DCISC tour of DCPP Containment was well planned and executed, permitting the DCISC Fact-finding Team to observe outage work in progress while achieving a very low radiation dose. Containment areas appeared to be well maintained, and closeout
activities were proceeding in an organized manner.

Recommendations:

None

3.7 Decommissioning Planning

The DCISC Fact-finding Team met with Jon Franke, Vice President, Power Generation, for an update on Decommissioning Planning. The DCISC last reviewed Decommissioning Planning during its January 2017 Fact-finding Meeting (Reference 6.6), when it concluded the following:

The California Public Utilities Commission (CPUC) has begun its formal proceeding to consider approval of the Joint Proposal. DCPP’s plan for decommissioning has begun with the process of developing its decommissioning organization which will determine what type of decommissioning to use and a detailed cost estimate.

Mr. Franke updated the Fact-finding Team on current activities underway within the Decommissioning group. DCPP had established a panel to receive applications and select people to become members of the Diablo Canyon Decommissioning Engagement Panel. The mission and purpose of the Decommissioning Engagement Panel is to review information and provide direct input on behalf of the local community to PG&E on Diablo Canyon Power Plant decommissioning plans and activities. Applications were currently being received, and it was planned for the panel to meet in April to make final selections for the Decommissioning Engagement Panel.

The Fact-finding Team inquired regarding the status of funding for Decommissioning activities. Mr. Franke responded that the current Decommissioning Fund would provide adequate funding in order to complete a full cost estimate for decommissioning the facility. The cost estimating work was estimated to be completed by 2019, and its cost would be covered by the Decommissioning Fund as the NRC regulations allowed up to 3% (approximately $37 million) of the fund to be expended for pre-planning activities that might be completed before operations cease in 2024. Mr. Franke continued to point out that the Decommissioning Fund was only intended to cover the cost for decommissioning of the radiologically-active portions of the facility and was never intended to cover a return of the site to a full “green field” status. As a result, DCPP was working to lay out a strategy to file with the California Public Utilities Commission (CPUC) for approval for a means for setting aside additional funding for non-radiological decommissioning activities. DCPP hoped to make such a filing within the next two years. Any such additional funds would be pass-through costs and neutral to PG&E’s revenue. As a part of the funding strategy, agreements would need to be reached and approvals obtained regarding any portions of the facility that might not be returned to green field status, such as leaving the Intake
Breakwater or office support building external to the power block. The ultimate status of those facilities would significantly affect the total cost of decommissioning. A large amount of additional costs beyond those allowed to be drawn from the Decommissioning Fund, possibly up to $80 million, would be needed to obtain the necessary state and local permits prior to the start of decommissioning activities.

Mr. Franke also updated the Fact-finding Team regarding plans for the disposal of low level radioactive waste. It was anticipated that new contracts for such disposal would be obtained given the large amount of waste that would be generated. Additionally, DCPP was reviewing the requirements of a state executive order which required that all waste from nuclear power plants be disposed outside of the state of California. DCPP desired to investigate the possibility of modifying the requirements such that some amounts of non-radiological wastes could be disposed or reused on site. An example of such a use that could be pursued would be using non-radiological concrete and stone waste as a road bed for improving the north access road to the site to allow future public access from that direction.

The Fact-finding Team asked regarding how the transition from the NRC Part 50 license to the Part 72 license (governing the Independent Spent Fuel Storage Installation) is handled following cessation of operations. Mr. Franke reported that as a part of License Action Requests to be filed with the NRC, there would be defined milestones which would allow reductions of portions of the Part 50 requirements until such time that the Part 50 license could be fully terminated. After all requirements were met to terminate the Part 50 license, only the Part 72 license would remain until all fuel was removed from the site.

**Conclusions:**

DCPP’s plan for decommissioning continues to be developed. Current activities include establishing the DCPP Decommissioning Engagement Panel, preparing a detailed cost estimate, and obtaining the necessary funds for decommissioning to a green field site.

**Recommendations:**

None

**3.8 Employee Retention Programs**

DCISC Fact-finding Team met with Jim Welsch, Vice President Nuclear Generation and Chief Nuclear Officer, for an update on Employee Retention Programs. The DCISC last reviewed this topic during its August 2017 Fact-finding Meeting (Reference 6.7), when it concluded the following:

*DCPP appears to be appropriately planning ahead for operator staffing, taking into account potential early and normal retirements, resignations,*
and the possible effects on staffing of the Joint Proposal, which requires plant shutdown in 2025. The DCISC should keep an Open Item for follow up on staffing when incentive plans end.

Since the last review of this topic by the DCISC, the California Public Utilities Commission (CPUC) ruled in January 2018 approving the Joint Proposal to retire DCPP at the end of its current operating license with some significant modifications. Among the modifications were reductions in the amount of funds that could be expended for employee retention. The original Joint Proposal called for an Employee Retention Program that would pay employees a 25% over base pay incentive per year in two tranches, the first of four years and the second of three years. In late 2016, approximately 86% of DCPP employees had signed Retention Agreements to accept the proposed 25% incentive and committing to remain as employees through the end of 2020. The first incentive payment was planned to be made prior to the end of 2017. However, the payment was not made as planned due to the fact that the CPUC had not approved the Joint Proposal prior to the end of 2017.

The final decision by the CPUC reduced the annual incentive payment to 15% per year but retained the basic structure of two tranches of four and three years each. Because of the changes ordered by the CPUC, the previous Retention Agreements signed by employees were no longer considered valid. Mr. Welsch reported that all employees had been presented with the option to sign new Retention Agreements covering the same period ending at the end of 2020. Employees who signed would be paid an initial 15% payment covering 2017 within 60 days and a second payment for 2018 by the end of August 2018. Although the period for employee signup had not yet closed as of the time of the meeting, Mr. Welsch stated that preliminary indications were that the acceptance rates for the new Retention Agreements appeared to be similar to the acceptance rates under the original Retention Agreements. Although the initial indications appeared to show that the reduced incentive amounts under the CPUC decision had not affected the Tier 1 tranche acceptance rate, he remained concerned that retention rates under the Tier 2 tranche might not be as successful given the reduced incentive amounts. Mr. Welsch also reported that the station would analyze the Tier 1 acceptance rate data closely and break it into various groups in order to see if there were specific areas of low acceptance that could possibly become a future issue.

Regarding the future Tier 2 tranche, Mr. Welsch stated that DCPP was in the process of reviewing plans and options for when to circulate the Tier 2 Retention Agreements to employees for their consideration. Although the Tier 2 Retention Agreements would not actually be needed before mid-2020, there were advantages in the planning of staffing to be gained by not waiting until late in the period before offering the Tier 2 Retention Agreements for employee review and acceptance. Lastly, Mr. Welsch reported that DCPP was also working to ensure that the station continued to be an environment where employees were pleased to work, as well as working to line up assistance for employees to receive to help find...
Conclusions:

DCPP appears to be appropriately managing Employee Retention Programs, taking into account the requirements of the Joint Proposal as modified by the CPUC. The DCISC should continue to monitor the effectiveness of the Employee Retention Programs and staffing plans to ensure that possible losses of personnel do not impact plant safety.

Recommendations:

None

3.9 DCISC Member Meeting with DCPP Officer

DCISC Fact-finding Team met with Jim Welsch, Vice President Nuclear Generation and Chief Nuclear Officer, to discuss the items in this Fact-finding Meeting and other items of mutual interest.

Conclusions:

The regular meetings between DCISC Members and DCPP Officers and Directors continue to be beneficial for both organizations.

Recommendations:

None

3.10 Human Performance Data Inclusion into Probabilistic Risk Assessments

The DCISC Fact-finding Team met with Rasool Baradaran, Probabilistic Risk Assessment (PRA) Supervisor; Nathan Barber, PRA Engineer; and David Imbaratto, PRA Engineer, to discuss how the DCPP’s Probabilistic Risk Assessment (PRA) performs the analysis task of including human performance data in their PRA. This was the DCISC’s first review of this matter.

The rationale for the inquiry is that during a presentation by DCPP’s Mark Frauenheim at the DCISC’s public meeting in June 2017, Dr. Budnitz (one of the two members of this Fact-finding Team) had an exchange with Mr. Frauenheim that included a discussion of this technical topic. It was decided that the best way for the DCISC to pursue the topic in depth was to arrange a Fact-finding Meeting on it.

The technical issue is as follows: One of the most important tasks in performing any PRA, such as the DCPP’s PRA, is to identify all of the important individual sequences of events (so-called “accident sequences”) that could lead to a severe accident involving the melting of the reactor core. Many of these sequences involve a combination of equipment failures and human errors, and the
identification of the various human errors and the role that each would play in the evolution of the accident sequence is typically very complex. Once identified, each human error must be assigned a numerical value representing the likelihood or probability that the error will occur.

There are many different categories of human errors: for example, errors of commission are distinct from errors of omission. (An error of omission occurs when a person fails to perform an action that should have been performed. An error of commission occurs when a person performs an action that should not have been performed.) Also, errors that occur prior to the initiation of a sequence are necessarily treated differently than errors that initiate the sequence or errors occurring while the sequence is evolving after starting with some other failure.

This entire PRA area is known as Human Reliability Analysis (HRA). There are several different accepted methodologies for performing HRA, each documented in the literature and many of them in wide use. They can differ considerably in both the approach to structuring the analysis and the way in which the numerical probabilities are determined and assigned. There is also an American Society of Mechanical Engineers (ASME)/American National Standard (ANS) for PRA analysis, the ASME/ANS PRA Standard (Reference 6.8), which has requirements for what to do to perform a technically adequate HRA analysis that can be used in PRA applications. The DCPP PRA has met that standard and has received a peer review to provide additional assurance that it has been met.

The standard, however, is a “what to do” standard, and the “how to do” is left up to the analysis team, subject to the peer review. It is the “how to do” aspect of the DCPP HRA analysis that was the subject of this Fact-finding meeting.

Plant-specific data: One aspect of the discussion in this meeting was the extent to which the DCPP PRA uses plant-specific data as a partial or major basis for the quantification aspect of the HRA. Generally, the state-of-practice in PRA is to use plant-specific data wherever it is both available and applicable.

The DCPP analysts reported that there is not generally enough plant-specific (DCPP-specific) HRA data to support its use in their PRA, and that this is generally true of most other similar PRAs at similar nuclear power plants. They reported that they have attempted to incorporate plant-specific HRA data for the more important accident sequences, if available, but where used (most often in the pre-initiator aspect of their HRA analysis) they have found that it does not generally make much difference to either the numerical results or the PRA insights. The DCPP team also reported that developing plant-specific data can require extensive analyst work. The PRA team does review those Corrective Action Program entries that might be relevant, and of course these are plant-specific.

They reported that they generally use Swain’s and Guttmann’s THERP (“Technique for Human Error Rate Prediction”) methodology and data (Reference 6.9). The
Fact-finding Team is familiar with the THERP approach, which is widely used, well understood among the community of practitioners, and accepted as one of the most useful HRA methods.

Recoveries: One aspect of the HRA analysis is to estimate the numerical values assigned to certain human recovery actions – that is, after a failure, the human action to recover the safety function, through either restoration of a failed piece of hardware or the overriding of a human procedural error by a more appropriate action. The time required for each individual modeled recovery needs to be determined, by developing what is known in the field as estimating the Time-Reliability Correlation (TRC). The DCPP team reported that they have generally used generic rather than plant-specific TRC values due to a lack of enough plant-specific data (which could in principle include either operational data or simulator data), but that using operator input they have modified a few of the TPC correlations to make them plant-specific.

They noted that the state-of-practice today is generally not to include post-accident cognitive errors of commission because they are generally believed not to be important contributors. However, for fire-initiated and seismic-initiated sequences the PRA team reported that they review the annunciator response procedures (ARPs) for potential errors of commission which are then included in their model.

On the issue of differentiating errors of commission from errors of omission, the team reported that they always differentiate between them including assigning different numerical failure probabilities as appropriate. That is today’s HRA state-of-practice.

Conclusions:

DCPP has been performing Probabilistic Risk Assessment (PRA) for many years, and their PRA model is mature. The way the PRA team performs the Human Reliability Analysis (HRA) aspect of their PRA was reviewed. The DCISC team believes that the approaches being used generally follow state-of-practice methodologies, and that the PRA’s use of plant-specific HRA data, where those data are available, is appropriate.

Recommendations:

None

4.0 Conclusions

4.1

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue
the meetings.

4.2

DCPP’s Software Quality Assurance Program appears to be comprehensive and designed to assure computer software that could affect the safety of plant operations is developed, maintained, operated, and changed in an appropriately controlled fashion.

4.3

DCPP 2R20 Outage work was proceeding in a controlled, professional manner with careful pre-planning and management.

4.4

DCPP identified the cause of the July 2017 event in which a nitrogen leak in Containment resulted in the declaration of an Alert. Appropriate corrective actions have been initiated and appear to be effective.

4.5

The 2018 Operating Plan contained appropriate focus areas with initiatives and key metrics. The DCISC should continue to monitor implementation of the Operating Plan and its progress against metrics in future meetings.

4.6

The DCISC tour of DCPP Containment was well planned and executed, permitting the DCISC Fact-finding Team to observe outage work in progress while achieving a very low radiation dose. Containment areas appeared to be well maintained, and closeout activities were proceeding in an organized manner.

4.7

DCPP’s plan for decommissioning continues to be developed. Current activities include establishing the DCPP Decommissioning Engagement Panel, preparing a detailed cost estimate, and obtaining the necessary funds for decommissioning to a green field site.

4.8

DCPP appears to be appropriately managing Employee Retention Programs, taking into account the requirements of the Joint Proposal as modified by the CPUC. The DCISC should continue to monitor the effectiveness of the Employee Retention Programs and staffing plans to ensure that possible losses of personnel do not impact plant safety.

4.9

The regular meetings between DCISC Members and DCPP Officers
and Directors continue to be beneficial for both organizations.

4.10

DCPP has been performing Probabilistic Risk Assessment (PRA) for many years, and their PRA model is mature. The way the PRA team performs the Human Reliability Analysis (HRA) aspect of their PRA was reviewed. The DCISC team believes that the approaches being used generally follow state-of-practice methodologies, and that the PRA’s use of plant-specific HRA data, where those data are available, is appropriate.

5.0 Recommendations:

None

6.0 References

6.1


6.2


6.3


6.4


6.5


6.6
Ibid., Exhibit D.6, Section 3.10, “Joint Proposal and DCPP Decommissioning Status.”

6.7


6.8


6.9

28th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2017—June 30, 2018
Preface | Executive Summary
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28th Annual Report, Volume II, Exhibit D.9, Diablo Canyon Independent Safety Committee Report on Fact Finding Meeting at DCPP on April 17–18, 2018 by Peter Lam, Member, and R. Ferman Wardell, Consultant

1.0 Summary

The results of the April 17-18, 2018 fact-finding trip to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. 4kV System Review and Walkdown with System Engineer
2. Refueling Outage 2R20 Results
3. Leadership Engagement in the Performance Improvement Processes
4. On-line Maintenance
5. Reactivity Management
6. Boric Acid Corrosion Control
7. Meeting with NRC Senior Resident Inspector
8. Meeting with Jan Nimick, Senior Director Nuclear Services
9. Control Room Ventilation System
10. Quality Verification Assessment of Refueling Outage 2R20 Activities

2.0 Introduction

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if PG&E’s performance is appropriate and whether any areas revealed observations which are important enough to warrant further review, follow-up, or presentation at a Public Meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4—Conclusions highlights the conclusions of the Fact-finding Team based on items reported in Section 3—Discussion. These highlights also include the team’s suggested follow-up items for the DCISC, such as scheduling future fact-finding meetings on the topic, presentations at future public meetings, and
requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations lists specific recommendations to PG&E proposed by the Fact-finding Team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the Fact-finding Report, including its recommendations, is provided to PG&E. The Fact-finding Report will also appear in the DCISC Annual Report.

3.0 Discussion

3.1 4kV System Review and Walkdown with System Engineer

The DCISC Fact-finding Team (FFT) met with Issa Kaminiski, 4kV System Engineer, and Ryan West, Manager of Electrical and Instrumentation & Controls, for a review and walkdown of the DCPP 4kV Electrical System. The DCISC last reviewed this system in November 2015 (Reference 6.1), concluding the following:

DCPP has devoted considerable attention to the reliability of the 4kV Systems of both Units, and reasonable progress has been made, including a temporary modification that addresses an issue related to the system’s response to a potential undervoltage condition. DCPP plans to replace this with a permanent modification in 2019. DCISC should continue to monitor station progress with respect to DCPP’s final resolutions to potential undervoltage conditions at the station that could affect plant safety systems. In this regard DCISC should consider reviewing NEI’s white-paper report and the potential impact of degraded voltage on DCPP and should consider a subsequent Fact-finding visit or DCPP presentation on this topic at a Public Meeting no later than the first quarter of 2017.

Each Operating Unit at DCPP is equipped with a 4kV Electric Power System. The systems provide power for the operation and control of “vital” and some “non-vital” electric equipment during all modes of plant operation. Vital equipment is equipment that is necessary for the safe shut down and cooling of the reactor. Each 4kV vital system can access power from DCPP’s 500kV switchyard, the 230kV switchyard, the corresponding Main Generator, or onsite Emergency Diesel Generators (EDGs). During normal operation, the 4kV system in each Unit receives its electric power from the Main Generator through the Auxiliary Transformer. Upon loss of normal power to any of the 4kV buses in one Unit, the corresponding EDG will automatically start and the normal electric feeder breaker to that bus will open. The backup supply via the 230kV system will automatically align to supply power to the Bus. If the 230kV system is also unavailable, the 4kV bus will be aligned to the running EDG. The System Engineer reviewed the system design with the DCISC FFT using the system electrical single line diagram.
The 4kV System health was rated “White, needs improvement” due to the potential for a High Energy Line Break (HELB) steam intrusion into the Vital 4kV Switchgear Rooms, creating a 100% relative humidity atmosphere, which could exceed the ratings of the components within the Switchgear. A Prompt Operability Assessment was performed and testing of the 4kV Switchgear electrical components for acceptable operation at 100% relative humidity concluded that all safety-related components inside the Switchgear Room would have been operable. A bridging strategy was to close selected fire dampers as a compensatory action to eliminate a harsh Turbine Building HELB environment from entering the 4kV Switchgear Room. The permanent resolution is a design change to make this compensatory action permanent. The system health will improve to “Green” or “healthy” upon completion of the design change, expected to be completed by the end of June 2018. This appeared satisfactory to the DCISC FFT.

Mssrs. Kaminiski and West led Mr. Wardell on a walkdown of the major components of the Unit 2 4kV Electrical System, including the outdoor 230- and 500-kV lines from off-site and associated transformers, an Emergency Diesel Generator room, and system Switchgear Rooms. The systems and components appeared to be in good condition, and the plant areas were clean and orderly.

Conclusions:
The DCISC Fact-finding Team concluded that the DCPP 4kV Electrical Systems were well-designed, operable, in good (and improving) health, and physically in proper condition in the plant. The System Engineer appeared knowledgeable and pro-active about the system.

Recommendations:
None

3.2 Refueling Outage 2R20 Results
The DCISC FFT met with Matt Coward, DCPP Outage Manager, for a review of the results of the DCPP 2R20 Refueling Outage. The DCISC last reviewed outage (Outage 1R20) results at its February 2017 Public Meeting (Reference 6.2).

Outage 2R20 began on February 11, 2018 and ended on March 22, 2018. Significant work included the following:

- Reactor coolant pump 2-4 motor overhaul (rotor/stator)
- Reactor Control Cluster Assembly guide tube swaps
- Thimble tube replacements
- Residual Heat Removal (RHR) pump suction structural weld overlays
- Namco position switch modification
- 500kV output breaker 632 replacement
- 230kV switch 211-2 overhaul
- 480V vital bus F breaker replacements
- High Pressure (HP) Turbine rotor blade replacements
- Feedwater Pump 2-2 turbine overhaul
- Auxiliary Saltwater 1-1 Pump/motor replacement
- Intake traveling screen overhauls

DCPP considered the following activities to have gone well:

- Containment Integrated Leak Rate Test
- RHR Pump suction structural weld overlay
- HP Turbine blade replacement
- Line ownership of radiation dose
- Vendor performance (Westinghouse/Siemens)
- Outage Scope Review Team
- Use of Microsoft OneNote for Outage Control Center and Maintenance turnovers
- Fuel handling equipment reliability

There were the following significant emergent issues:

- Reactor Coolant Pump motor failed to trip
- Condenser salt water leak on the east condenser
- Reactor vessel stud hole damage
- Centrifugal Charging Pump 2-1 discharge line weld indication
- Main Generator/Stator Cooling Water gas leakage

The DCISC should follow up on these emergent issues at future fact-finding meetings.

DCPP’s overall outage performance is shown in the following table:

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious Injury or Fatality</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nuclear Safety Events</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Site Level Human Error Events</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Site Clock Resets</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Outage Duration (Days)</td>
<td>40</td>
<td>39</td>
</tr>
</tbody>
</table>
The DCPP 2R20 outage performance met or exceeded all goals.

Conclusions:

The DCISC Fact-finding Team concluded that DCPP performance in Refueling Outage 2R20 was excellent as it met or exceeded all goals.

Recommendations:

None

3.3 Leadership Engagement in the Performance Improvement Processes

The DCISC FFT met with Mark Frauenheim, Nuclear Performance Improvement Manager, and Anne Shatara, Nuclear Performance Improvement Supervisor, to review DCPP Leadership Engagement in the Performance Improvement (PI) Process. The DCISC last reviewed PI in November 2017 (Reference 6.3) and December 2017 (Reference 6.4), concluding the following:

DCPP’s Performance Improvement Department, along with its Performance Improvement Coordinators (PICOs) appears to be an effective asset for plant problem solving and continuous improvement.

The DCPP Performance Improvement Department effectively reviews information from the Corrective Action Program to identify adverse trends and initiate appropriate corrective actions. The DCISC should review the trending of plant data by the Engineering Department during a future Fact-finding Meeting.

DCPP expects “Management engagement in all aspects of performance improvement processes so that all levels of leadership properly implement PI processes to achieve continuous performance improvement and successful resolution of station performance gaps. Leaders will:

- Recognize when performance is below desired (find)
- Evaluate to understand why (analyze), and
- Take action to address (fix).”

DCPP shared with the DCISC FFT their document, “Our Path Forward 2017 – 2018, Leadership Engagement in PI Processes.” This document spells out top management expectations and action steps for the leadership team. The action
steps include the following:

- Senior Leadership Team (SLT) will review Corrective Action Program (CAP) activity (80-100 Notifications per day) in the daily e-mail for equipment, process, performance trends, proper ownership, and standards issues.
- SLT will attend the daily morning SLT meeting to discuss key issues in Notifications, including significance, owner awareness, immediate actions planned, extent of condition, and timeliness.
- SLT are aware of Root Cause Evaluations and Cause Evaluations, CAP actions in their departments, formal and informal self-assessments and benchmarks.
- SLT attend meetings of the Corrective Action Review Board (CARB)
- Regular communications to leaders reinforcing the above and outlining expectations
- PI procedure changes to accomplish the above
- Revise CARB agenda to ensure all PI Metrics are reviewed at a specified frequency.
- Develop and implement a PI “elevation and escalation process” based on industry benchmarking.
- Change name of CARB to capture all PI product reviews
- Provide additional focused cause evaluator training to leadership team

The DCISC FFT regarded DCPP’s initiatives to involve its leadership more in their PI Process as positive.

Conclusions:

DCPP plans for augmented leadership engagement in Performance Improvement (PI) processes (corrective actions, self-assessments, benchmarkings, operating experience, and cause evaluations appear appropriate. The expectation is that all levels of leadership will properly implement the PI processes to achieve continuous improvement and successful resolution of station performance gaps.

Recommendations:

None

3.4 On-Line Maintenance

The DCISC FFT met with Rasool Baradaran, Probabilistic Risk Assessment (PRA) Supervisor; Matthew Shepard, PRA Engineer; and Mike Davis, Work Week Manager, for an update on DCPP’s On-Line Maintenance (OLM) Program. The DCISC last reviewed (OLM) in April 2016 (Reference 6.5) when it concluded the following:
DCPP’s program for managing on-line risk continues to be sound and has been effective in maintaining this measure of risk at low levels. Because this indicator is one that provides an effective measure of how safely the plant is being maintained, the DCISC should continue to review this subject in DCPP’s monthly reports and include it in formal Fact-finding Visits at least every two years, or more frequently if dictated by declining performance.

The DCISC has been following OLM for a number of years as DCPP had replaced its computerized ORAM (Outage Risk Analysis - Maintenance) computer program, a semi-quantitative on-line risk assessment program, with Safety Monitor, a fully-quantitative computer program for on-line risk assessment. The phrase “fully quantitative” means that the program calculates numerical risk indices and uses them to rank the importance of issues being analyzed. Safety Monitor had been fully functional for over two years and is widely used in the plant. About 20 to 25 people develop information that is input into Safety Monitor, and an even larger number are users of the output. Components scheduled to be taken out of service are input into the program, along with the desired time period during which the work is intended to be performed. The main benefit of Safety Monitor is that it not only provides a quantitative analysis of risk (i.e. reactor core damage frequency) presented by taking specific equipment out of service, it also calculates the core damage frequency resulting from removing a number of different pieces of equipment at the same time. The computer program displays the aggregate risk presented by the postulated work plan. This calculated risk is also displayed in a color context of Green, Yellow, Orange, or Red, with Red being the greatest risk. Using this information, work planners are able to schedule equipment outages at times that will control risk to desired levels by keeping the individual and aggregate risks in the Green band.

DCPP has now replaced Safety Monitor with an improved risk evaluation tool, the Electric Power Research Institute (EPRI)-developed Phoenix Risk Model, which incorporates the updated DCPP PRA as well as the presence of new Reactor Coolant Pump Seals, which prevent reactor coolant leakage via the seals upon a loss of power/cooling event, significantly reducing the risk of core damage. To evaluate specific OLM risk Operations Planning performs Phoenix runs prior to taking equipment out-of-service for OLM. Work Control evaluates risk at T-9, T-6, T-3, etc. prior to work beginning. (“T” is the time in weeks prior to the subject activity.) During refueling outages, DCPP performs daily Phoenix runs to assure Defense-in-Depth of safety systems and to assure the Outage Safety Checklist requirements are met.

DCPP uses two procedures to determine Maintenance risk:

2. Interdepartmental Administrative Procedure AD7.ID14, “Assessment of
Both of these procedures are clearly active, “living” documents. Procedure AD7.DC6 is in its 25th revision, and Procedure AD7.ID14 is in its 16th revision as of this Fact-finding Visit.

DCPP’s use of this OLM process was expanded substantially in February 2012 with the formation of the DCPP Integrated Risk Review Team (IRRT). As prescribed in the above mentioned procedure, AD7.ID14, during plant operation this team is composed of personnel possessing expertise in their fields of specialty as follows: an Operations Senior Reactor Operator (SRO) and representatives from I&C Maintenance, Mechanical Maintenance, Electrical Maintenance, Radiation Protection, Chemistry and Environmental Services, Safety, Security, Engineering Services, Emergency Planning, and Work Planning. Normally, DCPP’s Work Week Manager or Outage Manager serves as chairperson. Similarly the Outage IRRTs are composed of an Operations SRO or foreman, and representatives from Outage Management, Radiation Protection, Safety, and the work group for the work being reviewed.

Procedure AD7.DC6, identified earlier, is the governing document for managing the risk of performing maintenance on a Unit that is operating on-line. This is governed by the NRC’s Maintenance Rule. This procedure provides guidance for managing plant trip risk, probabilistic risk, and safety function degradation risk.

A 12-week rolling work matrix, developed for DCPP’s pre-planned OLM for all the major Systems, Structures, and Components, is based on the Surveillance Test Procedures (STPs) performed in MODE 1, Power Operation. By knowing which equipment is to be taken out of service 12 weeks ahead of time, DCPP can determine the corresponding change in the risk of core damage. DCPP has rules on what levels of risk are acceptable during maintenance work windows. Risk is minimized by the following methods:

- Performing only those maintenance items on-line required to maintain the reliability of the System/Structure/Components (SSCs)
- Minimizing the cumulative unavailability of SSCs in DCPP’s PRA model by limiting the number of at-power maintenance outage windows (MOW) per cycle per train/component
- Minimizing the total number of SSCs out-of-service (OOS) at the same time.
- Minimizing the risk of initiating plant transients that could affect safety systems.
- Avoiding higher risk combinations of items OOS by using PRA insights.

Risk assessment includes both internal and external factors as follows:
Internal Risk Examples

- Fire
- Flooding
- High and medium energy pipe breaks

External Risk Examples

- Risks affecting off-site power
- Peak power demand
- Fires threatening power lines
- Severe storms
- Trip risks
- High ocean swells

Assessment of Maintenance Risk

Whereas the above OLM Risk Management is focused on nuclear safety for on-line maintenance, DCPP performs integrated risk management associated with all sensitive work activities for all modes of operation, including outages and for the following types of risk:

- Industrial Safety
- Nuclear Safety
- Radiological Safety
- Chemistry and Environmental Safety
- Regulatory Compliance
- Security

The risk management process uses the following phases:

1. Phase 1: Risk Classification
2. Phase 2: Risk Assessment
3. Phase 3: Risk Prevention and Mitigation
4. Phase 4: Implementation of Work
5. Learning and Adaptation

Processes are also included for the following types of work:

- Recurring Task Risk Assessment
Mr. Baradaran noted that the focus on risk continues to be evident at the worker level where personnel are showing more interest in knowing any risks to the plant that are posed by emerging work. This risk assessment process provides a tool for answering worker questions and enabling workers to better understand the impact of their work on plant operation.

**Conclusions:**

DCPP’s process for evaluating risk when taking equipment out-of-service during operation for on-line maintenance appeared satisfactory. The process was structured and controlled by procedure and employed good tools for evaluating risk.

**Recommendations:**

None

3.5 Reactivity Management

The DCISC FFT met with Ken Kargol, Operations Manager, and Brian Galvan, Reactor Engineer, for an update on DCPP Reactivity Management. The DCISC last reviewed Reactivity Management in May 2016 (Reference 6.6), concluding the following:

*Although brought down by an error identified in a Westinghouse document, Reactivity Management health measures for Unit 1 (Yellow) and Unit 2 (Green), are acceptable in the short term, with the knowledge they will improve in December 2016, when both units will be Green.*

Reactivity is defined in DCPP’s controlling Procedure OP1.ID3, “Reactivity Management Program” as “the fractional change in neutron population from one neutron generation cycle to the next, or the measure of departure from criticality.” In general, it is a measure of the potential for a nuclear core to increase or decrease in its chain reaction rate or power level. It is important to control reactivity in order to maintain safe control of the nuclear reactor itself.

Procedure OP1.ID3 defines the roles, responsibilities and actions associated with the control of reactivity to ensure safe and reliable operation. It provides the
guidance to ensure that all plant evolutions affecting reactivity will be controlled, safe, and conservative. The goal of the Reactivity Management Program is to prevent reactivity events. The procedure states:

_The Reactivity Management Program ensures conservative reactivity management by promoting a reactivity conscious culture when operating and maintaining the plant, and by providing reactivity management expectations and standards. The standards are derived from industry standards and reactivity management experience. The proper control of core reactivity and spent fuel has been a long-standing fundamental principle in maintaining nuclear plant safety and reliability._

The Operations Manager is responsible for plant reactivity management, including the direct control of reactivity, and for ensuring conservative actions with regard to nuclear fuel integrity during operations, fuel handling, and storage. He/she has the single-point accountability for operational decision-making associated with reactivity management and is responsible for the overall management and implementation of the Reactivity Management Program and the Reactivity Management Leadership Team (RMLT). The RMLT is a team of individuals representing Operations Services, Maintenance Services, Engineering Services, Learning Services, and the Corrective Action Program. The team reviews reactivity events and adverse trends to identify needed corrective actions and recommend additional training or qualification for groups that can affect reactivity.

RMLT activities include the following:


b. Review the following areas for reactivity events, adverse trends, and needed corrective actions or opportunities for Reactivity Management Program improvements:

   - Notifications and event trend records
   - Reactivity Management Program performance indicators
   - Plant and industry operating experience, self-assessment recommendations and benchmarking trip lessons learned
   - Maintenance schedules and corrective maintenance backlogs
   - Licensed operator initial and continuing training

c. Classify and categorize reactivity events.

d. Recommend additional training or qualification for groups that can affect reactivity to improve performance.

The DCISC FFT received and reviewed the minutes of the February 7, 2018 RMLT
quarterly meeting. The RMLT discussed the three Open Items (all procedure related), classified 15 RM notifications, reviewed RM Performance Indicators (shown in the chart below), discussed RM issues impacting the performance indicators, reviewed industry RM operating experience, and heard reports from Operations, Engineering, Maintenance, and Learning Services. The meeting and minutes appeared satisfactory to the DCISC FFT.

Reactor Operators (ROs) and Senior Reactor Operators (SROs) are responsible for fulfilling the requirements of the Reactivity Management Program, including (1) ensuring that expected responses to a reactivity change are identified and fully understood prior to initiating any action that affects reactivity, (2) closely monitoring appropriate indications for reactivity changes to verify the expected magnitude, direction, and effects, (3) remaining alert for situations that could affect reactivity, and initiating appropriate conservative corrective actions, (4) reducing reactor power or tripping the reactor without the need for concurrence of the unit Shift Foreman or reactivity SRO when the reactor operator deems that the action is immediately necessary to protect the reactor core, and (5) maintaining the reactor core parameters within established limits.

Reactor Engineering provides technical support for the RMP and also provides a Reactor Engineering representative to the RMLT. Reactor Engineering is responsible for providing reactivity management recommendations to Operations with emphasis on reactor safety, based on the most accurate core information available.

Reactivity manipulations for the operation of Control Rods, Reactor makeup control, and Main Turbine control are described and controlled by operating procedures. Other system operations, surveillance test procedures or maintenance activities that may affect reactivity are required to be preceded by an operating crew reactivity brief to ensure that the reactivity impact is understood and managed. Examples include starting a Reactor Coolant Pump, manual control of Steam Dump Valves, paralleling or stopping a Turbine Generator, Main and Auxiliary Feedwater Pump operational changes at power and core offload and reload. Reactor Engineering is also intimately involved with controlling reactivity whenever one of the reactors enters an outage and during each outage, and as the reactor emerges from an outage and ascends to power.

The Shift Foreman conducts reactivity briefs at the beginning of each operating shift, prior to planned plant evolutions, and following plant transients. Reactivity briefs include a review by the operator at the controls of expected control rod movement, Reactor Coolant System boron level dilutions and increases and turbine load changes anticipated to maintain or establish desired plant conditions. The reactivity brief at the beginning of each shift includes all control room licensed operators for the unit and a review of the Reactor Engineering Reactivity Briefing Sheet. Reactivity manipulations require oversight by an active SRO, normally the unit Shift Foreman. The operator at the controls must obtain SRO approval and
oversight for each reactivity manipulation during normal operation. Activities that might distract the operator at the controls are suspended during reactivity manipulations.

DCPP’s performance measures for Reactivity Management are shown below. They are based on 12-month rolling data. Unit 1 and Unit 2 are Green (Healthy). This is good performance.

![Reactivity Management Program (OPS-01)](image)

Reactivity Management Program (OPS-01)

**Conclusions:**

The DCISC Fact-finding Team concludes that the DCPP Reactivity Management Program is satisfactorily designed and implemented with tight controls and Green (good) performance measures.

**Recommendations:**

None

**3.6 Boric Acid Corrosion Control**

The DCISC FFT met with Dave Gonzales, In-Service Inspection (ISI) Supervisor, and Jim Hill, ISI Engineer and Boric Acid Corrosion Control (BACC) Program Owner, for an update on the DCPP Boric Acid Corrosion Control BACC Program. The DCISC last reviewed BACC in April 2016 (Reference 6.7), when it concluded the following:

*The individual who is the Boric Acid Corrosion Control Program Owner is highly experienced in the management of this program and has over 10 years of experience with this Program. DCPP actively participates within the industry with regard to this program. A comparison of the current Boric Acid Corrosion Control Program performance data and Program Health with similar information that was available at DCISC’s previous examination of this program in April 2014 indicates that DCPP’s level of current performance is comparable to what it was about two years ago, where it was acknowledged that more improvement was needed.*
Accordingly, it would be appropriate for DCPP to strengthen its efforts to reduce the number of boric acid leaks. DCISC’s next review of this program should occur in about the next two years.

DCPP, like other nuclear power plants, uses boric acid in the Reactor Coolant System for long-term, slow reactivity control along with the fast-acting control rods. Boron absorbs neutrons, and as the reactivity in the nuclear fuel drops due to burn up, the concentration of boron in the coolant is reduced. The use of boric acid makes the coolant more corrosive to metal components, and this potential for corrosion must be properly managed to avoid equipment damage. The DCPP BACCP is controlled by Procedure ER1.ID2, “Boric Acid Corrosion Control Program.” It is used in conjunction with the following procedures:

- AD4.ID2, “Plant Leakage Evaluation”
- AD7.ID11, “Fluid Leak Management Program”
- STP R-8A, “Reactor Coolant System Leakage Test”
- STP R-8C, “Containment Walkdown for Evidence of Boric Acid Leakage”
- ISI X-CRDM, “Reactor Vessel Top and Bottom Head Visual Inspection”
- NDE VT-2-1, “Visual Examination During Section XI System Pressure Test”

The DCPP In-Service Inspection (ISI) Group is responsible overall for the BACC Program. The Program Owner has great experience in and knowledge of this Program. His backup is in the process of becoming qualified in this discipline. Their responsibilities include ensuring that the following aspects of the Program are fulfilled:

- As the BACCP Owner, providing the “single point accountability” for the success of the program
- Identifying and reporting boric acid leaks in general
- Performing Containment walkdowns to identify and report boric acid leakage
- Monitoring leaks until corrective action is implemented
- Documenting as-found condition of all components affected by boric acid leaks
- Screening for the need to perform corrosion evaluation for identified leaks

The procedure provides instructions for documenting and evaluating boric acid leaks and any material damage. When leaks do develop they can be visually identified by the boric acid crystals coating the leak area. Leaks are classified as either Active or Inactive Boric Acid Leaks, depending on their characteristics. All leaks are included on the DCPP Boric Acid Leaker List. The procedure calls for a Boric Acid Review Team, which is made up of representatives from many station functions, to review new boric acid leaks and indications in order to resolve those
that can’t be easily corrected. Minor leaks may be corrected by tightening or retorquing fasteners, adjusting valve packing, repairing gaskets, or repacking leaking valves. Long-term corrective actions include upgrading valve packing materials and loading configurations, gasket replacement, protective coatings and cladding to impede boric acid attack, material changes to replace low carbon steel with corrosion-resistant materials, or other design modifications.

BACC Program status is primarily reflected by the significance and number of boric acid leaks. Such leaks are classified as follows, from DCPP’s April 1, 2018 report on Boric Acid Leak Maintenance:

- **LK2/Wet**: “Active” leak: Exhibits visual evidence of wetness (Wet) – requires a corrosion evaluation
- **LK3**: Dry, Discolored, or Excessive Leak – requires a corrosion evaluation

![Boric Acid Leak Maintenance](image)

A review of the most recent Boric Acid Corrosion Control Program Health Reports for Units 1 and 2 revealed the following, where the definitions of LK2 and LK3 are in the caption of the figure just above:

- Unit 1 LK3 (dry, discolored or excessive leaks) health was rated Yellow for the current month and previous two months
- Unit 1 LK2 (wet leaks) was rated White for the current month, down from Green the previous two months
- Unit 2 LK3 had improved to Green for the current month and previous month
- Unit 2 LK2 had degraded to White from Green the previous month

Unit 1 Wet leaks are scheduled for resolution in Refueling Outage 1R21, and dry leaks are scheduled to be resolved by June 1, 2018, which will return the rating
from Yellow to Green.

Unit 2 Wet leaks are scheduled to be corrected by August 31, 2018, which will return the rating to Green.

Conclusions:

DCPP Boric Acid Corrosion Control Program is being implemented satisfactorily. There are some visible wet and dry leaks, which are being addressed to bring their health back to Green (Good) by August 2018.

Recommendations:

None

3.7 Meet with the NRC Senior Resident Inspector

The DCISC FFT met with Chris Newport, NRC Senior Resident Inspector for an update. The DCISC last met with the Senior Resident Inspector in March 2018 (Reference 6.8), concluding the following:

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings.

The group discussed the following items:

1. Refueling Outage 2R20 – there were no issues identified
2. Boric Acid Corrosion Control Program – NRC’s inspection identified no issues
3. Residual Heat Removal weld overlay went well
4. Containment Integrated Leak Rate Test went well
5. Open Phase Power modifications have been installed but not connected until operational experience shows the modification is stable and reliable
6. National Fire Protection Association-805 modifications have been installed, and the NRC will perform their inspection.
7. DCPP has lost some licensed operators and has created some new classes to fill any gaps

Conclusions:

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and the DCISC should continue the meetings.

Recommendations:
None

3.8 DCISC Member Peter Lam Meeting with Jan Nimick, Senior Director Nuclear Services

DCISC Member Peter Lam met with Jan Nimick, Senior Director Nuclear Services, to discuss items from this fact-finding meeting and items of mutual interest.

Conclusions:

The meetings between the DCISC Fact-finding Teams and DCPP Plant management continue to be useful for both organizations.

Recommendations:

None

3.9 Control Room Ventilation System

The DCISC FFT met with Greg Porter, Control Room Ventilation System (CRVS) System Engineer, for an update of CRVS issues. The DCISC last reviewed the CRVS in July 2017 (Reference 6.9), when it concluded the following:

DCPP has successfully obtained NRC approval to use the Alternate Source Term in its Control Room Ventilation System and has completed its re-analysis of the “Control Room Envelope,” which assures that calculated post-accident radiation levels are within acceptable limits. Other changes, i.e., modifications and procedure changes are to be completed in 2017. The DCISC should follow up in early 2018.

The DCPP Control Room Ventilation System (CRVS) consists of the following three systems:

1. Control Room HVAC System (CRHVAC)
2. Control Room Pressurization System (CRPS)
3. Plant Process Computer (PPC) Room Air Conditioning System

The CRHVAC consists of two independent trains for each unit. The CRPS is composed of one train for each unit. These two systems are interconnected mechanically and operationally and are intended to be operational during all plant operating modes. The PPC Room Air Conditioning System serves only to cool the Plant Process Computer room.

The CRHVAC and CRPS operate in one of the following modes:

<table>
<thead>
<tr>
<th>Mode</th>
<th>CRVS “normal” mode (CRNV)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>CRVS smoke removal mode to remove smoke in the Control Room</td>
</tr>
<tr>
<td>3</td>
<td>CRVS 100% air recirculation with 27% passing through high efficiency particulate air (HEPA) filtration, and manual zone isolation is used in the event of a toxic chemical spill outside the Control Room when personnel sense a problematic odor or smell.</td>
</tr>
<tr>
<td>4</td>
<td>CRVS pressurization mode (CRPS) to counteract the detected presence of radiation at the Control Room air intake or a Containment Isolation signal. The system can detect radiation at various air intake locations and select the unaffected intake.</td>
</tr>
</tbody>
</table>

The CRVS is designed to meet the following criteria/guides:

- 10CFR50 Appendix A, General Design Criterion 19, “Control Room” radiation protection for normal and accident conditions
- NRC Standard Review Plan 6.4, “Control Room Habitability System”
- NRC Standard Review Plan 9.4.1, “Control Room Ventilation System”

The initial DCISC review was prompted by its receipt from the station of a January 24, 2013 PG&E Licensee Event Report (LER) to the NRC discussing a long term inadequacy in the ability of the Control Room Ventilation Systems (CRVS) to control air in-leakage into the Control Room in postulated post-accident situations when the atmosphere could contain radionuclides. Although other factors through the years affected the integrity of the CRVS, the consistent long-term issue that was not recognized until recently was that in-leakage to the Control Room Envelope could not be maintained below allowable limits in situations where one of the ventilation units is in pressurization mode and the other is in recirculation mode and a ventilation fan fails. In such a configuration, the reverse flow in one of the ducts allows unfiltered air to bypass the filters and can result in a level of airborne radioactivity in the Control Room that exceeds regulatory limits.

The remedy was to install backdraft dampers in two of the ventilation ducts. This design change was implemented in October 2012. As stated in the LER: “PG&E concluded that because the in-leakage was performed with both trains operating, the SR (surveillance requirement) had not been performed as required, nor had it
ever been performed as required.” In December 2012, after modifying the Control
Room Ventilation System, PG&E satisfactorily completed in-leakage testing on the
CRVS using a single CRVS train, thereby successfully demonstrating acceptable in-
leakage in the most limiting configuration with a single CRVS train operating. The
system was declared operable on December 20, 2012.

The “long term” aspect of this design issue was documented during an NRC
Integrated Inspection during the first quarter of 2012 when the NRC noted that
PG&E had incorrectly confirmed in April 2005 that the required control room
habitability testing had demonstrated that the main control room did not have any
unfiltered in-leakage when the test was performed in the most limiting
configuration for operator dose. This Integrated Inspection Report also stated that
the NRC had identified in September 2011 that the control room in-leakage test
results had been greater than both the values reported to the NRC in response to
the 2003 NRC Generic Letter 2003-01, “Control Room Habitability,” and the values
assumed in the design basis radiological analyses. Also, NRC inspectors had
identified that PG&E had not performed the trace gas in-leakage testing in the
most limiting configuration for operator dose consistent with Regulatory Guide
1.197, “Demonstrating Control Room Envelope Integrity at Nuclear Power
Reactors.” In response to these notifications, PG&E took the steps necessary to
resolve this issue.

DCPP has been working the following two remaining issues:

1. The Control Room Air Conditioning System needed upgrading due to a long
history of reliability issues due to design, age and corrosion. Design of the
new system has been funded and is in progress. Unit 1 design was completed
in 2016, and Unit 2 design is expected in 2018.

2. DCPP developed a new CRE (Control Room Envelope) radiation dose analysis
using the “Alternate Source Term” to restore dose margins. The analysis,
submitted to the NRC in June 2015 along with a License Amendment Request
(LAR), will make unnecessary any major physical changes to the CRVS. NRC
provided approval in mid-2017, and this has become the new licensing basis.
Part of this effort was to add a shielding wall to the Control Room Briefing
Room. Additionally, radiation monitor set points were changed for earlier
CRVS switchover to pressurization mode.

3. Planned modifications include the following:

   a. Upgrade exhaust ducts to Class 1
   b. Install HEPA (high efficiency, particulate, absolute) filter in
      Technical Support Center vent
   c. Move a Unit 2 flow switch to address an equipment qualification
      issue

DCPP performed its most recent tracer test of the CRE in January 2016. This test
confirmed the assumed CRVS air in-leakage rates.

With the AST analysis complete DCPP also completed its CRVS modifications, setpoint changes, and procedure (Operations, Maintenance, Chemistry, Emergency Preparedness, Engineering, and Learning Services). This resolves all of the outstanding issues with the CRVS.

**DCPP has completed all actions to resolve the long-term issues with its Control Room Ventilation System (CRVS).** The DCISC Fact-finding Team recommends that the DCISC consider the issues closed and remove the CRVS as a special issue from the Open Items List but retain it on the list of systems regularly reviewed by the DCISC.

**Recommendations:**

None

**3.10 Quality Verification Assessment of Outage 2R20 Activities**

The DCISC FFT met with Ray Robins, Audit and Assessment Manager, and Brian Sizemore, Shift Foreman on Rotation for Outages, to review the Quality Verification (QV) Assessment of 2R20 Outage Activities. The DCISC last reviewed outage assessments in January 2018 (Reference 6.10), when it concluded the following:

*DCPP Quality Verification issued a Finding on the Seismic Induced System Interaction Program (SISIP) that inconsistent understanding of the SISIP procedure resulted in storage of transient equipment that was not in accordance with site requirements and also issued a Recommendation that procedural requirements be clarified. This was performed with a procedure revision. This appeared satisfactory to the DCISC Fact-finding Team.*

The DCISC FFT received and reviewed the assessment report. The assessment included activities of Operations, Maintenance, Engineering, Work Management, Radiation Protection, Security, Fire Protection, Safety, and supplemental personnel. The following significant problems were identified as follows:

- The DCPP Confined Space Program was not rigorously followed. This issue was escalated to management due to problems continuing from Outage 1R20. Ownership of the Confined Space Program was transferred to Radiation Protection.
- Challenges with ensuring adequate work instructions being available and utilized.
- Operators not taking appropriate actions to verify equipment configurations or plant conditions prior to completing activities or crediting equipment to
support plant operations

The following good outcomes were identified:

- All of the station goals set before the outage and communicated in each daily brief were met.
- After a high number of deficiencies relative to transient combustibles were identified early in the outage by QV to leadership, performance improved significantly.

The QV assessment of Refueling Outage 2R20 was thorough and comprehensive.

Conclusions:

DCPP Quality Verification’s assessment of Refueling Outage 2R20 was thorough and comprehensive. Several issues were identified, including the escalation of the Confined Space Program implementation due to continuing problems from Outage 1R20.

Recommendations:

None

4.0 Conclusions

4.1

The DCISC Fact-finding Team concluded that the DCPP 4kV Electrical Systems were well-designed, operable, in good (and improving) health, and physically in proper condition in the plant. The System Engineer appeared knowledgeable and pro-active about the system.

4.2

The DCISC Fact-finding Team concluded that DCPP performance in Refueling Outage 2R20 was excellent as it met or exceeded all goals.

4.3

DCPP plans for augmented leadership engagement in Performance Improvement (PI) processes (corrective actions, self-assessments, benchmarkings, operating experience, and cause evaluations appear appropriate. The expectation is that all levels of leadership will properly implement the PI processes to achieve continuous improvement and successful resolution of station performance gaps.

4.4

DCPP’s process for evaluating risk when taking equipment out-of-service during operation for on-line maintenance appeared
satisfactory. The process was structured and controlled by procedure and employed good tools for evaluating risk.

4.5

The DCISC Fact-finding Team concludes that the DCPP Reactivity Management Program is designed and implemented satisfactorily with tight controls and Green (good) performance measures.

4.6

DCPP Boric Acid Corrosion Control Program is being implemented satisfactorily. There are some visible wet and dry leaks, which are being addressed to bring their health back to Green (Good) by August 2018.

4.7

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and the DCISC should continue the meetings.

4.8

The meetings between the DCISC Fact-finding Teams and DCPP Plant management continue to be useful for both organizations.

4.9

DCPP has completed all actions to resolve the long-term issues with its Control Room Ventilation System (CRVS). The DCISC Fact-finding Team recommends that the DCISC consider the issues closed and remove the CRVS as a special issue from the Open Items List but retain it on the list of systems regularly reviewed by the DCISC.

4.10

DCPP Quality Verification’s assessment of Refueling Outage 2R20 was thorough and comprehensive. Several issues were identified, including the escalation of the Confined Space Program implementation due to continuing problems from Outage 1R20.

5.0 Recommendations:

None

6.0 References

6.1

6.2

6.3

6.4
Ibid., Exhibit D.6, Section 3.10 “Management of Data in the Performance Improvement Process.”

6.5

6.6
Ibid., Exhibit D.11, Section 3.11, “Reactivity Management Update.”

6.7
Ibid., Exhibit D.10, Section 3.9, “Boric Acid Corrosion Control Program.”

6.8

6.9
Ibid., Exhibit D.1, Section 3.5, “Control Room Ventilation System.”

6.10
Ibid., Exhibit D.7, Section 3.4, “Quality Verification Assessment of Outage 1R20 Seismically Induced System Interactions.”
1.0 Summary

The results of the May 2–3, 2018 fact-finding trip to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Meet with NRC Resident Inspector
2. Workplace Seismic Safety
3. Equipment Data Collection, Trending and Retention
4. System Engineering Programs
5. Observe Corrective Action Review Board Meeting
6. Commercial Grade Dedication Program
7. Cybersecurity Program
8. Spent Fuel Pool Systems
9. Meet with DCPP Director
10. Large Transformers

2.0 Introduction

This fact-finding trip to the DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if PG&E’s performance is appropriate and whether any areas revealed observations which are important enough to warrant further review, follow-up, or presentation at a Public Meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4—Conclusions highlights the conclusions of the Fact-finding Team based on items reported in Section 3—Discussion. These highlights also include the team’s suggested follow-up items for the DCISC, such as scheduling future fact-finding meetings on the topic, presentations at future public meetings, and
requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5—Recommendations lists specific recommendations to PG&E proposed by the Fact-finding Team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the Fact-finding Report, including its recommendations, is provided to PG&E. The Fact-finding Report will also appear in the DCISC Annual Report.

3.0 Discussion

3.1 Meet with NRC Resident Inspector

The DCISC Fact-finding Team met with John Renyoso, NRC Resident Inspector, for an update. The DCISC last met with the NRC in April 2018 (Reference 6.1), when it concluded the following:

*The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and the DCISC should continue the meetings.*

The participants discussed the following topics:

1. Results of the Recent NRC Problem Identification and Resolution Inspection
2. Geomagnetic Disturbances
3. Resident Inspector Objectivity Visits and Rotation Policies

Conclusions:

*The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings.*

Recommendations:

None

3.2 Workplace Seismic Safety

The DCISC Fact-finding Team met with Tom Baldwin, Nuclear Business Operations Chief, for an update on DCPP Workplace Seismic Safety Programs. The DCISC last reviewed Workplace Seismic Safety its December 2015 Fact-finding Meeting (Reference 6.2), when it concluded the following:

*DCPP has satisfactorily completed almost all of its seismic workplace safety improvements and has an on-going process to assure new additions and modifications are addressed. While DCISC Fact-finding*
teams should remain alert to identify work-space seismic safety issues, the DCISC Fact-finding Team believes that the DCISC can now consider this issue closed.

Mr. Baldwin briefed the Fact-finding Team on DCPP’s latest efforts to protect personnel from injury and ensure egress routes are not blocked from office furniture impacted by an earthquake. Furniture contained in most office areas was not controlled by formal seismic safety programs that cover equipment located within areas of the power plant that house safety-related equipment. In such areas not covered by the formal seismic safety program, DCPP followed a PG&E document entitled “Standards for Bracing Office Furniture, Cabinets, and Storage Racks, Revision 0,” a copy of which Mr. Baldwin provided to the Fact-finding Team. The document was intended to ensure that DCPP purchased furniture that would not be a hazard to personnel during an earthquake, but it did not require that furniture be designed specifically to withstand seismic events. A review of the document found that it contained standards that required:

- Bracing for storage cabinets over five feet high, can be easily tipped, contained unrestrained drawers, or with a high center of gravity.
- Restraints for any storage cabinets or racks over five feet high mounted on wheels.
- Restraints to prevent shelf contents from falling on open bookshelves greater than four feet high.
- Any bracing installed to be connected to wall studs or other structural elements.
- No storage of items on top of cabinets greater than five feet high.

Mr. Baldwin stated that the standard had been followed during the procurement of furniture used during recent office remodeling and refurbishment activities. The Fact-finding Team then toured office areas on the fifth and sixth floors of the Administration Building with Mr. Baldwin. The Team found that most tall cabinets had been properly braced or were not a hazard due to their location. However, the Fact-finding Team also found a significant number of tall cabinets that were not properly braced and could fall over and injure any employees nearby during a seismic event. Two specific deficiencies identified included unrestrained hutches recently installed in guest offices and a large open bookcase located in a copier room as shown below.
Later during the Fact-finding Meeting, the Fact-finding Team toured the Instrumentation and Controls (I&C) Shop located in an administrative area of the power block. The Team found additional examples of tall cabinets that were not restrained and could possibly fall over and injure personnel or block access pathways during a seismic event as shown below:
Unrestrained and open bookshelf in I&C Shop with material stored on top

Rows of unrestrained cabinets in I&C Shop

Mr. Baldwin agreed that the areas identified in the Administration Building did not appear to be properly braced in accordance with DCPP Standards. Accordingly, he prepared and submitted a Notification titled, “Office Seismic Bracing Gaps,” SAPN Number 50978378.

Conclusions:

DCPP has failed to be fully effective in maintaining its seismic workplace safety improvements in that the DCISC Fact-finding Team identified several examples where new furniture had not been restrained properly. Corrective actions have been initiated by DCPP, and the DCISC should review the effectiveness of those corrective actions at a future Fact-finding Meeting.

Recommendations:

None

3.3 Equipment Data Collection, Trending and Retention
The DCISC Fact-finding Team met with Lou Fusco, Manager, Mechanical Systems Engineering, to discuss the uses of equipment data at DCPP. This was a follow-up review resulting from a discussion regarding management of data in the Performance Improvement Program during a December 2017 Fact-finding Meeting (Reference 6.3), when the DCISC concluded the following and made the following recommendation:

**Conclusion:**

The DCPP Performance Improvement Department effectively reviews information from the Corrective Action Program to identify adverse trends and initiate appropriate corrective actions. The DCISC should review the trending of plant data by the Engineering Department during a future Fact-finding Meeting.

**Recommendation:**

DCPP should review policies for retention times for instrument data related to equipment performance to assure data is available for analysis following equipment performance problems.

**Basis for Recommendation:**

In some cases, the current retention of instrument data may be too short, as in the case of the primary coolant pump vibration data collected when a misaligned bearing was being damaged, where the data had been deleted by the time the problem had been discovered and a root cause evaluation was conducted. Longer retention times would ensure data is available for later event analysis as well as additional trending.

Mr. Fusco briefed the Fact-finding Team that most process data from plant instrumentation was collected and stored by the Plant Process Computer (PPC). The PPC archived data regularly and large amounts of historical data were available for review and analysis on an as-needed basis. He provided the team copies of graphs created from Feedwater Pump Turbine instrumentation that used data recorded by the PPC and trended by engineers to troubleshoot intermittent problems with the turbine. Mr. Fusco noted that nearly all trending and analysis was performed manually. Additionally, he reported that the detailed gathering and analysis of PPC data required the use of a stand-alone analysis software package, called eDNA, to build and run reports. That software was not generally available on all network computers but rather required engineers to travel to and use specific workstations available in the Administration Building.

Regarding advanced or automated monitoring of PPC data, Mr. Fusco stated that there were several Efficiency Bulletins provided by the Nuclear Energy Institute that discussed the use of additional equipment monitoring tools as a basis for optimizing maintenance planning. DCPP had not yet initiated any specific capital projects as a result of those initiatives, but was in the process of reviewing the
applicable Efficiency Bulletins for possible recommendations. One area that appeared to be a possible target for a capital improvement would be the gathering and use of automated monitoring data obtained on continuously running non-safety-related equipment. In that case, additional monitoring could be relatively easy to install, and it was possible that the monitoring could allow a reduction in the number of preventive maintenance activities for such equipment. The Fact-finding Team noted that adopting such advanced monitoring tools would likely be of interest to most engineers and that it could boost morale for engineers to be able to implement and use such state of the art monitoring tools on a regular basis.

During the previous Fact-finding Meeting in December 2017, the DCISC learned that the capability of the currently installed Reactor Coolant Pump (RCP) Vibration Monitoring systems to retain historical data for later analysis was extremely limited. Mr. Fusco mentioned that DCPP was currently planning to replace the RCP Vibration Monitoring system with a more capable system. Later in the meeting, the Fact-finding Team met with Mr. George d’Entremont, Senior Advising Engineer, to obtain more information regarding the replacement system. The Fact-finding Team learned that a new system based on the “System 1” technology from Bentley-Nevada would be installed on the RCPs in three stages starting in the summer of 2018. The new system would continue its primary, hard-wired function to provide an alarm in the Control Room and would also have the ability to store vibration data virtually indefinitely. The system would save the mathematically complex vibration data both in vector and dynamic format. Reports in the form of vector and dynamic data plots would be periodically collected. When asked if the new system would provide an interface with the data collected and stored in the PPC, Mr. d’Entremont replied that an interface was a possible option on the system, but the interface could be difficult to implement due to limitations of data diodes (required for cybersecurity protection) in transmitting the large amounts of information contained in the vibration data.

Conclusions:

DCPP routinely collects data from plant equipment, and such data can be manually collected and analyzed on an as needed basis. Possible future uses of advanced or automated equipment data monitoring systems are being reviewed, but no plans currently exist for the installation of such systems. The Fact-finding Team noted that adopting such advanced monitoring systems would likely be of interest to most engineers to be able to use such state of the art monitoring systems on a regular basis. The DCISC should follow DCPP plans for implementing and using state-of-the-art plant health monitoring technologies closely.

Recommendations:

None
3.4 System Engineering Programs

The DCISC Fact-finding Team met with Lou Fusco, Manager, Mechanical Systems Engineering, to discuss the status of System Engineering Programs. The DCISC was last reviewed System Engineering at its March 2015 Fact-finding Meeting (Reference 6.4), when the DCISC concluded the following:

**DCPP’s System Engineering Program continues to be active and expanding. The recently added focus on “Top Ten” issues, in conjunction with the System Health Reports, should enable station management to more effectively prioritize and track actions to improve the health of plant systems. The DCISC should consider reviewing the station’s effectiveness in employing the “Top Ten” issues list after the process is given an opportunity to mature during the remainder of 2015. At that same time the DCISC should consider examining DCPP’s effectiveness in reducing the number of open Engineering Notifications. Health of the Emergency Diesel Generators (EDGs) remains a prolonged issue. It is noted that the DCISC has appropriately scheduled a review of this important equipment in the April 2015 Fact-finding Visit.**

Mr. Fusco first reviewed the status of component programs managed by the System Engineering Department and provided copies of the Program Health Reports with the current overall status for each of the following programs (White = Needs Improvement; Green = Healthy):

<table>
<thead>
<tr>
<th>Program</th>
<th>Overall Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor-operated Valves (MOVs)</td>
<td>White</td>
</tr>
<tr>
<td>Air-operated Valves (AOVs)</td>
<td>Green</td>
</tr>
<tr>
<td>In-service Testing (IST)</td>
<td>White</td>
</tr>
<tr>
<td>Fire Protection</td>
<td>White</td>
</tr>
</tbody>
</table>

Regarding the ‘White’ status of the MOV Program, it was rated as needing improvement primarily due to uncertainty surrounding required future actions that may be required in response to industry issues with Anchor Darling double disc gate valve wedge pin failures. Although DCPP’s population of the subject valves was considered not to be susceptible to the industry issue based on engineering analyses, future NRC guidance could result in the need for additional actions. Additionally, there were only two engineers with the qualification necessary to perform MOV diagnostic inspections with two more currently working to obtain the qualification. Lastly, recent changes in MOV calculation methodologies found that 16 MOVs had design margins for internal forces of less than 10%.

The IST Program was rated as ‘White’ due primarily to pending work to implement changes made necessary by the adoption of the Alternate Source Term license amendment at DCPP. Also, several minor discrepancies with pump testing data...
and valve stroke times were driving Corrective Actions that should be implemented during upcoming outages.

Regarding the Fire Protection Program, the ‘White’ rating was driven by the fact that the Program owner backup position was unfilled and multiple Fire Protection procedures were still being revised in support of implementation of the National Fire Protection Association (NFPA) 805 Program at DCPP. Mr. Fusco noted that implementation of the NFPA 805 Program has not, as yet, made management of the Fire Protection Program any easier at DCPP.

The Fact-finding Team inquired as to the general status of the System Engineering Department. Mr. Fusco reported that he was pleased that a recent evaluation by an external organization did not identify any concerns within the Department. Separately, the Department was working to improve the proactiveness of System Engineers, improve their adherence to standards, and increase the frequency at which System Engineers challenge or question the technical consensus on equipment issues. During 2017, the Mechanical Engineering Group lost 11 of 34 engineers to retirement, transfers to other departments, or other reasons. The number of Fire Protection engineers in the Department had been particularly hard hit. He also noted that the Department was being challenged by a high rate of turnover with engineers. In response to the losses, the Department was aggressively hiring new engineers and was generally being successful in doing so.

Conclusions:

DCPP’s equipment programs are being managed well by the System Engineering Department. The recent turnover of System Engineers has been high, and the DCISC should follow up on this issue at a future Fact-finding Meeting.

Recommendations:

None

3.5 Observe Corrective Action Review Board Meeting

The Fact-finding Team attended a Corrective Action Review Board (CARB) meeting to observe the conduct of the meeting. Paula Gerfen, Station Director, facilitated the meeting, with Jan Nimick, Senior Director Nuclear Services; Adam Peck, Operations Director; Susan Westcott, Learning Services Director; and Pat Nugent, Engineering Director, as the other voting members attending the meeting. The DCISC last attended a CARB meeting at its December 2017 Fact-finding Meeting (Reference 6.5), when the DCISC concluded the following:

The Fact-finding Team’s observation of a Corrective Action Review Board (CARB) meeting was hindered by the fact that a quorum was not present for the meeting. A Corrective Action Program Notification was submitted...
for the lack of a quorum, and those present at the meeting made a productive use of the time. The DCISC should attempt again to observe a CARB meeting during a future visit.

The CARB is governed by DCPP Procedure OM4.ID15, “Corrective Action Review Boards” and its purpose is to provide a significant forum for station personnel to demonstrate commitment to Corrective Action Program (CAP) excellence. The CARB fulfills a need for senior management oversight of the CAP and this oversight function includes:

- Reviewing Root Cause Evaluations (RCEs) for accuracy, completeness and alignment of the problem, causes and corrective actions.
- Approving extensions to the due dates for Corrective Actions to Prevent Recurrence.
- Approving effectiveness evaluations for CAP documents.
- Periodically reviewing CAP metrics to ensure the CAP is meeting management expectations.
- Reviewing and disposition requests for Cause Evaluation downgrades.
- Reviewing notifications screened by the Notification Review Team

The membership of the CARB consists of regular and alternate members designated in writing by the Station Director. CARB meetings are held as necessary, typically on a weekly basis.

The agenda for this meeting included the following:

- Safety Assignments
- Facilitative Leadership Minute
- Review Desired Outcomes
- Verify Quorum
- Review and Approve Minutes from Previous Meeting
- Review of Action Items
- Review of Overdue Notifications
- Review of CARB Products
- Review Condition Reports
- Additional Reviews as Needed
- Actions and Meeting Evaluation

The meeting was conducted with efficiency, and the agenda was covered as scheduled. A strong emphasis was placed on plant safety and reliability throughout
the discussion. The agenda items focused on during the meeting were appropriate for ensuring effectiveness of the Corrective Action Program. Two major items on the agenda were ‘bringback’ items, meaning items that had been previously discussed and were being brought back for additional discussion and approval. The first ‘bringback’ item was a review of Corrective Actions being taken to upgrade the plant announcement system to ensure that it met all regulatory commitments. The second ‘bringback’ item was a review of procedure revisions made in response to an incident that occurred while diving operations were being performed at the DCPP intake structure. For both items, the discussion was appropriately centered around ensuring that the Corrective Actions were appropriate and were being properly implemented in a timely manner.

The CARB also spent a significant amount of time reviewing Condition Reports (Notifications) processed since the last meeting to ensure that the classification and initial actions were appropriate. This process was an important element of the Corrective Action process to ensure that plant management was familiar with and approved actions taken by the Notification Review Team during daily Condition Report reviews. It was noteworthy during this review that the members had all reviewed the items in advance and were prepared to make the best use of the time in the meeting. Additionally, the CARB reviewed the status of the 20 oldest corrective action assignments to ensure that the actions were going to be completed by the assigned due dates along with trends for the overall backlog of open actions being tracked in the Corrective Action system.

Conclusions:

The May 2, 2018, DCPP Corrective Action Review Board meeting was performed efficiently and effectively. It was evident that members were prepared, facilitated open and effective discussion, and made clear decisions and action assignments.

Recommendations:

None

3.6 Commercial Grade Dedication Program

The DCISC Fact-finding Team met with Jeff Kaar, Supervisor, Supplier Quality, to discuss the DCPP Commercial Grade Dedication Program. The DCISC last reviewed the Commercial Grade Dedication Program during its September 2008 Fact-finding Meeting (Reference 6.6), when it concluded the following:

*The DCPP Commercial Item Dedication (or Replacement Parts Evaluation) Process appeared sound with thorough and well-documented evaluations. A DCPP Quality Verification audit found the program satisfactory.*

In general, Commercial-Grade Dedication (CGD) is a process by which a commercial-grade item is designated for use as a basic component in a safety-related system. This acceptance process is authorized by 10 Code of Federal Regulations (CFR) Part 21, and is undertaken to provide reasonable assurance that a commercial grade item to be used as a replacement part would perform its intended safety function. In this respect, a commercial grade item can be deemed equivalent to an item designed and manufactured under a 10 CFR Part 50, Appendix B, Quality Assurance (QA) program. This assurance is achieved by identifying the critical characteristics of the item and verifying their acceptability by inspections, tests, or analyses by the purchaser or a third-party dedicating entity.

Mr. Kaar explained that most replacement parts for nuclear safety-related equipment are purchased through vendors qualified to produce nuclear safety-related components through a vendor QA Program based on 10 CFR 50, Appendix B. To facilitate the process of establishing and maintaining QA Programs for vendors, the U.S. utility industry created the Nuclear Utility Procurement Issues Corporation (NUPIC). The NUPIC establishes a common process for vendor QA Program certifications and coordinates audits for vendors, typically on a triennial basis. The CGD program comes to bear if a repair part is needed for a nuclear safety-related component and no vendor with a certified QA Program is available. Such situations occur most often when the original vendor which supplied the part no longer has a certified QA Program or is no longer in business. The CGD program is not used to save costs as it is typically more cost-effective to purchase components from certified vendors. In all cases, once a part is qualified for use in nuclear safety-related equipment, 10 CFR 21 requires that complete traceability be maintained, including tracking of when and where the part was produced or dedicated, how the part was purchased, where the part was stored, and where the part may be installed during maintenance activities. The traceability process is critical to ensure any failures that occur can be properly investigated with regards to evaluating the possible risks to other equipment where identical parts may be in use.

Mr. Kaar then explained that DCPP’s CGD process is controlled by Procedure CF3.ID13, “Replacement Part Evaluation and CITE (Commodity Items Technical Evaluations),” and provided copies of the procedure for review by the Fact-finding Team. The procedure is based on the process described in 10 CFR 21, and delineates the responsibilities, process and documentation for Replacement Part Evaluations (RPEs). Individuals preparing or independently verifying RPEs must be qualified to the appropriate standards. Typically, these individuals are in the applicable engineering group. The basic steps of the process are:

1. The engineer preparing the RPE evaluates what is the nuclear safety-related function of the component. To do so, the engineer gathers all available design documentation such as system descriptions or design criteria memorandum. Most of these documents are now available as a part of the information.
gathered and placed in a document repository created during the recently-completed Licensing Basis Verification Project.

2. The engineer determines what features about the component are important to achieve the nuclear safety-related function.

3. The engineer identifies critical characteristics of the features needed to accomplish the safety-related function and identifies the tests that should be performed on the component and the acceptance criteria needed to demonstrate that the component can perform its function in accordance with the design basis. All of these items are documented in the RPE.

4. Testing based on the approved RPE is performed on components, and if successful, the components are placed into the repair parts inventory as available for safety-related use.

The Fact-finding Team inquired as to what challenges were present within the procurement process today. Mr. Kaar replied that when trying to purchase a part, procurement staff frequently finds that a part is obsolete or unavailable. To address these situations, DCPP has formed an Obsolescence Group, whose function is to do the research and evaluations necessary to find alternative sources for parts.

The Fact-finding Team toured a small testing laboratory used for CGD testing in the Santa Fe Road Warehouse. The laboratory contained instruments used for checking such things as material hardness, types of metals (Nitron Alloys analyzer), and types of polymers (infrared photospectrometer). Testing using each instrument was performed in accordance with a procedure approved for the use of that particular instrument, copies of which Mr. Kaar provided to the Fact-finding Team. The Fact-finding Team also noted how material is tagged and tracked in the warehouse and observed that the warehouse appeared well organized and clean.

Material Hardness Tester inside testing laboratory in Santa Fe Road Warehouse
Conclusions:
The DCPP Commercial Grade Dedication (or Replacement Parts Evaluation) Process appeared sound. The Santa Fe Road Warehouse and testing laboratory appeared to be clean and well maintained.

Recommendations:
None

3.7 Cybersecurity Program

The DCISC Fact-finding Team met with Jordan Tyman, Manager of Risk Management and Cybersecurity, for an update on the DCPP Cybersecurity Program. The DCISC last reviewed the Cybersecurity Program during its December 2015 Fact-finding Meeting (Reference 6.7), when it concluded the following:

DCPP is proceeding satisfactorily according to schedule with its implementation of NRC’s Cybersecurity Rule. Completion is set for year-end 2017.

Mr. Tyman reported that DCPP completed its implementation of the full Cybersecurity Program prior to the due date of December 31, 2017, as required by NRC regulations. The Cybersecurity Project was currently in the closeout phase, having taken approximately seven years and $50 million to achieve full implementation. Project staffing was currently at about 20 people, which was down from a peak of 47 people in 2016 and moving towards a final permanent staffing level of five full-time personnel. During program implementation, over 40 existing plant procedures were modified, and 32 new procedures were developed. The overall program and its roles of people and procedures are managed in accordance
with the DCPP Cybersecurity Program Document, copies of which were provided to the Fact-finding Team.

An NRC pilot inspection was completed in May of 2017, with no significant issues, and a full NRC inspection for the Cybersecurity Program was scheduled for March 2019. DCPP’s Cybersecurity Plan was designed to implement guidelines provided by the Nuclear Energy Institute, via documents NEI 08-09 and NEI 13-10, which were endorsed by the NRC as an acceptable approach to implementing a program to meet the requirements of 10 CFR 73.54, “Protection of Digital Computer and Communication Systems and Networks.” In addition to closeout of the overall project, DCPP was also continuing to work on incorporating some of the requirements of later revisions to the NEI guidelines. DCPP had been heavily engaged with the NRC and industry groups during implementation and planned to continue to stay engaged with those groups as future revisions were considered to the guidelines.

Mr. Tyman explained that the core element of the Cybersecurity Program was identifying and implementing protection for all of the Critical Digital Assets (CDAs) at DCPP. CDAs were digital computer and communications systems associated with safety-related and important-to-safety functions, security functions, emergency preparedness functions, and support systems which if compromised could adversely impact any of those functions. DCPP identified approximately 4,000 CDAs across 66 critical systems, which reflects a higher number of digital systems than typical for commercial nuclear power plants. Slightly less than half of the 4,000 were in security-related systems, and the remainder were in plant-related systems. Some examples of CDAs were the Programmable Logic Controllers in the Digital Electrohydraulic Turbine Control System, Operator Human-machine Interface Computers, the Plant Process Control System, Security Cameras, and the Security Event and Monitoring System. Almost all of the CDAs were located inside protected or vital areas of the plant. All of the CDAs were evaluated, and 900 were found to require modifications to assure compliance with the regulations. Modifications included such work as locking USB ports, removing unnecessary programs, upgrading firmware, and reassigning or locking IP addresses.

The NRC-required Cybersecurity Program did not cover PG&E’s Utility Data Network (UDN), which is the principal network used by DCPP employees for administrative functions. Security for the UDN is implemented by a different department, and that security is also strong and being continually improved. Some plant management software, such as electronic logs used by operators (eSOMS) or work management systems (SAP), are located on the UDN.

Another key feature of the Cybersecurity Program was the isolation of networks connected to CDAs from the UDN and other external networks. Such isolation was achieved by the installation of multiple firewalls and data diodes. Data diodes are hardware devices which are designed to limit data flow to a single direction, e.g., a data diode would allow a CDA to send data out to a user but would not allow any
data to be sent in to a CDA. As data diodes use hardware to prevent intrusion and cannot be defeated by malicious software such as viruses or worms, they provide an extremely secure boundary between plant systems and outside threats.

Conclusions:

DCPP has completed implementation of its Cybersecurity Program to meet all current NRC requirements. The program appears to be well designed and implemented, and the program is transitioning to become a permanent, ongoing station program. The DCISC should continue to review the Cybersecurity Program every two to three years.

Recommendations:

None

3.8 Spent Fuel Pool Systems

DCISC Fact-finding Team met with Garrick Worrell, Spent Fuel Pool (SFP) System Engineer, and Sergio Santiago, Engineering Supervisor, for an update on the health of the SFP and supporting systems. The DCISC last reviewed this topic during its April 2015 Fact-finding Meeting (Reference 6.8), when it concluded the following:

DCPP’s Spent Fuel Pool (SFP) Cooling System is currently rated to be in Green (good) health with no major outstanding issues.

Each of the two operating Units at DCPP has its own Spent Fuel Pool and SFP Cooling System. Each SFP is an interim storage facility for fuel assemblies that have completed their useful cycles of producing power. When the spent fuel assembly is removed from the reactor, it continues to produce heat due to radioactive decay which diminishes over time. When a spent fuel assembly’s heat production diminishes to an acceptable level, the assembly may then be transferred from the SFP into dry cask storage. Because the fuel assemblies in the SFP continue to produce heat and radiation, it is important to maintain the water level in the SFPs and to keep it cooled and shielded.

The SFP Cooling System maintains water level in the SFP and transfers decay heat from the SFP to the Component Cooling Water (CCW) System. Each pool has two 100 percent capacity cooling water pumps provided with Class 1E electric power and one 100 percent capacity heat exchanger that is cooled by CCW which is then in turn cooled by the Auxiliary Salt Water System and the Pacific Ocean. The SFP is designed to provide a minimum of 23 feet of water over the tops of the spent fuel assemblies. Each SFP has instruments that use floats to provide a high-level and low-level alarm locally and in the Control Room. Although the actual level in each SFP can be checked locally by observing level as marked on the wall of the pool,
there is currently no remote wide-range level indication that could be used to observe the exact SFP water level from outside the fuel handling building. During outages, a temporary camera is mounted and focused on a level-marking strip in the SFP so that level can be monitored from the Control Room.

In response to lessons learned from the 2011 accident at the Fukushima power plant in Japan, in 2012 the NRC issued an order, EA-12-051, requiring all U.S. nuclear power plants to install water level instrumentation in their spent fuel pools. Following issuance of the NRC order, NEI issued an industry guideline, NEI 12-02, providing the industry-suggested method for compliance with the NRC order. The NEI guideline required that nuclear power plants should:

1. Provide a primary and back-up level instrument that will monitor level from the normal level to the top of the used fuel rack in the pool,
2. Provide a display in an area accessible following a severe event, and
3. Provide independent electrical power to each instrument channel and provide an alternate remote power connection capability.

The Fact-finding Team inquired as to the status of implementing the requirements of the NRC Order and the NEI guideline regarding SFP level instrumentation at DCPP. Mr. Worrell reported that all of the modifications necessary for compliance had been completed. Two independent and wide-range level instruments using guided-wave technology had been installed in each unit’s SFP along with a separate digital display for each instrument located in two diverse areas that would be accessible at ground level following a severe accident. A final phase of the project, which was not required for compliance, remained to be completed. That remaining project phase would provide remote displays for the new wide range SFP level instruments inside the DCPP Control Room.

Regarding the health of SFP systems, Mr. Worrell reported that SFP systems were now considered a lower tier system. As such, formal system health reports were no longer prepared on a regular basis. However, the overall system health was very good with no major issues. Mr. Worrell stated that he walked down SFP areas along with other areas under his responsibility at least once per week. Upcoming major activities related to the SFP included the need to perform routine inspections and maintenance for the SFP Heat Exchangers. As each unit had only one Heat Exchanger in its SFP Cooling System, a complete system outage is required to perform Heat Exchanger maintenance. For Unit 2, it was currently planned to remove the SFP Cooling System from service to perform Heat Exchanger maintenance near the end of the Unit 2 operating cycle, when decay heat levels in the SFP would be at their lowest levels.

The SFP was originally designed with multiple possible sources of makeup water, including the Refueling Water Storage Tank (normal supply), the Condensate Storage Tank, and the Fire Water System. As a part of the Flexible Response
(FLEX) modifications performed after the Fukushima accident, a point of connection for FLEX equipment was selected in the SFP Cooling System and designated in FLEX implementing procedures. The FLEX connection would allow FLEX equipment to pump water from any source (typically the Raw Water Storage Ponds) to the SFP. The selected connection point for FLEX equipment was valve number 8771B, and the connection can be accomplished by removing the bonnet from the valve and installing a hose connection flange.

The Fact-finding Team then toured the Unit 1 SFP areas and observed the general condition of the SFP and Cooling Systems. Additionally, the Fact-finding Team saw the recently installed wide-range level instrumentation along with the FLEX equipment connection point. Overall, the SFP and Cooling Systems appeared in excellent condition, and the level instruments and FLEX connection point were confirmed to be installed as expected.
Conclusions:
DCPP’s Spent Fuel Pool (SFP) Cooling Systems are in good health with no major outstanding issues. Modifications have been completed to comply with NRC orders regarding SFP Level Instrumentation.

Recommendations:
None

3.9 DCISC Member Meeting with DCPP Director
DCISC Member Dr. Peterson met with Jan Nimick, Senior Director, Nuclear Services, to discuss the items in this Fact-finding Meeting and other items of mutual interest.

Conclusions:

The regular meetings between DCISC Members and DCPP Officers and Directors continue to be beneficial for both organizations.

Recommendations:

None

3.10 Large Transformers

The DCISC Fact-finding Team met with Jason Cook, Transformer System Engineer, for an update on the health of Large Transformers. The DCISC last reviewed this topic during its January 2017 Fact-finding Meeting (Reference 6.9), when it concluded the following:

*The DCPP Large Transformer Program appears to be well designed and implemented to effectively assure the transformers operate reliably and problem-free.*

Mr. Cook reported that all of the major transformers at DCPP were currently in good health. One of the best indicators of good health of transformer internals was the results of Combustible Gas Measurements made of oil samples taken from the transformers. Those measurements for all DCPP major transformers, including Main Transformers, Auxiliary Transformers, and Start-up Transformers, found the units to be in 'Condition 1', a normal monitoring status. Currently, it was forecasted that the health of all major transformers was sufficient to support plant operations through the end of the current operating license in 2025. The Fact-finding Team asked regarding any recent problems with high voltage flashovers, and Mr. Cook reported that corrective actions to clean and replace insulators appear to be effective as there have been no flashovers since 2013.

Work that was recently completed on large transformers during the Refueling Outage 2R20 (in February-March of 2018) included:

- Replacement of Startup Transformer Circuit Switcher 211-1
- Upgrades to the 500kV Capacitive Coupled Voltage Transformers
- Upgrades to the Unit 2 C Phase Main Transformer Winding and Oil Temperature Switches

A plan to replace a transformer conservator tank bladder had been deferred as investigations revealed that there was only a small amount of oil that had leaked from the bladder. On Unit 1, an off-normal temperature on the neutral bushing...
connection for the C Phase Main Transformer was being monitored closely. Currently, the temperature trend was stable, and it was forecasted that maintenance on the bushing would not be required prior to the next Refueling Outage, 1R21, currently planned for the fall of 2019. Mr. Cook also reported that the proposed project to install protective walls around the transformers had been placed on hold.

The Fact-finding Team inquired as to any possible effects geomagnetic disturbances could have on major transformers at DCPP. Mr. Cook responded that the DCPP transformers were generally thought not to be very susceptible to such disturbances because most of the high voltage lines in the area have a north-south orientation and are thereby less vulnerable to induced voltages from geomagnetic forces. To date, DCPP has not observed any noticeable effects on its transformers from geomagnetic disturbances.

Conclusions:

DCPP’s Large Transformers are in good health overall. Transformer and insulator maintenance activities completed over the last few years appear to have been effective in addressing problems.

Recommendations:

None

4.0 Conclusions

4.1

The DCISC Fact-finding Team concluded that the meeting with NRC Resident Inspector was beneficial and that the DCISC should continue the meetings.

4.2

DCPP has failed to be fully effective in maintaining its seismic workplace safety improvements in that the DCISC Fact-finding Team identified several examples where new furniture had not been restrained properly. Corrective actions have been initiated by DCPP, and the DCISC should review the effectiveness of those corrective actions at a future Fact-finding Meeting.

4.3

DCPP routinely collects data from plant equipment, and such data can be manually collected and analyzed on an as needed basis. Possible future uses of advanced or automated equipment data monitoring systems are being reviewed, but no plans currently exist for the installation of such systems. The Fact-finding Team noted that adopting such advanced monitoring systems would likely be of
interest to most engineers to be able to use such state of the art monitoring systems on a regular basis. The DCISC should follow DCPP plans for implementing and using state-of-the-art plant health monitoring technologies closely.

4.4

DCPP’s equipment programs are being managed well by the System Engineering Department. The recent turnover of System Engineers has been high, and the DCISC should follow up on this issue at a future Fact-finding Meeting.

4.5

The May 2, 2017, DCPP Corrective Action Review Board meeting was performed efficiently and effectively. It was evident that members were prepared, facilitated open and effective discussion, and made clear decisions and action assignments.

4.6

The DCPP Commercial Grade Dedication (or Replacement Parts Evaluation) Process appeared sound. The Santa Fe Road Warehouse and testing laboratory appeared to be clean and well maintained.

4.7

DCPP has completed implementation of its Cybersecurity Program to meet all current NRC requirements. The program appears to be well designed and implemented, and the program is transitioning to become a permanent, ongoing station program. The DCISC should continue to review the Cybersecurity Program every two to three years.

4.8

DCPP’s Spent Fuel Pool (SFP) Cooling Systems are in good health with no major outstanding issues. Modifications have been completed to comply with NRC orders regarding SFP Level Instrumentation.

4.9

The regular meetings between DCISC Members and DCPP Officers and Directors continue to be beneficial for both organizations.

4.10

DCPP’s Large Transformers are in good health overall. Transformer and insulator maintenance activities completed over the last few years appear to have been effective in addressing problems.

5.0 Recommendations:

None
6.0 References

6.1

6.2

6.3

6.4

6.5

6.6

6.7

6.8
6.9

The log is intended to provide a memorandum of contacts initiated by individual members of the public, citizen, or public interest groups, or similar organizations with the Committee members, consultants or staff.

<table>
<thead>
<tr>
<th>Date Initiated</th>
<th>From</th>
<th>Status</th>
<th>Comments/Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/13/2017</td>
<td>Ms. Rochelle Becker – Alliance for Nuclear Responsibility</td>
<td>Complete</td>
<td>7/13/2017 Email re hacking at U.S. nuclear facilities; 7/13/2017 Acknowledged by email.</td>
</tr>
<tr>
<td>7/14/2017</td>
<td>Ms. Kavya Balaraman – Reporter with California Energy Markets</td>
<td>Complete</td>
<td>7/14/2017 Email and telephone request for interview re spent fuel storage; 7/14/2017 Acknowledged by email; 7/14/2017 PFP responded/accepted.</td>
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<td>“Jer-Man” (unidentified)</td>
<td>Complete</td>
<td>8/17/2017 Email “Near Disaster at Diablo concealed”; 8/18/2017 provided to DCISC by email and 8/29/2017 provided to NRC &amp; PG&amp;E by email; 8/29/2017 email acknowledgement from NRC.</td>
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<td>8/18/2017</td>
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<td>Complete</td>
<td>8/18/2017 Email request for PowerPoint used at public</td>
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<td>8/20/2017</td>
<td>Ms. Simone Malboeuf</td>
<td>Complete</td>
<td>8/20/2017 letter received with information and documents re remarks by Ms. Malboeuf at the October public meeting; 8/27/2017 email acknowledgement sent re follow-up to come; 11/27/2017 Follow-up response provided by email &amp; letter; 1/3/2018 email received with (same) documents.</td>
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<tr>
<td>8/20/2017</td>
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<td>10/20/2017 email received attendance at October public meeting; 10/27/2017 response provided by email.</td>
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<tr>
<td>Date</td>
<td>Name and Organization</td>
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<td>Mr. Ioannis Kondylis</td>
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<td>1/19/2018</td>
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<td>1/19/2018 email sent re interest in public tour; subsequently confirmed.</td>
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<td>Mr. David Weisman – Alliance for Nuclear Responsibility ☎️</td>
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<td>1/22/2018</td>
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<td>1/22/2018</td>
<td>Mr. Richard &amp; Mrs. Patricia Davega ☎️</td>
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<td>1/22/2018</td>
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<td>1/22/2018</td>
<td>Mr. Denny &amp; Mrs. Linda McAllister ☎️</td>
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<td>Mr. David &amp; Ms. Margaret Levine ☎️</td>
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<td>1/22/2018</td>
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<td>Ms. Roberta Metcalfe 📞</td>
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<td>1/22/2018</td>
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<td>1/26/2018</td>
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<td>Dr. Gene Nelson – Californians for Green Nuclear Power</td>
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<td>Ms. Rochelle Becker – Alliance for Nuclear Responsibility</td>
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<td>2/8/2018</td>
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<td>2/8/2018 email received with information of tsunamis;</td>
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<td>Ms. Linda Seeley</td>
<td>San Luis Obispo</td>
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<td>2/14/2018</td>
<td>Ms. Linda Seeley</td>
<td>San Luis Obispo</td>
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<td>2/14/2018</td>
<td>Mr. David Weisman</td>
<td>Alliance for Nuclear</td>
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<td>Correspondence</td>
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<td>3/28/2018</td>
<td>Cal Poly, City of SLO, SLO County, Shell Beach/Pismo Beach and Arroyo Grande Public Libraries</td>
<td>Complete</td>
<td>3/28/2018 CD version of DCISC 27th Annual Report provided by USPS.</td>
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<td>4/20/2018</td>
<td>Mr. David</td>
<td>Complete</td>
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<td>5/10/2018</td>
<td>Weisman, Alliance for Nuclear Responsibility</td>
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<td>Weisman inquiry received re final SPRA hazard update/SSHAC process; 4/30/2018 email response sent by Dr. Budnitz.</td>
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<td>5/21/2018</td>
<td>Michael Pelizzari</td>
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<td>5/22/2018</td>
<td>Rochelle Becker – Alliance for Nuclear Responsibility</td>
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<td>Date</td>
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<td>5/29/2018</td>
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<td>Kern ☎️</td>
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<td>Mr. David Weisman – Alliance for Nuclear Responsibility</td>
<td>Complete</td>
<td>5/30/2018 email received re Dr. Victor appearance; 5/31/2018 email response sent re Dr. Victor appearance postponed to October 2018 public meeting.</td>
</tr>
<tr>
<td>5/31/2018</td>
<td>Ray Lutz - Citizens’ Oversight Projects</td>
<td>Complete</td>
<td>5/31/2018 email received with information on the HELMS project and DCISC June public meeting agenda; 6/6/2018 email acknowledgement sent; 6/9/2018 email received re rule-making petition and June public meeting agenda; 6/11/2018 email sent with information on time set aside for public comment at June public meeting.</td>
</tr>
<tr>
<td>6/15/2018</td>
<td>Rochelle Becker – Alliance for Nuclear Responsibility</td>
<td>Complete</td>
<td>6/15/2018 email received re decommissioning draft regulations; 6/15/2018 email response and acknowledgement</td>
</tr>
<tr>
<td>Date</td>
<td>Name</td>
<td>Status</td>
<td>Notes</td>
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DCISC CORRESPONDENCE
Chris – thanks very much for this schedule. I will share it with the Members and Consultants.

We’re here in Avila and about the year Rosar Jhangir is present on the Seismic PRA Project ...

Hope we get to see you and John next time at the October 24-25 PM,

Best regards,

Bob

From: Newport, Christopher [mailto:Christopher.Newport@nrc.gov]
Sent: Thursday, June 14, 2018 8:43 AM
To: info@DCISC.org
Subject: RE: RE: Diablo Seismic Submittals - For DCISC Awareness

Bob,

See attached schedule.

--Chris Newport

Christopher Newport
Senior Resident Inspector
Diablo Canyon
US Nuclear Regulatory Commission
(805)595-2354

From: info@DCISC.org [mailto:info@DCISC.org]
Sent: Thursday, June 14, 2018 8:00 PM
To: Newport, Christopher <Christopher.Newport@nrc.gov>
Cc: info@DCISC.org
Subject: (External Sender) RE: RE: Diablo Seismic Submittals - For DCISC Awareness

Chris & John -

Attached is the "working" agenda for the DCISC's public meeting next week at the Avila Lighthouse Suites on Wednesday and Thursday.

1 G.2 – 3

The earlier seismic PRA from 1988-1989, aka the Long Term Seismic Program Synthetic PRA, The Committee also requested a brief presentation, in conjunction with this item, on the associated tsunami analysis results.

I will be sending you and John a copy of the final agenda for the June public meeting when it is ready.

Thanks again,

Bob Rathe

From: Newport, Christopher [mailto:Christopher.Newport@nrc.gov]
Sent: Tuesday, May 8, 2018 9:23 AM
To: info@DCISC.org
Cc: Alexander, Ryan <Ryan.Alexander@nrc.gov>; Haire, Mark <Mark.Haire@nrc.gov>; Raynoso, John <John.Raynoso@nrc.gov>
Subject: [External Sender] RE: Diablo Seismic Submittals - For DCISC Awareness

Chris – thank you, and I will provide your message to the DCISC Members and Technical Consultants.

The links to the documents in your email did not work for me but I believe the Committee received the Seismic PRA and the Mitigating Strategies Assessment from PG&E and Dr. Budzinski is in the process of reviewing these and other documents. I believe the Committee has also seen the request for an extension but I will confirm it to them at attention with a copy of this email. The "M" numbers should also allow them to access the documents.

Hope to get a chance to see you at our next public meeting in Avila Beach which is coming up on June 13-14. The DCISC has asked PG&E for a presentation at that meeting on the Seismic PRA Project Results including the main results insights including a summary of how and why these results and insights differ from the similar results and insights from the earlier synthetic PRA.

2 G.2 – 4

Next steps:

- [NRC/PRO] Branch Staff to complete assessments of both the SPIRA & Seismic MSA; nominal 9 month review period.
- Staff performs acceptance-type review and will verbally report the licensee within approximately 1 month if level of detail provided supports continuation of review.

Additionally, the below link is to the staff's response to the licensee's October request for an extension on the submittal deadline for the SPIRA.

October Extension Request Response (ML17269A177)

Open ADAMS P&F Document/Diablo Canyon Power Plant, Units 1 and 2 - NEI 12-06, Appendix H, Revision 4, 14.5 Path 5, (GMS) v 2.6, Mitigating Strategies Assessment (MSA) report for the New Seismic Imaging Information.

- Both documents were submitted in response to March 12, 2012, 5054(3) request for information associated with Fukushima lessons learned.
- Based on reevaluated seismic hazards Diablo Canyon is one of 18 sites needing to perform an SPIRA.
- Diablo is the 5th site to submit its SPIRA following Vogtle, Watts Bar, Beaver Valley, and North Anna.
June 13, 2018

Robert H. Weisnerather, Ph.D.,
Chair, California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Dear Dr. Weisnerather,

I am truly honored that you have reappointed me to the Diablo Canyon Independent Safety Committee for a fourth term beginning July 1, 2018. I deeply appreciate the guidance and support you have provided over the years. I certainly enjoy working and interacting with the exceptionally strong team you have put together at the California Energy Commission. I look forward to continuing to collaborate with your technical and policy experts on nuclear safety issues in securing California’s energy future.

I am grateful by your trust and confidence, and look forward to my continuing service on the Committee.

It would be a pleasure to see you again in Sacramento.

Sincerely yours,

Pete L. Paul, Chair
Much has been said about the inequity of the current canisters and the need to swap them out. This proposal offers an upgrade without any need to open existing canisters and which is more cost effective than replacing them with the "new" canisters some people promote. Also, this proposal provides the additional benefit of easy monitoring by placing a lid with a sensor in the outer shell.

The petition for rule making has been accepted by the NRC and it has appeared in the Federal Register on March 23, 2018. The public comment period just closed on June 5.

I hope you will have time in the agenda so I can give this proposal adequate time. I may be able to arrive by the 5:30 pm meeting on the 13th, but if I am coming from a meeting in Bipartisan, it is very difficult to predict traffic. If I cannot make it on that day, then I will plan to come the subsequent day in the morning.

I am attaching the two documents in the petition filing. The NRC docket on this action is here: https://www.regulations.gov/document?D=NRC-2018-0017

Our project page on this is here: http://www.cospwiki.org/Common/rehlsProposal

I am looking forward to being able to present this to you,

Ray Lutz
Citizens' Oversight Project (COPs)
http://www.citizensoversight.org
619-802-5321
HELMS Proposal

Direct link to this page: http://www.cpsews.org/Comm/HELMSPetition

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For New Visitors
HELMS! Very glad to see you make it to this page to find out about the HELMS Proposal for storing nuclear waste around the country in a sensible way. First, let's agree on one thing. There is no really great way to deal with this waste. The nuclear industry created it, and they have really no good way to deal with it. With that said, there are some really bad ways to deal with it and some much better ways. We have to balance all the issues and promote a positive plan that will be as prudent as we can be, without relying on some future magic. As I frequently say, the bottom line of the nuclear industry are "We'll figure it out later." The troubles is that it is later, now 25 years after they were supposed to first take the haz, and it is settling all around the country. HELMS is a plan to figure this out now, for the good of future generations, we must have a good plan that won't just start falling in a few decades with no backup plan.

PLEASE TAKE THE FOLLOWING STEPS:
1. I hope you will take the time to read the HELMS document and the NRC Filing (below) so you know what we are asking for.

Overview
HELMS MEANS
- Permanent - Robust facilities that will resist simple surface attacks,
- Extended-life - double-wall design of canisters to provide easy detection of cracks using pressure loss detection and sacrificial outer cases to resist corrosion,
- Local - More waste from precious water resources but not all the way across the country, to probably a dozen regional consolidated sites,
- Monitored - Standard 724 tomographic monitoring of critical parameters: temperature, radiation flux, airflow, etc.
- Surface - Forget the deep geologic repository for probably the next 200 years so this waste can cool off.

Regarding nuclear waste, we view the likely near-term solution to be storage on or near the surface, in containers that can be easily and passively cooled, and which can be configured for long-term storage of up to 1000 years without any need to move the containers from that location, and which can be processed so as to be immune from terrorist attack.

March 22, 2018

Citizen Oversight

3. Sign the Public Support Petition: Click Here
4. Comments to the NRC are no longer being accepted. Instead, use the Public Support Petition or for longer comments, send to: info@CPSews.org
5. Continue to help by spreading the word! See Images Campaign for specific instructions.
6. The NRC process regarding rulemakings is described here: https://www.nrc.gov/about/1578384/1581699/1581705/1581706.html

Overview
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ABSTRACT
Ray Liu and Citizens Oversight negotiated the recent settlement agreement with Southern California Edison which established an action plan focused on moving the 3.6 million pounds of spent fuel nuclear waste from the San Onofre, only 35 years from the oceans, to a safer place. Nationally, we need a better plan for dealing with spent nuclear fuel waste, and we should target safe storage for the next 1,000 years. The centerpiece is the "HELMS" Storage criteria, allowing gradual upgrade of the infrastructure in dry storage to date and prudently balancing risks, It is our hope that environmentalists and the nuclear industry will recognize that they share a common agenda for the storage of this waste while minimizing impact to the environment and safety risks, now that the nuclear industry is in decline.

HELMS Storage is Hardened, Extended-life, Local, Monitored Surface Storage, and is a set of criteria against which any option may be measured. "Local Surface" implies that waste should be moved away from water resources and dense populations in the vicinity of the original location of the waste, but stored locally or regionally, probably within state or among states consorisia, on the surface. Hardened, Extended-life implies the facilities are temnorose hardened facilities with extended-life cask designs. Montano means 704 computer modeling of all measurable attributes. For "Extended-life," we suggest the Dual-Wall Cask design (DWC) which provides a sacrificial outer shell pressurized with inert gas enclosing the existing "thin" casks in use in the L5, so the internal cask will not suffer corrosion degradation. The DWC outer shell can be monitored for leaks by detecting the pressure inside the outer shell, rather than relying on difficult and occasional robotic inspection technologies which probably will not be effective in detecting microscopic cracks. The outer shell of the DWC should be added to any thin casks within a few years after the spent fuel has cooled for 20 years.

This paper provides the context and compares with other alternatives.

Finally, the paper defines a set of steps - or a conceptual level - phase-in the HELMS Storage + DWC proposed for the industry under the watchful eye of oversight groups. This white paper does not attempt to quantify costs or exact implementation details. However, we believe there will be cost benefits to the proponents while still improving safety. We appreciate your review and notice of any technical errors or omissions that could be repaired.

This plan is focused on commercial nuclear spent fuel and does not attempt to create a comprehensive plan for defense waste, however the same concepts can be employed in that segment as well perhaps with some modification, and is mentioned briefly.
INTRODUCTION

THE NUCLEAR EXPERIMENT

"Atoms for Peace" was our attempt to harness the destructive power of the atomic bomb for peaceful purposes. That experiment, which never would have occurred in the free market without extensive investment, prominent, and secret government schemes. It was not only the destruction of commercial fuel plants that was necessary; it was the getting worse. We now have an eternal "split" from that experiment: the US nuclear industry alone generates over 2,000 tons of highly toxic spent fuel each year, and we have 76,400 tons to deal with as waste. By the time we get all nuclear plants to close, we'll have much more, perhaps 120,000 tons of such waste at sites all around the country and a complete failure of the promise that this waste would be safely and effectively dealt with. Given the sorts of costs we will be discussing below, we are talking about approximately 10,000 costs.

WASTE CONFIDENCE? Not at all.

The Nuclear Regulatory Commission (NRC) has the responsibility for the safety of nuclear materials used in a commercial context. It has conducted "Waste Confidence" proceedings over the years, based on the notion that as a matter of policy, "it would not continue to license reactors if it did not have reasonable confidence that the waste could be disposed of safely." The original plan was primarily focused on a deep geologic repository – Yucca Mountain (YM) – which was to be licensed and open for business by January 1, 1998. Nearly 20 years later and no geologic repository is open. YM is far from viable, and nothing is on the horizon.

In 2014, the NRC changed the name of the report to "Continued Storage Of Spent Nuclear Fuel," now stating that the waste could be left where it was generated: as the power plants all around the country, indefinitely. And, in circumstances only designed for temporary use, that they were designed to last only until the promised repository opened. These "plants" have a 10 or 20 year warranty, and the manufacturers say they have been designed for 60 years or possibly 100 or 120 if you are lucky, but not necessary. At best, and the NRC licenses them for 40 years with possible renewal of another 20. The place where we find the short-term storage installations (called an "Independent Spent Fuel Storage Installation" or "ISFSI") – at some 70 sites near 104 reactors all around the country, are hardly optimal for nuclear waste storage. This default solution is simply not acceptable.

HELMS Proposal

Our proposal, which uses the acronym HELMS, is in essence a set of criteria to which any proposal can be measured rather than a specific detailed plan, but we do have some specific technical design recommendations and changes to NRC regulations and operating philosophy, and this should also infuse DOE strategic development in their quest to manage our nuclear waste.

(Our proposal will be defined at this point in this document prior to seeing the stage in the Technical Content section, readers who are new to the field may wish to read the Technical Context first.)

HELMS simply means:

Hardened – in a moderate (remote) attacks such as by truck bomb, airplane strikes, etc.,

Extended-life – ensuring a design life of 1,000 years, and we suggest deal-wall cement design

Local – meaning located in-state or within regional consortia of states.

Monitored – each container is outfitted with a standard electronic monitoring package.

Surface – used to store on the surface for cooling for at least the next 200 to 300 years.

Starting with the second part of the acronym:

Local, Monitored Surface (LMS) Storage

Spent fuel from nuclear sites is thermally hot for many decades and will require extended cooling on the surface, Surface storage facilities monitoring and is obviously renewable, so it fulfills the requirements of Monitored, Recoverable Storing (LMS), which is the acronym for surface storage envisioned by the Nuclear Waste Act along with YM. Unless some very novel disposal approaches are created, surface storage is an unavoidable requirement.

Local – Probably In-State

Where we site these facilities will impact transportation requirements, "Local" implies that although the waste will likely be moved from the plant to the storage facility by heavy truck over extended periods from the water resource and out of harms way, it will not move all the way across the country. This is a common-sense fairness to the idea that each state should be responsible for its own waste, and even better, within the service area of the population that gained the benefit of the power generated.

Keeping the waste in or near the state of origin mitigates "not in my state" (NIMS) legal action that may result otherwise. We use the term "Local" because it may be the only facility in common with a number or adjacent states where the transportation is still limited to the local area. The limitations of the transportation of the waste is important to reduce the overall risk while still allowing consolidation in a relatively near one area from the densely populated areas near where the nuclear plants are typically sited.

Some states with nuclear power plants may have difficulty finding a safe location for waste storage. Some power plants straddle the borders between two states. Maryland power has to move to a new state. Although easier that situing a deep geologic repository, surface storage is still not a trivial endeavor.

Characteristic: Surface Storage Deep Geologic Repository

Siting Difficulty Much Easier Very difficult, requires extensive geologic characterization

Containment Fully Contained Problematic, relies on geology to contain

Ground water Not Impacted Will Permeate or flood

Cooling Passive >200 years of Active Ventilation

Transportation Local Remote, Risky

NIMBY Local Responsibility Remote

Monitorable Yes No plans disclosed

Maintainable Yes Only that the design must allow retrieval in the last 200 years.

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The problem becomes even more pressing as nuclear plants are retired and we transition to a sustainable renewable energy infrastructure.

Local communities have no say over their safety concerns as long as the NRC claims the risk is "low." This is due to the concept of federal preemption, where no community can set higher safety standards that black anything due to safety concerns. If the NRC says it's safe, then you can't even mention safety as a concern. Yet the NRC is primarily focused on licensing nuclear power plants, which are a noisy times more risky than an ISFSI, so anything you do in an ISFSI is safe on their yardstick, and there is no discrimination among various options.

THIN TEMPORARY CARSTERS NEAR WATER RESOURCES IS ANOTHER BLUNDER

The ISPSNI designs we use in this country surround the thin carsters with a chunk concrete overpave, or place it below-ground vaults. But the strength of these vaults is largely an illusion, because the thin carsters are exposed to outside air flowing into and out of vents and over the surface of the (very hot) carsters to cool them. This cooling must continue for many decades before they will be cool enough to seal into a repository like YM. Once any portion of the carster surface cools below about 70°C (158°F), corrosion and cracking may start within a couple of years, and the radiation boundary can be compromised within about another two years, which then release radioactive particles and allow moist oxygenated air to enter, and with that, even more damage may occur.

The default solution currently embraced by the industry is to leave this basic toxic waste near the closed nuclear plant, usually only yards from important water resources, where nuclear waste definitely does not belong. And, since the power is desired for use by major cities, the plants are also near these populations. By regulation, the ISFSIs related to the plant has to be located within the exclusion zone of the plant and thus these rules do not encourage prudent placement of the ISFSI away from those populations and the water, rising sea levels, coastal ridges, or flooding, and coastal storms.

The waste problem is still not solved, and it is getting more expensive the worse we look into our options. It is almost never included in the economic analysis of nuclear power. Then, we suggest that we must plan to deal with the waste based by accepting the realities of the present rather than gambling that we will have better solutions in the near or distant future.
approach will be available in the future. The proposal is not predicated upon a reservoir. We must consider that a HELMS facility is permanent in the human life scale, and that a number of HELMS facilities – perhaps a dozen or more around the country – will exist for multiple human generations.

The 1,000 year goal is likely NUGI feasible without some monitoring and replacing part of the system on regular intervals. The design should provide that maintenance occur due to an absence of administrative causes, and, then it will remain safe for an extended period and only slowly release significant toxicity into the environment.

Dual-Wall Canister (DWC)

For sake of description, we propose a specific mechanism for obtaining the Extended-life criterion. But we must also emphasize that the HELMS proposal does not rely on the adoption of this specific proposal as long as the extended-life criterion is satisfied.

The Dual-Wall Canister (DWC) proposal provides encapsulation of each of the relatively thin canisters (1/2" or 5/8" thick) used within an additional intermediate and prestressed containment, to form a dual-wall canister system. The DWC outer shell should be similar in design to the 3" thick container proposed for Yucca, but we propose a "gas gap" between the inner canister and the outer shell, filled with dry pressurized helium, thereby creating a dry versus environment for the inner canister, eliminating oxygen and the corrosive effects of moisture. The pressure of the helium should be about the same as what is currently used inside the canister (perhaps about 50 psi). Any leak to the outside environment could be easily detected just by sensing the gas pressure (described in more detail below).

The DWC outer shell is exposed to the environment and thus to moisture, oxidation and ultimately, corrosion and cracking. As a result, it is sacrificial and will deteriorate over time while protecting the inner canister from deterioration. When they finally crack or come through the wall, the release of radioactive particles will occur, and the relatively unharmed inner canister can be removed and inserted into a new DWC outer shell. Thus, with periodic replacement of the outer shell, the DWC system meets the extended-life criterion.

This two-layer approach is analogous to the double-shell design mandated in US. waters after the Exxon-Valdez disaster of 1989. 9 There, the inside and outside steel plating is about 15mm thick (0.59") with a gap of about 2 meters between the two shells. Thus, in an accident, if the outside hull is breached, it is hoped that the new outer shell will keep the inside hull from being breached as well. The difference in the two cases is that the skin to the outer hull in the oil tanker is mostly due to accident, while in the case of spent fuel canisters, we are mainly concerned about corrosion and deterioration over a very long period of time.


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- Sacrificial

The purpose of the DWC outer shell is to provide longevity to the expected life of the overall container, and allow the outer shell to deteriorate without affecting the inner canister, and then replace it when it fails. It is not necessary, therefore, to constantly visually inspect the DWC because the outer shell can fail without the entire system failing, as the inner canister is protected from the corrosive environment until the outer shell fails. However, there are other aging effects that will come into play, such as vibration, irradiation 10, from pressure pulsations of the enormous weight, as well as residual contamination. But without DWC encapsulation, deterioration will occur much more rapidly.

- Easy to Test

Considering a dry canister system without the DWC outer shell, the canister must be carefully inspected visually or through other detection mechanisms (x-ray, current, ultrasonics, etc.) to anticipate failure. The hope is that prior to failure, those inspection protocols will indeed detect cracking or other failure mechanisms, and allow the radiation containment boundary to be replaced. In contrast, with the DWC, there is no need to anticipate failure through difficult inspection protocols. The outer shell is simply allowed to fail. Failure can be easily detected by a loss of pressure inside the DWC outer shell. At this point, we still have plenty of time to react, as the inner canister can withstand exposure for many years.

- Easy to Replace

Replacing a thin canister costs less than replacing the system. The outer shell must be fully replaced, but the inner canister is unharmed and left in a new canister. This requires a "hot cell" (chamber) pressurized with dry helium or fuel pool. This process is not clearly specified in NRC and industry documents, but one generally uses heat in such a study.

In contrast, the DWC outer shell can be easily replaced. To do so, the top is removed from the DWC outer shell, and the inner canister is removed and then inserted into a new DWC outer shell. Since this process does not open the inner canister at all, there is no need for a hot-cell

10 Radiation emitters may be a risk. See the recent NRC MALS aging management document on the subject:

Regarding Stainless Steel, 322.2 Radioactive Elements: Excessive amounts of these elements under suitable exposure to radioactive radiation. Depending on the effective flux, radiation can cause changes in surface material, mechanical properties, as well as density, fracture toughness, and remanence to rock (Ishikawa et al. 2000). Cooling has been observed in boiling-water reactor core water at fluences above 2 x 10^27 to 3 x 10^28 neutrons/cm² (1.3 x 10^20 to 2 x 10^21 Swr/cm²) (Vano et al., 2008). Gasser (2001) found that fluence levels (as low as 1 x 10^20 Swr/cm²) were required to produce measurable degradation of the mechanical properties. Candy (1982) also indicated that neutron fluence levels of up to 2 x 10^20 Swr/cm² (1.3 x 10^21 neutrons/cm²) were not found to affect SCC susceptibility.

As discussed in Section 3.2.1.3 of this report, the maximum potential accelerated neutron fluence in D2E systems after 100 years was calculated to be 2.0 x 10^19 Swr/cm² (70 x 10^13 neutrons/cm²). This figure is far below the level that would degrade the mechanical properties of stainless steels. As such, radiation embrittlement of stainless steel up to any environment is not unlikely.

The detailed discussion exactly how to upgrade to the DWC is deferred to designers in the various firms offering their dry storage solutions to the industry. However, we offer the following conceptual proposal to allow discussion of the implications of such a configuration.

Above-ground systems can add the DWC outer shell fairly easily by removing the upper lid of the overlap, removing the canister into a transfer can, then introducing the DWC outer shell into the existing concrete overlap (if there is sufficient space) or within a new concrete overlap with sufficient space, and then replacing the canister into the DWC outer shell, sealing the upper lid to the outer shell, and then the overlap lid. We anticipate that there may be a need to replace the concrete anyway, as it will degrade over time due to the radiation it is absorbing.

Similarly, the DWC outer shell can be introduced into an underground system such as the Hanford UMAX system. As mentioned, the canister should be designed up front to be of sufficient size to encapsulate the inner canister PLUS the outer shell.

The DWC outer shell can be added after the inner canister has cooled sufficiently but not below the temperature where cracks may initiate (70 to 100°C – about 20 years of cooling the coolest part of the canister.) The process is envisioned as follows a) remove the top can from the cavity, b) remove the inner canister from the cavity, c) insert the DWC outer shell in the cavity, d) replace the canister into the outer shell, e) bolt (or weld) the DWC outer shell lid, f) pre-pressure the DWC outer shell with dry helium, and g) close the top cap. The DWC is used similar to the manner in which a transportation or transfer can is used in today.

In either case, some thought will need to be put to the design for the concrete vaults are compatible with the addition of the DWC outer shell to the design.

Other desired attributes of the DWC:

- Confinement Barrier

The DWC outer shell as envisioned here is intended primarily as a corrosion barrier and as a secondary confinement barrier, not as a repository or gamma radiation shield. Thus, there is a potential to save shielding. Uranium and radioactive isotopes are physically held inside the fuel, cold cladding (if they are not contaminated) and confined inside the sealed inorganic canisters, Alpha and beta particles are stopped by the cladding and the inner canister. The surrounding concrete overlap (or below-ground concrete vault) would still exist to absorb the acoustic and gamma radiation. When transferred or handled, additional shielding would be necessary is it today.

- Logical Unit Option

If fully integrated into the design of a dry storage system, the DWC could be handled in much the same way as the internal thin canister is today, with the DWC outer shell and the internal canister forming a logical unit, to be placed inside the transfer or transportation overpacks. This would require substantial change to transportation procedures and other existing licenses and thus it is not feasible at this juncture. (The canisters used in Chemsolv adopted the Logical Unit option, see details below.)

- Component Options

The more likely approach would use the DWC outer shell only in the storage configuration, and when moved, continue to use the thin inner canister inside the existing and unmodified transfer and transportation overpacks, for shielding and structural support. This scenario implies that cooling and pressurizing the DWC system is performed at the storage location, once the lid is closed and secured to the top.

- Seals may be used

If the lid of the DWC outer shell is bolted to the outer canister shell, this would likely require the use of seals which would need to be replaced periodically, or the lid could be sealed with a weather seal. Any required maintenance of a seal does not open the inner canister, and does not require the use of a hot-cell or fuel pool. However, the DWC would need to be purged of air and represented using helium in situ. Buttress seals are not required.

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will be monitored to the extent that "they'll know exactly what is going on." In our review of the current dry storage systems, the only mandated monitoring is to perform a manual check of ventilation vents to verify they are not blocked. Very minimal indeed, but once may be the case even though it may not be monitored.

We are not aware of any DOE or NRC documentation that requires electronic monitoring, recommended standards for monitoring, nor any review of the electronic strategy. Real-time monitoring is a key shortcoming in the dry-storage system in use nationwide. Occasional inspections of one or two canisters once every twenty years with robotic robots is wholly insufficient.

The only specific requirements for monitoring appear to be in Part 72.122(h) 4.

Storage confinement systems must have the capability for continuous monitoring in a manner such that the licensee will be able to determine when corrective action needs to be taken to maintain safe storage conditions. For dry spent fuel, periodic monitoring is sufficient provided that periodic monitoring is consistent with the dry spent fuel storage tank design requirements. The monitoring period must be based upon the spent fuel storage tank design requirements.

**Standard Monitoring Module**

The DWC should be outfitted with replaceable standardized electronic monitoring module to allow constant real-time monitoring of conditions inside the outer shell, such as pressure, temperature, humidity, gamma radiation intensity, neutron flux, etc., as well as capture the ID of the canister and relay those data to a central monitoring facility. A monitoring module requires the penetration of the outer shell, certainly less problematic than it is to penetrate the hermetically sealed concrete canister. Standardizing this module will allow various vendors to compete on price and functionality.

The same monitoring module can be reviewing the design of the transfer and transportation cases so as to constantly track the location of each spent fuel canister by ID.

One caveat to the glimmer of hope such monitoring is that any gamma added will likely also fail and may reduce the overall life, which is of importance in an institutional failure scenario. The design of a

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11 Robert Line, Nevada Governor: “The thing I think we need to understand is that this material is not just going to be vaulted in and covered up with dirt and forgotten, the idea is, it is going to be monitored, and its going to be retrievable. And by being retrievable, they'll know exactly what is going on with it, it's not going to be just a large and a prayer that something happens.” [12] "From NRC or DOE. Please provide any additional information on the electronic monitoring strategy as it is not really clear to us when and we are not aware of it."

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**summary of HEMS**

The HEMS proposal requires three changes to the current status quo:

1. The use of a dedicated DWC outer shell over the current thin canisters to extend the design life to 10,000 years, including electronic monitoring to allow the detection of through-wall cracks,
2. Lining surface storage installations locally, near the nuclear plant or (cluster of plants) of origin but away from the water resource, high population densities, known fault lines, tsunami risk, sea level rise, etc. that is frequently present at the plant site, and
3. Improved hardening of the ISFSI site including a bunker or building surrounding the facility, or at least providing footings and locations where bunker walls can be added to the base structure.

**Action Plan**

We recommend the following actions:

- Each state, or local group of states, should determine if they own spent fuel storage land, probably with a consolidated site chosen in-state or among a few adjacent states, or to continue to store the spent fuel at short-dated sites indefinitely using a prudent, 1,000-year design basis,
- NRC should review the design of spent fuel ISFSI canisters to reduce the disparity between the dual canisters and the current approval of ISFSIs to remain on site indefinitely. We recommend the adoption of the DWC design, with the features we have mentioned. ISFSI owners should be required to upgrade to DWC with monitoring after the canister has cooled in a temperature of delamination (about 70°C - 158°F). As the temperature on the surface of the canister is not uniform, we estimate that should be about after about 35 years of fuel assembly cooling, and probably before 30 years of cooling.
- We recommend a memorandum on any movement of spent fuel to local ISFSIs until a top-to-bottom review is performed and a strategy at each site is determined.

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12 ISFSIs are not a trivial matter, but at least in the near term when we do not have very much experience with the degradation of the canisters, such continuing is viewed as well worth the trouble, and provides the public with the assurance that the industry is employing the latest technologies in the storage of these extremely toxic materials.

**Detecting through-wall cracks**

The DWC outer shell is to be presented with an intact gas, such as helium. If a through-wall crack occurs or if any of the seals are compromised, then this can be detected by losing the pressure drop. Such pressure sensors are to be part of the Monticule Module. Failure of the DWC outer shell is an expected event, and does not compromise the ultimate confinement boundary.

**Detecting NEC canister through-wall cracks**

After passing the DWC outer shell for leaks by pressurization, integrity of the contained canister can be tested with pressure tests. The test would include a purge of gas inside the outer shell, pulling a vacuum. If the vacuum does not hold, then the contained canister may be leaking. Even if the contained canister has minute cracks, encapsulation will eliminate the threat that canister failure may result in radiation release.

**Hardened**

The "Hardened" attribute relates to resisting malicious attack. Current ISFSI installations are far from acceptable in this attribute.

There are two elements which are envisioned for this attribute:

1. An existing building or bunker. This can provide several functions:
   - Limiting release of radiation in the event of any accident on site, and thus providing another layer of defense in depth,
   - Enclosing all storage system operations, such as loading, replacing DWC outer shells, and maintaining the system, and
   - Securing the facility and reducing vulnerability to simple malicious attacks.
2. Covering the facility with earth, rock, or other material to further provide immunity to surface blasts.

One of the important aspects of the security topologies is the resistance to many attack scenarios with even some "bunker-buster" (smaller than these are always advancing, so this may be only a temporary facet). To provide similar resistance in a surface facility would require the addition of a bunker concept. Most "bunker-buster" explosives do not penetrate more than about 60 meters deep (about 200 ft.), and much less if the material above the bunker is hard rock. For example, provision for spacing and additional footings for intermediate supporting walls may allow a structure to be added.

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**Funding and Ownership**

It is our position that HEMS complies storage installations should be funded by the NWF with monies originally collected from taxpayers, and contributions from open operating plants should be invested. (Collections were, we believe, improperly stored in 2014.) The installations should be owned and operated by the federal government. With this said, HEMS storage is not a deep geologic repository and so it is not considered "disposal," but is an interim solution for the next 1,000 years. The first 1/10th of the minimum time we are concerned with (assuming the waste reaches the same toxicity as the original are after 150,000 years.)

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13 WASH News, "DOE offers $1.5 billion in aid to dispose of plutonium implosions" (May 14, 2014) https://www.washingtonpost.com/politics/2014/05/14/1850777b-0d92-11e4-8350-999999999999/
problem, but finding sites for such a repository and then developing it is a very difficult technical and political challenge, and given the recent history of YME, we plan now that it will not be available. As a result, our "Plan B" needs to be good enough to be considered effectively "prudent" rather than a temporary or interim fix. And that means storage on the surface for an extended period of time, probably 100 to 300 years, before it can be moved, and we recommend a design goal of 1,000 years, with the ability to persist safely without any maintenance for 300 years.

• The BRC Report says that after the Fukushima disaster...
  "...Americans became wary of the presence of tens of thousands of tons of spent fuel at more than 70 nuclear power plants across the country—of the fact that the United States currently has no physical capacity to do anything with this spent fuel other than to continue to leave it at the sites where it was first generated."
  "...A revised nuclear waste policy..."
  "...Nuclear fuel will remain in a commercial power reactor for about four to six years, after which it can no longer efficiently produce energy and is considered used or spent. The spent fuel that has been removed from a reactor is temporarily hot and gives off a great deal of radiation; upon removal from the reactor, each spent fuel assembly consists enough to deliver a lethal radiation dose in minutes to someone in the immediate vicinity who is not adequately shielded. To keep the fuel cool and in protective containers from the radiation, the spent fuel is transferred to a deep, water-filled pool where it is placed in a metal tank. Typically, spent fuel is kept in the pool for at least five years, although spent fuel at many U.S. reactor sites has been in pool storage for several decades. Approximately 50,000 metric tons of commercial spent fuel are currently stored in pools in the United States."
  "...Spent Fuel Pool Risk Varies...
  "...Spent fuel is stored in large, deep concrete-and-stainless-steel tanks called water-filled pools. The tanks consist of two concentric cylindrical vessels made of stainless steel, surrounded by an additional structural support and shielding element, such as concrete – when spent at a fixed site – or surrounded by transportation overpacks, which can be reused and sometimes water, surrounded by a steel jacket – when transported. The original concept for the DOE assumed that MFCs would be scored for no more than about 20 to 40 years at each plant."
  "...Water Resource Risk...
  "...As the plants close and are decommissioned, the spent fuel remains at those sites and moving it away from the water resource is likely appropriate. Due to NRC licensing restrictions, SFFSSs are within the exclusion area of each power plant, which is in very close proximity to a large water resource to almost all cases, except for the Palo Verde site near Phoenix, AZ, which is the only nuclear plant in the world which does not rely on a water resource for cooling."
  "...Thus, moving the waste away from this water resource can decrease the risk that any accident will contaminate and ruin that resource virtually forever. The temporary increased risk of transportation is easily offset by the reduced risk at a location away from such water resources over a much longer period of time.

Also within this consideration is the concern about sea level rise due to climate change. Most on-site ISFSIs are within a few dozen feet of the high water mark and will be easily inundated by the expected rise of sea level. For example, the ISFSI at San Onofre is expected to be fully surrounded by Pacific Ocean water by the end of the century, according to documents submitted by Southern California Edison to the California Coastal Commission. 

- Salinity Results in Corrosion
   Furthermore, sitting water storage facilities near salt-affected water expose the thin metal containers to the corrosive saltwater air and will reduce the life of storage containers.

The reality of Chloride-Induced Stress Corrosion Cracking (CISC) was not fully recognized for more than a decade after MPCA started being used. The 2007 NRC Probability Risk Assessment for Dry Storage36 stated that no corrosion would occur at all. The issue was recognized more fully understood by the NRC starting in 2010, and work continues to deal with this issue.

The canisters are not immune from corrosion and over extended periods of time, WTEC will corrode and deteriorate. The question is not IF, it is WHEN. According to test data it appears that at temperatures greater than about 79°C (175°F) that any salt that may collect on the surface will not dissolve into the water, known as deliquescence37. Once the surface temperature of the canisters drops below that figure, CISC is possible, and in test scenarios, “the time to SCC initiation is between 32 and 138 weeks.” Thus, in less than 2½ years and as quickly as just one half a year, CISC may start on any canisters with surface temperatures less than 79°C, and crack development is faster the higher the temperature. It appears that through-wall cracks could develop in the top 10% canisters in as little as 12 years, as a worst-case minimum, but it may take 30 years or more for any cracks to develop to compromise the boundary (See adjacent figure). We will meet here that the NRC Regulatory Issue Resolution Protocol (RIPR) investigation into the CISC issue should not yet be cleared because we believe additional steps should be taken. At this point, the only action taken is adding administrative control and improving management. We believe the design of the cracks must be improved. Our suggestion of the DWC design is an example of a feasible design change that can more appropriately solve this issue.

- Spent Fuel Still Hot
   The NRC Report notes that the spent fuel is “dramatically hot.” The maximum expected temperature of fuel cladding has been estimated to be 400°C (752°F) at the beginning of storage. This cladding temperature is expected to decrease in around 26°C (51°F) after 20 years and to approximately 127°C (260°F) after 60 years. The cladding is around the fuel rods, and that is inside the canister, but the surface will exhibit similar temperatures. It’s not safe to approach the canister unless it is inside another canister, and one could, if it was hot, be too hot to touch even after 60 years.

- Dry Storage Types
   In the common dry storage configurations in the U.S., there are two major vendors, AREVA (now TNP-Centrica) and Holtec. These storage designs feature container surrounding the canisters to absorb radiation, however, atmospheric air freely circulates through openings and then over the canisters to cool them off, and it is subject to gamma and neutron radiation, and depending on the intensity of that radiation, may become slightly

radioactive. Any release of radioactivity would be carried into the atmosphere without restriction. The concrete that surrounds the canisters is needed to absorb the gamma radiation and neutron flux from the radioactive material and will break down over time and therefore eventually will have to be replaced.

- Airborne Radioactive Release Danger
   One risk from dry storage is an airborne release caused by an extremely hot fire, that spreads over hundreds or even thousands of square miles. Such a release could be caused by terrorist acts, wildfire, sabotage, or industrial accident. Since, there are not daily events, but we need to plan for the worst case. Dry storage facilities should be in remote locations generally away from dense populations.

- "Spent" Fuel is extremely dangerous
   A U.S. Nuclear Regulatory fact sheet states that after 10 years in a cooling pool, the surface radioactivity of a spent fuel assembly is still about 10,000 megawatt hour. To understand the danger that poses to health, consider that a 500-ton steel delivered to a whole person in a single exposure is fatal. Close proximity to a single 10-year-old spent fuel assembly would deliver a fatal whole-body radiation dose in about three minutes. After about 150,000 years the spent fuel will be no more hazardous than the parent ore, so any regulatory repository should be designed for that period of time. But we must admit, planning to safely store the waste for even 1,000 years is a big challenge.

- Shallow Defense
   The nuclear industry usually prides itself by respecting the philosophy of “Defense-in-depth” by providing layers of defense and preventing recovery of failures at many levels. This philosophy is not well respected in the case of spent fuel, as the spent fuel is encased only two times, once by the cladding of the fuel pellets, and once by a thin canister. However, the cladding of fuel pellets is already cracked in many cases (perhaps about 15% of the time at many nuclear plants). In any accident that deforms the canister itself, and since the ceramic cladding is porous (Barenblatt38), it may start to burn, and pouring water on it will split the water into oxygen and hydrogen, only making matters worse. So really the cladding can’t be counted as a defense layer in any conservative analysis. And the “core” used around individual damaged fuel assemblies do not fully isolate the spent fuel because they have drainage in the bottom (so water cannot drain out when the canisters are loaded from the fuel pool). And so, they don’t provide an isolation boundary either. That leaves only one layer — the thin canister — which if cracked or

• Constant monitoring is required for wet storage, but only periodic monitoring is required for dry spent fuel systems. We disagree that this is an appropriate level of monitoring given that electronic monitoring is feasible on 7/24 basis.

• The short-duration of the license is not realistic and results in designs that are insufficient for "indefinite" storage now allowed by other NRC regulations. The license "The package must be designed to contain the high-level radioactive waste for the duration of the license," is the crux of the problem. The short 20-year license means that dry storage systems will be designed only for that time, and perhaps only two or three times longer (40 to 50 years) is not "indefinitely." HELMS is proposed to fix this deficiency in the regulations.

• No easy way to deal with cracked canisters

If these stainless steel canisters are subjected to the outside air, especially if next to the ocean, they will suffer stress corrosion cracking.

In a sheltered environment, deliquescence of adhering salts below the dew points also could generate an aqueous electrolyte initiating general corrosion. These salts may be chloride rich and originate from marine environments, dusts, and condensed water from cooling towers, as well as a range of other nonchloride-rich species originating from industrial, agricultural, and commercial activities. Studies have shown that MgCl2, a component of sea salt with a lower solubility under relative humidity, would deliquescence below 52°C (126°F) under realistic absolute humidities in nature (Ike et al., 2015).

If a canister becomes compromised due to cracking, the industry has very few actions defined. Apparently, the way to solve this is to replace the canister, and to do that, it needs to be placed in either a spent fuel pool or a "hot cell," which is a chamber which can be filled with helium to provide a dry inert environment (without moisture or oxygen), and use remote controlled robots to cut the canister, remove the fuel assemblies, and then place them in a new canister, and weld it shut, and pressurize it with helium. This step is so difficult, it should be avoided by design. The HELMS proposal avoids this problem.

• Consolidated Storage

The RBC Report proposes that an interim solution is to build one or more large "Consolidated Interim Storage" (CIS) sites designed to operate on the order of 100 years while a permanent geologic repository can be developed. Consolidation can reduce costs of administrative control and security by avoiding duplication. However, they propose the same long term design similar to what we have now at the local USFSs (4). In our position any CIS facility must comply with the HELMS plan. Fully consolidated waste means a lot of transportation, which will be covered below.

• Transportation

"Because of the residual hazard it poses, spent fuel must be shipped in containers or casks that shield and confine the radioactivity and disperse the heat. In the United States, spent fuel has typically been transported via truck or rail; other nations also use ships for spent fuel transport;"42

• Limit Transportation, Limit Risk

There is obviously increased risk in handling and transportation compared with not transporting the waste at all, if the two sites (source and destination) have similar risk profiles. The increased risk is due to three factors: human error, in handling the waste containers during transportation; design error, the possibility that the containers do not perform as expected, and terrorist risk, which might be higher if the transportation route is entirely accessible to such attacks, as well as route exposure to dense populations.

• High Consolidation Means High Transportation Risk

Either a single geologic repository or a single large CIS facility includes the concept that spent fuel would be transported across the country to those consolidated sites, resulting in transportation over very large distances and then requiring a second move in a permanent repository, and it that that ever happens, Residents are rightly concerned about this possibility exacerbated by the fact that rail transportation seems to go right through the middle of cities. We must say, however, that it is probably quite reasonable to transport spent fuel out of California (and any locations west of the Rocky Mountain range, approximately 104° longitude—approximately along the extension of the Mountains-North Dakota border) to locations east of that line to reduce risk due to seismic factors. We do

Where exactly should the sites be? That question is beyond the scope of this paper, but some work should be done to look at possible sites generally away from dense populations, water resources, and other concerns, while being mindful of environmental justice issues.

• Deep Geologic Repository

"While several options for disposing of spent fuel and high-level nuclear waste have been considered in the United States and elsewhere, international scientific consensus clearly redunes the conclusion that deep geological disposal in the most promising and accepted method currently available for safely isolating spent fuel and high-level radioactive waste from the environment for very long periods of time."43

• Interest Storage or A Breeder

While the statement in the above paragraph is no doubt true, we believe there are a number of reasons why we must have a better interim solution which can get us through the next few centuries with a design goal of 1,000 years, as follows:

• Siting Very Difficult

Siting and developing a deep geologic repository is a more difficult technical and political challenge than anticipated. There are many unknowns over a long period of time in a geologic repository and it would be very difficult to deal with any significant unanticipated events.

• Very Few

Very few deep geologic repository sites will be developed, if any. Our experience so far is only with Y-12, and it was perhaps the easiest not because it is an optimal location from a geologic standpoint but because it is near the national atomic weapons testing area, and the planners at the time figured that politically, it would be accepted by Nevada.

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40. NRC NUREG-2124. "Managing Aging Processes In Storage" (draft) Adams ML1739A2257, page 3-6, Secretary of Energy reports that spent fuel should be conserved and that future waste should be conserved at 70°C.

42. RBC Report, Page 35
43. RBC Report, Page 8
44. RBC Report, Page 11

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YM Not Visible

There are many red flags about the YM site. It is not really "deep" in that it is in a mountain above the saturated zone rather than being deep in the crust. It is not in a highly stable geologic rock formation. It is near crater cones and has a number of faults running through it. This recognition that it will be permeated by water. You may hear that "it is the most studied place on earth" from a geologic standpoint, but that only means that we now know how much we really don't know about the situation and any notion that it is the best place for such a repository has been reduced, particularly when viewed with the design philosophies, which are based on the geologic formation for insulation.

Science Must Guide Law, not the reverse

It is tempting for lawmakers to draw science under the bus and just pass a law saying the YM site will be used no matter what. We then say that 'any scientific conclusions to the contrary are now moot' which is exactly what the DOE administrator said in the early 2000s in a recorded interview.48 We must base our actions regarding this highly toxic waste on science and prudent planning rather than passing an overriding law in desperation while ignoring those real concerns at the site. In our view, science does not support YM.

Spent Fuel Too Hot Anyway

There are two approaches to the use of YM, one where the mountain is allowed to get very hot and another where the temperature is kept below 100°C, so the water will not be boiled out of the rock and its characteristics changed dramatically. It will apparently be necessary to actively ventilise and cool the mountains for up to 200 years before it can be sealed. If that is the case the "deep geologic" part of the proposal is far from real. The air circulated over the waste effectively plateaus on the surface, or the spent fuel mass stays on the surface for a long time (> 100 years) as well as being "aged" which is to say they must cool off.

Then, even if we had YM open and ready for business, waste caissons from plants are far too hot, from a thermal perspective, to place in the repository under the cool-mountain scenarios.

The Hot for Humans

If the waste is placed into the mountains, then it will be all but impossible to work in that environment without being grilled. We are told that it will be fully automated and that there will be no reasons for humans to have to enter. This is the same sort of broken optimism that got us into the corner to begin with. Our conclusion is that a geologic repository is premature until at least several hundred years of cooling has been completed,

48 [https://www.youtube.com/watch?v=clM7YvJHZ/4] "Fireside Chat: The Story of Yucca Mountain Nuclear Repository - T.H. White by Edward P. Speelman III, Director Office of Civilian Radioactive Waste Management, U.S. Dept of Energy. "Who is who at Yucca Mountain is an appropriate site for a repository. It is an area that is an area of high human activity and has a significant and comprehensive plan for dealing with the materials in a manner that is safe for the environment." Speelman.

49 [Blue Yucca Mountain Report, series 2.1.1.3.5.5.7 Aging, Overpack and Blown Traveler Casks] p.2-9

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DISCUSSION

With the HELMMS proposal presented and factual context in hand, there are a number of other important points which deserve treatment,

Two Phases of Spent Fuel Storage

We can define two phases in the storage regime:

Phase 1 – Hot Storage: Single-wall caisson storage is inappropriate when no part of the caisson is below the deliquecence threshold, This is the hot phase, and the single wall caissons are important to allow cooling of relatively hot fuel assemblies, and

Phase 2 – Extended life storage: The DWC caiser shell should be added when the heat load of the caisson has decreased enough to allow the use of the DWC caiser shell, and when the coldest location on the surface may dip below the deliquecence threshold,

To get a rough estimate for the two phases requires that we review the estimate of the temperature profile along the surface of a caiser and how it changes over time. The adjacent illustration shows the temperature distribution as it varies along vertical axis of a caisner which is stored in the vertical orientation.

Figure 5. Axial Temperature Distribution at the Container Shell Surface for Projected Decay Heat Decrease Over Time in Vertical Storage


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Design of a Repository should be compatible with Surface Storage

We believe it is a mistake for the caisners used at any geologic repository to be a completely different design from that used on the surface. The design proposed for YM was developed primarily to ensure that works best on the surface (and we believe we are still learning what works best on the surface). YM proposes caissners that are much smaller (only 24 PWR fuel assemblies vs. 37 in Holtec USMAX system), where the caisniers are placed in a horizontal orientation and rolled down long tunnels with no means to pull out just one casser or deal with any issue down that tunnel, and do not use a double-wall design as proposed in HELMMS.

We suggest it is probably best to rethink the YM design to make it compatible with surface storage, i.e. a HELMMS surface installation moved underground.

If we assume easiest vertical, UMAX style emplacement with three tiers on both sides of the main tunnel, and since the main tunnel is about 6 km (4.0 km) long, there is room for about 10,000 tons (about 120,000 tons heavy metal waste), That’s about how much waste we expect if we prudently shut down the remaining nuclear plants and avoid building any new ones.

With this said, we believe this decision can be set aside for the next one or two hundred years and focus on the reasonable proposal of HELMMS on the surface.

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Loss of Administrative Control

One of the important considerations and the rationale for either the geologic repository or the 1,000 yr design criteria we endorse is the potential loss of administrative control and an assumed "dark age" when the human culture may lose its technological prowess, or just a loss of funding, industry bankruptcies, and total lack of attention. Such a scenario implies that all infrastructure, maintenance, and aging management protocols will be lost. Optimally, nuclear installations should then persist in a safe state without needing radiation into the environment for as long as possible, ultimately allowing the human culture to re-establish technological capability and sustain to the waste.

We can note that the temperature varies substantially (100°C) almost initially and then the differential decreases more and more, as what we are interested in is actually the minimum temperature because once that goes below 70°C, CEA may take it, is clear from this chart that the minimum drops below 70°C before 30 years of cooling has occurred. To get a better idea of what the minimum might be, we can add the phase diagram that is simply a graph of the temperature of a given "typical" spent fuel caiser in a vertical orientation, and on this illustration, we have attempted to minimise the minimum temperature (provided by the prior illustration), and then defines the two phases.

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Figure 5.6. Calculated Temperature Estimates for Caisners with an Initial Heat Loading of 24 kW Over Different Ambient Conditions (Custom et al. 2009) Copyright 2009, Electric Power Research Institute, used with permisison.

Minimum temperature curve added by comparing with the axis (vertical) temperature profile, which provides (with) 10% of 10Gw at 1.0°C, 25% of 10Gw at 5°C and 75% of 10Gw at 15°C and showing in the curve using different colors. Delaminated threshold of ROC provides likely need to upgrade caisner when high assemblies have cooled for about 20y. Additional estimate by R. List.

Primary data by "NDE Management of RCC in Caisners for Dry Storage of Spent Fuel: An Assessment"

Remarquably, the data in the first illustration does not actually mix any of the data points in these second set of curves, so these key data points of the minimum temperature have been added to this illustration. We believe there are reasons the minimum curve must be added to be the very bottom of the caisner is hotter than it is slightly up from the bottom, due to the air flow. Also, the deliquecence threshold of 70°C is shown. From these data, Phase 1 evens after about 20 years of cooling, and as soon
as the overall best load of the container can endure the DWC outer shell, it should be added to configure the container for the long term. This estimate represents a best guess as to the time when the public should expect DWC to be used, so provide a basis for long-term storage.

HELMS does not assume a geologic repository will soon open

The use of this temporary container was based on the expectation that the spent fuel would be stored in a geologic repository within the limited service life of those containers. This expectation is now known to be without merit, both from the likely life of these containers in corrosive environments, and the likelihood of a repository, which is currently not on the horizon.

The more recent suggestion that some containers alone (without the DWC outer shell) can be stored indefinitely at a Consolidated Energy Storage (CES) facility is also untenable. Faced with the temporary nature of the thin container solution, communities who are asked to consent to such CES facilities require that a geologic repository is also available or at least predicted to be available. Indeed, that may cause some to link approval of YMS to laws allowing CES to be developed, even if approved and use of YMS may not be supported by scientific inquiry or honest reason.

Even if YMS were approved and open, it would not be feasible to accept such hot containers in the facility. Use of the existing thin containers without using an improved storage technology is unreasonable and impractical. Therefore, it is essential that improved storage technology is used, such as the HELMS Storage recommendation and DWC.

HELMS: an essential and prudent step to secure commercial nuclear waste

The Waste Bethlehem selected some new plants and thus reduced the overall waste problem. As the world came to recognize the danger of nuclear power after witnessing periodic devastating meltdown accidents and other close calls, communities wished to block the threat of new nuclear power plants. However, the principle of federal presumption standardized existing safety concerns as a means to block new plants and close those that were already in operation. Some states — starting with California — passed moratoria to block new nuclear plants based on economic concerns unless a permanent solution to the waste problem was established.

So if no permanent repository site was approved, the moratorium would turn new plants from being built. Although we believe that the YMS repository was appropriately discontinued. Regardless of the state, there is now a build-up of waste around the country. The world now recognizes that one of the fastest weaknesses in nuclear energy is the production of long-lasting and highly toxic waste, and that there is no means at hand to safely and cleanly dispose of it.

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Since operating nuclear plants generates new waste, blocking new plants and expediting the decommissioning of any operating plants becomes the top priority to reduce the overall amount of toxic radioactive waste that needs to be dealt with.

Thus, we are faced with a difficult decision. Do we work to provide a safe way to store the waste for the long term, albeit in HELMS facilities, because that might encourage the industry to build new plants? We believe we have moved past this quagmire due to the economics of electricity sources and the rapid decline in the cost of electricity from solar photovoltaic (PV) systems and other renewable sources. We believe this is a trend that will be impossible for nuclear and other large-scale power plants to compete with.

SPV is a good match to demand-based renewable generation because many manufacturers compete in the fabrication of SPV cells, and since many millions of cells are built each year, there is a great impetus and opportunity to improve them. The open market cannot be easily controlled or rigged by utilities to monopolize to reduce this competitive advantage and thus to preserve their existing investment in fossil and nuclear plants. In contrast, nuclear plants and other large-scale plants are NOT a good fit for market-based optimization because there are too few vendors and the design and life cycle of the plants is far too long. Experts agree we are still using nuclear plant designs that are obsolete and risky — like the Mark I design in Fukushima are downstream dangerous. In the very near future, nuclear plants will be even more economically untenable. It makes no sense that we are still mentality oriented to new-fangled "modular" designs can be mass-produced, this difference in optimization will never allow the more complex and dangerous nuclear plants to compete.

Thus, it is now time to shift gears and embrace prudent storage of the existing commercial nuclear waste, and allow those severe market forces to limit the future generation of waste.

Thick vs. Thin Canister Debate

Thick has been used in lieu of the inferiority of the thin canisters for use on an extended basis at 5ISP due to the risk of destruction, and we agree with this concern as the thinnest canisters were designed for short-term use only, and we now believe that they will corrode and crack over time. The industry has responded with administrative workarounds — make them work anyway, using even more administrative controls, in the form of aging management and detailed robotic inspections, perhaps using ultrasonic or eddy-current imaging25. These steps might work to squeeze every year of life out of the thin canisters, but it compromises the aging management and inspections are indeed feasible, performed correctly, and the reports honestly prepared. The simple fact remains that the design of these thin canisters is insufficient for the purpose for which they are now being applied — indefinite storage — and ignores the concern of loss of administrative control.

The HELMS criteria issued actually takes no position on the technology used to obtain the criteria of "hardened" and "extended life." Then, it is open to any proposals that may come forward that can be judged against each other. Our proposal of using an additional DWC outer shell with inert gas protecting the thin encased container, we believe is one viable approach.

However, some have advocated very strongly that we require the so-called "thick" cans, pointing to the CASTOR design, as an example, made of ductile cast iron instead of stainless steel. It is much thicker, with walls about 10" thick or more. Typically, these are stored in buildings without requiring the concrete overpacks or transfer casks, and they may be directly transported. Additional shielding is not required because shielding is integrated into the can. These cans are not licensed for use in the US, and were originally designed for a different use case, to be reused as spent fuel was sent to be reprocessed.26 That said, just because they are not licensed does not mean the design elements cannot be adopted. These do have some very good design features, but we must caution that every design change comes with a trade-off of some sort, and so no design is perfect.

Direct Comparison Can Be Inappropriate

Sometimes, the thin canisters (1/2") to (5/8") are compared directly (i.e. without the overpack associated with the thin canisters) with the thicker cans to demonstrate how thin and inadequate they are. But, this is an incorrect comparison, because the thin cans are part of a component system and are always transported and stored with some other additional overpack or enclosure, other concrete, steel

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with lead (for example the Holtec HI-STAR 100), or sometimes steel with lead and water (Holtec HI-TRAC transfer cask). The overpack would need to be included to make a fair comparison with regard to radiative shielding.

On the other hand, the comparison does have merit because the thin canisters ARE exposed directly to the environment and the air, and are more likely to develop through wall cracks (due to their movement). Even if any cracks should develop, radiative peculiarities could escape.

The thicker cans look more robust, but size is not everything. Cast iron, even the more decile is much more brittle than stainless steel and there is a lot to learn how these options react to neutron bombardment over many decades or centuries. The thicker cans typically have cavities inside the cast iron filled with polymer and provide radiation shielding in the ductile cast iron is inadequate in that regard.

Also, the thicker cans have a bolted lid with a seal which degrades over time and must be replaced. The hemispherically sealed thin cans have no seals to replace. As a result, thick cans require periodic maintenance which may require a hot cell to avoid any exposure of oxygenated air.

No need to inspect fuel assemblies inside the Interior canister

We reject the notion that there is a need to inspect the cavities of the canister since it is sealed, if you ever do that, then it will likely require a hot cell as the can is completely open. It is better to view the cansister as a unit that is never to be opened unless there is some other reason. Yet inspection is still possible and will likely occur often enough for the industry to get an idea of the degradation processes inside. Opening a sealed canister is one impossible, probably by cutting the lid off with a hot cell with remotely controlled equipment.

Heat Load Differences

The other desirable of the "thick" cast iron alternative is its reduction in heat dissipation, since the thicker walls will reduce the transmission of heat, and therefore, those cans will not be able to enclose the very hot fuel assemblies these canisters commonly allow. This is probably the most important reason the U.S. industry adopted the thin canisters, as they were eager to move extremely hot spent fuel out of fuel pools into containers that could carry a lot of heat to the environment.

The DWC design suggests here with a different layer and gas-gap, therefore, it does reduce the transmission of heat. However, we are suggesting using the outer shell only after the interior container has substantially cooled and after the heat load of the canister can be effectively dissipated through the DWC.

This Common Canister System is the Definitive Standard in the U.S.

The design of dry storage systems is a balancing of many trade-offs. Most decisions in this industry were made to solve the near-term problem with cost and expense in mind, rather than a well-thought out integrated system. The fact remains that the industry has already adopted the thin containers and replacing the investment in these canisters will be a very difficult sell.

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The DWC proposal essentially embraces this fact, thereby minimizing handling while improving the design to extend the overall life of the system. These canisters should be compatible with any future geologic repository. There was an assumption in the design of YMR that the fuel assemblies would be removed from the canisters and placed in smaller YMR-compliant canisters. This additional handling is a mistake, in our view. The only handling should be replacement of any deteriorated DWC outer shells.

Since almost all spent fuel in the U.S. is in the thicker canisters (which are combined with other shielding elements), we are hopeful that providing an upgrade path in the form of the DWC design will provide most of the advantages of the thick canister systems, and provide a few other benefits not available with the single-wall design.

For these reasons, we suggest that those pushing for the thick canister should endorse the DWG proposal, as we are proposing, so that the sacrificial outer shell can serve as the warning that the interior canister may now start to corrode, and will eliminate the severe requirement that inspections of the canisters detect minute cracks before they become through-wall holes. The DWG design provides an upgrade path for existing thick-wall canisters and can be readily adopted on a gradual basis, most particularly as new locally consolidated HELMS composite facilities are built somewhat away from the risk factors that exist at the nuclear plant sites.

But it is fair to say that either choice is allowed under the HELMS criteria. If the industry decides that the single-wall canisters can provide the 1,000 year design life and 300 year passive life, then there is no reason to quibble.

The upgrade path
We suggest the following upgrade path from the status quo:

- Any new ISFSI installations—and most importantly, any Consolidated Interim Storage site—should be designed with sufficient space between the internal canister and the outer concrete and or steel shielding, so as to accommodate a DWG outer shell and thereby HELMS compliant design.

- Older ISFSI installations which are designed to be shore-ground, should phase-in a larger overpack, if insufficient space exists around the interior canister, and then add the DWG outer shell to the older canisters and then concrete the overpack as described to avoid 70R and Stress Corrosion Crack may start. This may be after the fuel has cooled for about 20 years (including spent fuel pool cooling).

- Older ISFSI installations which are designed with below-ground vaults should review the applicability of the dual-wall design provided by adding the DWG outer shell and if necessary, using lower capacity canisters, and then add the DWG outer shell as soon as they cool to 70°C.

- Otherwise, we hope that timberframe is given to any new below-ground ISFSI installations so they will have the capacity for the DWG design.

We believe that the DWG design should be compatible with any future geologic repository, so that no repackaging would be necessary, and if any were to be done, it would be restricted to replacing the DWG outer shell.

Comparison with HOSS
The HOSS proposal – Hardened On-Site Storage – has been discussed recently and is similar to HELMS in that surface storage is used. But, in contrast with the “On-Site” of HOSS, HELMS includes the notion of “Local” to imply that an on-site location may be fine in a few instances (such as at the Pilos Verde nuclear plant in Arizona, where there is no associated body of water next to it), but in general, some local transportation will likely be appropriate, so as to move it away from the water resource associated with the nuclear plant, away from dense populations, and consolidate the waste on a regional basis. For these plants in California – which we now know are in a very seismically active area – moving these off the moving Pacific plate and onto the more stationary North American Plate is advisable to reduce seismic risk. Although there is no risk from seismic risks, 50% of earthquakes occur on the “Ring of Fire” around the Pacific Ocean, and 81% of the largest earthquakes occur there. All of California is considered “very” or “extremely” hazardous.

Comparison with Humboldt Bay Nuclear Plant ISFSI
Humboldt Bay Nuclear Plant was very small, and during decommissioning, had the need to store only five multipurpose canisters, and one canister with Cesium Than Class C waste. PG&E selected the underground Holtec UMAX design, but modified the design not just to accommodate the “thin” canisters, but also to include the Holtec Hi-STAR transportation overpack (without the impact limiters installed, see illustration).

This is VERY similar to the DWG design because it includes two containment boundaries, and the gap between the overpack and the canister is purged of oxygenated air and replaced with purified helium. The outer shell at Humbold is the Hi-STAR transportation overpack and so it does provide excessive radiation shielding instead of transportation. That shielding is redundant in the storage configuration because the underground UMAX facility also provides sufficient radiation shielding, but more less needing truck, the Holtec Hi-STAR 190, similar to the one at Humboldt, has ways that are a total of 15.25“ thick, including nine inches of lead encapsulated in steel.\(^{60}\) Overpacks include concrete and sometimes water encapsulated in a steel jacket. The units

Comparison with Yucca Mountain
We should note that the canister design at Yucca Mountain (YMR) uses a single-wall canister using two layers of different steel alloys bonded together, which together is about the same thickness as what we envision for the DWG outer shell.\(^{3}\) The two layers in the YMR design has no gap to facilitate monitoring for cracks of the outer canister. They also add increases to the partial layer, in the form of a titanium (and costly) “drill shield” to avoid corrosion induced corrosion. We believe there would have been more merit in a slightly different design by extending the drill shield as an enclosed outer shell, like the DWG design.

According to Farmer et al. of the Lawrence Livermore Laboratory regarding the waste package proposed for YMR, “The waste package outer barrier (VFW) is to be made of Alloy 22 (UNS N06220), while the underlying structural support is to be made of 304N or 304L (UNS S31600). Alloy 22 is a high-performance nickel-based alloy with substantial amounts of chromium (11%), molybdenum (13%) and tungsten (3%). This particular material contains palladium (0.12-0.25%) to enhance resistance to hydrogen induced cracking.”

Stress Corrosion Cracking
Farmer continues, “There are several modes of failure that could lead to premature breach of the waste package. One of the most devastating is stress corrosion cracking (SCC). Initiation and propagation of SCC can occur at relatively low stress intensity factors. After initiation, through-wall propagation is essentially instantaneous when compared to the 10,000-year time scale of importance to the high-level waste repository at Yucca Mountain.”\(^{19}\) (This issue has already been fully described in this paper.)

The paper by Farmer goes on to say there are a number of strategies to reduce the probability that such cracking will occur, but there is no way to prevent all risk of such cracking. Other than this factor, they claim that general corrosion will not consume the container for 10,000 years.\(^{19}\) We submit that the YMR storage container and its associated drill shield is not optional. The drill shield provides incomplete encapsulation and is built into the storage container rather than being part of the canister shell. There is no means to monitor and detect leakage of the canisters at YMR and no way to do much about anything if a breach does occur. The drill shield was a very costly attempt to reduce the flow of water over the canisters but can’t stop inundation from below.


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Comparison with Holtec UMAX system with metal liner

The underground Holtec UMAX system, like that installed at San Onofre, does include a metal cavity liner. This may appear to provide another layer of defense, but it is almost useless because it is not sealed, cannot be easily replaced, is not pressurized to detect leaks and to isolate the canister from the corrosive coolant air; nor is there an integrated and redundant monitoring package. Thus, it does not — in itself — provide the attributes of the DWC design, and therefore, we see a need to add the DWC outer shell to the UMAX system, which unfortunately may require slightly larger canisters. Modifications to the current UMAX system design may provide none of the advantages of the DWC design by pressurizing the cavity between the metal liner and the enclosed metallic canister with helium once the canister cools to the point that the lid can be sealed, and outfitting the lid with the standard monitoring units. In any case, the UMAX system as it stands is insufficient after about 20 years of cooling.

Comparison with Maine-Yankee Failed canister enclosure

We understand that the Maine-Yankee plant has a failed canister overpack on hand which exhibits some of the characteristics we are suggesting in the DWC outer shell so as to provide a double-wall canister. The image of this component (adapted) provides a concept which would likely be quite similar to what we have envisioned in this recommendation, albeit with the note that the Failed Canister Overpack does not provide the monitoring features we are recommending.

HELMS for Hanford

Since HELMS is really a set of criteria rather than a fixed design, it may help us find a better solution for the Hanford, WA site, even though this question is out of the intended scope of our attention. Nevertheless, this question can be entertained as follows.

Much of the waste at Hanford is in the form of liquid waste in tanks, some 149 single-shell tanks (SSTs) and a few dozen double-wall tanks. The SSTs are all acidic for one and decides part their design life. Some of capacity of all tanks at Hanford is 206,000 cubic meters. Assuming a DWC system similar in size to the Holtec PFC-37 plus the DWC outer shell, we end up needing about 15,000 tanks. If placed 10 feet on center, 122 units on a side, this would consume an area of about 75 acres — easily sized at Hanford. The benefit to using many smaller tanks rather than large tanks is that a) they can be produced as a factory setting with tighter tolerances and quality assurance; b) they can be more easily replaced if there are any leaks, and; c) if one is completely breached, it is not nearly as large a catastrophe as a large tank. That said, this is a much different problem because liquid waste would more easily leak out of a canister system when compared with spent fuel, which is solid in form. And, some of the tanks were filled with grain to absorb the liquid and getting it out is a problem of its own, and in some cases the waste is vitrified into a solid.

Conclusion

We hope that the nuclear industry and community concerned with nuclear spent fuel will consider our recommendations in this document, and start to make some changes in the planning, most particularly for any new ISFSI installations or CSS proposals.

We appreciate feedback and comments from the community as we progress this plan for national implementation. Please email the author.

About the Author

Ray Lutz, MSEIT, has been involved in nuclear decommissioning and spent fuel issues most particularly regarding the shut downs and decommissioning of the San Onofre nuclear plant, and has served in the role as intervener at CPUC and NRC proceedings, among other endeavors.

Ray Lutz, rclutz@citizensoversight.org / 619-820-5321
Citizens Oversight
771 Janacha Rd, #148, El Cajon, CA 92019
Statement of the Problem & Proposed Solution

6. CONCLUSION 1: MISMATCH BETWEEN NRC REGULATIONS AND REALITY OF SPENT FUEL STORAGE.

This petition is focused on Part 72 regulations regarding spent nuclear fuel (SNF) and related regulations. The crux of the problem has been a mismatch between these NRC regulations which define elements of Independent Spent Fuel Storage Installations (ISFSIs), which were originally based on the expectation that a deep geologic repository would be open in 1998, versus the reality of the current storage paradigm implied by storage at nuclear plants "indefinitely," as now allowed under the "NRC Continued Storage of Spent Nuclear Fuel" document.¹

There is no deep geologic repository, and we assert that the SNF is so thermally and radiactively "hot" that, even if a deep geologic repository were available for use, it could not be used for many decades or centuries without active cooling. If Yucca Mountain were open today and put into use, it would have to be actively cooled for some 100 to 200 years, effectively placing that waste on the surface. Thus, the actual situation has changed, while the NRC regulations have not changed sufficiently to respect the current reality.

7. CONCLUSION 2: NRC NOT ORGANIZED TO ADDRESS STORAGE DOMAIN

The change in the storage paradigm reveals two very different underlying regulatory domains:

a) licensing of operating commercial nuclear plants during their useful life, and
b) regulating SNF storage from those nuclear plants indefinitely.

The first has been the primary activity of the NRC since it was founded while the second has only recently started to become important. As time progresses, the primary activity of the NRC is expected to transition from the former to the latter.

8. The big difference between the two activities mainly has to do with the time frame within which the regulations must operate. The former activity has a relatively limited time frame, initially expected to maintain safe confinement despite aging mechanisms, allowing inspections and minimal replacement of subcomponents.

Also, we assert passive life should be defined with the goal of 300 years, such that the storage system will remain safe, contained, and shielded from the environment for a minimum of 300 years with no maintenance or other intervention.

11. CONCLUSION 4: NRC Regulations should embrace HELMS.

A more rigorous statement of the problem and technical context is provided in the companion document, "A New Strategy: Storing Spent Nuclear Fuel Waste, Featuring HELMS: Stabilized Extended-life Local Monitored Surface Storage and DWC-Dual Wall Canisters," which is attached to this petition and incorporated in its entirety.

13. In summary, the HELMS proposal suggests that the NRC and the public embrace surface storage, since that is actually how the waste is being stored today, and that we should plan to store it safely, passively, and indefinitely on the surface. The time is over to rely on "freeing it out later."

We take steps to predictably move toward safe continued surface storage, and we assert that a design life goal of 1,000 years is prudent.

13. HELMS stands for Hardened, Embedded-life, Local, Monitored Surface Storage, Hardened to deal with the reality of the terrorist and other unpredictable events, Embedded-life to embrace a 1,000 year DESIGN LIFE, 300 year PASSIVE LIFE, while still allowing a 40-year license term. Local, to imply that the waste will likely be moved to perhaps a half-dozen Consolidated Interim Storage (CIS) ones which are near the source of the waste but away from the coastal areas and other waterways, Monitored, by defining and including a standard monitoring electronics package that can provide 7/24 monitoring during the initial decades of storage. Surface, to emphasize the fact that the waste is simply too hot to place in any geologic repository; b) no geologic repository actually exists, and c) if the SNF is emplaced in the repository, it would need to be actively ventilated for up to 200 years.

14. It appears at this juncture that yet again, the NRC is relying upon some magical solution to be developed to deal with the waste once the current dry storage facilities (ISFSIs) start to reach their useful life, since the time horizon of the NRC license is only 40 years. At the end of the term, will there be any option to deal with corroding and cracking canisters, or will the NRC simply approve just about anything as "safe" because it will be very expensive to fully repack the waste? Or will the NRC just revise the requirements over and over, or perhaps through budget cuts, just forget about it? Today, we are again painting ourselves into yet another corner through impudent planning.

15. CONCLUSION 5: Consolidated and MRs storage should be HELMS compliant.

Consolidated Interim Storage has been proposed, The expected useful life of these facilities is much longer, and therefore, most specifically in this case, the design life of the facility must be much longer, and we assert 1,000 years should be the design goal.

16. It is our intention that this petition and the HELMS document can be applied to a number of NRC proceedings currently in process, have been recently closed, and to any other proceedings that may need to be opened to address how the NRC focus can start to shift from operating nuclear plants -- and their relatively short life -- to the regulation of dry storage facilities, and their very long required useful life.

17. Regulations Affected

The following regulations deal with issues which are related to the recommended changes described by the HELMS document, and assuming we enforce the use of the DWC system, We have attempted to make recommendations regarding changes we feel are appropriate, under the concept that the term for the license and CoC are not changed (i.e., 40 years), while the new concepts of Passive Life and Design Life are added. Exports at the NRC will no doubt be aware of many other documents and regulations that will be affected, and we hope to work with these persons and groups directly to orchestrate the changes needed.

For purposes of discussion and review, each item is numbered ("CN") as a separate

CN.1: Stabilized Extended-life Local Monitored Surface Storage, CN.2: A New Strategy: Storing Spent Nuclear Fuel Waste, CN.3: Consolidated Interim Storage (CIS) ones which are near the source of the waste but away from the coastal areas and other waterways, CN.4: Monitored, by defining and including a standard monitoring electronics package that can provide 7/24 monitoring during the initial decades of storage. CN.5: Surface, to emphasize the fact that the waste is simply too hot to place in any geologic repository;
22. Recommend removal of absolute terms from this document, i.e., “The maximum license term for a DSF is 40 years from the date of issuance (see 10 CFR 72.42(a)),” and instead opt for indirect reference such as “The maximum license term for a DSF is defined by 10 CFR 72.42(a),” or maybe both: “The maximum license term for a DSF is defined by 10 CFR 72.42(a), and is 40 years as of this writing.” The point is to avoid having to rewrite this document should Part 72 change in the future.

23. With that said, we recommend that the LICENSE TERM of 40 years is fine as long as the DESIGN LIFE and PASSIVE LIFE are separately defined to permit 1,000 years and 300 years, respectively. (Please see the more thorough definition of these terms above.)

24. Table 3-2 on page 3-22 defines “Design Life” as “Limited to the requested term in the application, not to exceed the applicable limit in other 10 CFR 72.42(a) or 10 CFR 72.230(b).” This is incorrect. That is the LICENSE PERIOD, The DESIGN LIFE should be defined as the entire life expectancy of the DSF, including periodic maintenance, while the PASSIVE LIFE should be defined as the expected time within which the system will remain safe, including containment and sheltering, without any administrative controls, inspections or maintenance.

25. CONTESTION 35. A NEW SECTION is needed to separately address the needs for HELMS-compliant extended-life storage at a DSF (MESS and CIS storage) to separately address the longer life requirements for these systems. The design, and therefore the Review Plan for the DSF storage facilities addressed in the existing document is insufficient for HELMS-compliant systems. Any spent fuel canisters in CIS and MESS facilities should be cool enough to allow the outer shell of the DSF system when canisters are moved to those facilities, and those facilities should be HELMS-compliant.

26. CONTESTION 36. Overpack Dimensions for any on-site facilities SHOULD include the option that they can be upgraded to incorporate the outer shell of the DSF system, and be HELMS compliant. Thus, SIOULD provide adequate dimensional space between the overpack and the MFC canister so that the DSF outer shell can be added at the appropriate time, however, if there is a plan in place to move the canisters to another CIS or MESS facility, then this

28. CONTESTION 42. The regulatory issue resolution protocol (RIRP) regarding Chloride Induced Stress Corrosion Cracking of spent fuel canisters was resolved by adding administrative controls, increased inspections, and improved aging management protocols. We disagree that this is sufficient because of the reasons put forth above. Administrative controls are insufficient for the actual period of time we must plan for surface storage. Therefore, this RIRP should be reopened and the design of the canister system should be revised along the lines of the Dual-wall canister design. One part of the response to this RIRP was the generation of NUREG-2214, below, which we also find insufficient.

29. CONTESTION 44. Management of Aging Processes In Storage (MAPS) Report. Unfortunately, we were misinformed about the closure date for comment and respectfully submit this comment after the closure date. Our comment is comprised by the HELMS document as a basic and the following.

30. CONTESTION 46. Although we view NUREG-2214 as a large step in the right direction as it contains a wealth of valuable information on aging processes and experiences, we have a fundamental disagreement with this document. The abstract states: "The MAPS Report evaluates known aging degradation mechanisms to determine if they could affect the ability of dry storage systems to fulfill their safety functions in the 50- to 60-year period of extended operation." We view this time scale as to be insufficient, as we have outlined. Simply stated, 20 to 60 years does not acknowledge the clear reality of the likely situation, which we believe is 300 to 1,000 years, and that only deals with the first 1/3 of that problem.

31. The NUREG-2214 should be enhanced by avoiding the view that we are only interested in the 20 to 60 year time frame. At present, if an aging mechanism is not expected to be significant within that period of interest, the current text just states it is "not credible." We would prefer that the full life of the subject material be provided, and if it is unknown, then that can be stated. This would make the document useful for planning for the longer time scales we assert are necessary for a prudent spent fuel storage plan to be developed.

32. This document is based on an invalid assumption. It is not credible that spent fuel storage systems can exist for only 20 to 60 years, To make such an assumption is potentially imprudent.

33. COMMENT ON "Standards Review Plan for Spent Fuel Dry Storage Systems and Facilities" (NUREG-2215 - Bucketed ID NRC-2017-D611)

The Standards Review Plan for Spent Fuel Dry Storage Systems comment period closes on January 2, 2018. Since NUREG-2215 is modeled largely as a result of the thinking behind Part 72, it suffers from many of the same considerations already mentioned for Part 72 above. Therefore, our comment on NUREG-2215 includes the entirety of the instant document and the companion HELMS document. The vast majority of NUREG-2215 will require no change even if we achieve our goal of getting the nuclear industry and regulator agency to embrace the HELMS criteria. However, throughout, there are a few important changes and since the concept of longer life is a fundamental assumption to the review plan, other changes throughout NUREG-2215 will be required. And specifically, we offer the following specific comments.

34. CONTESTION 35. LICENSE TERM vs. DESIGN LIFE vs. PASSIVE LIFE.

The most important underlying issue is the difference between the licensing period and the expected Design Life of the Dry Storage Facility (DSF). Since NUREG-2215 relies on Part 72, one reasonable approach is to remove absolute references to the license period and licensed life, and change the wording slightly to allow a difference between the term of the license and the expected life of the system, Page 3-7, says, "The applicant should demonstrate that the design will last for the proposed effective certificate or license term, as applicable." This should be changed perhaps to: "The applicant should demonstrate that the design will last for the proposed effective certificate or license term, as applicable, will last for the proposed "PASSIVE LIFE with no administrative controls or maintenance, and will last for the DESIGN LIFE with specified periodic maintenance."

Although this document has been submitted as comment to NUREG-2215 for consideration, the variance we raised in the draft petition process may be slightly revised. Please allow the draft petition process to be submitted.

36. CONTESTION 37. Page 8-4, 8.5.15 Management of Aging Degradation.

Current text says: "Initial Storage Term – In some cases, materials degradation may challenge the ability of a component to fulfill its intended function for the duration of the storage term, if an applicant cannot demonstrate adequate material performance, then the BAR should describe maintenance programs (e.g., monitoring, inspections) to address issues associated with materials aging degradation;"

We have thoroughly described our rationale for extended-life criteria of HELMS and our proposed solution for the extended life criterion, the Dual-Wall canister outer shell, which can be added after about 10 to 20 years of containment in the DSF, which is the likely worst-case time when the spent fuel is probably cool enough to allow the surrounding outer shell to be used, and yet any part of the canister is not below 100°C, so that declassification will not occur and prompt CISSC.

Therefore, we disagree that any DSF or DSF should be used in a manner that extensive manual inspection, such as by using inspection robots, is required. With that said, the HELMS criteria does include the ability to constantly monitor the DSF system.


The Blue Ribbon Commission acknowledged that existing DSFs do not provide adequate monitoring. The wording in Part 72 is inadequate because of the term "as needed.", Monitoring should be mandatory.

On Page 9-4, this section continues with the following: "The application should describe the proposed monitoring capability and surveillance plans for mechanical closure seals. In instances involving welded closures, the commissioned has accepted that no closure monitoring system is required. This practice is consistent with the fact that other welded joints in the confinement system are not
info@DCSIC.org

From: DCSafety@DCSIC.org
Sent: Wednesday, June 6, 2018 9:19 AM
To: "Ray Lutz"
Cc: Info@DCSIC.org
Subject: RE: HELMS proposal before the NRC

Mr. Lutz:

This will acknowledge receipt of your message below with its attachments concerning the Citizen’s Oversight Projects HELMS proposal. This information has been provided to the DCSIC Members and Technical Consultants for their prompt attention and consideration as to any additional information that may be needed regarding the issue raised in the White Paper and the Petition for Rulemaking.

Thank you for contacting the DCSIC and for your interest in its activities. 

Best regards,

Robert Rathie
DCSIC Ass’t Legal Counsel
(800) 439-4488 in CA
info@dcsic.org

--- Original Message ---
From: Ray Lutz [mailto:raylutz@citizensoversight.org]
Sent: Thursday, May 31, 2018 1:07 PM
To: dcsafety@dcsic.org
Subject: HELMS proposal before the NRC

Greetings:

Your committee has frequently wrestled with the issue of the “thin” canisters vs. “thick” W-NTRs as used in Europe and Japan. There is also the inconsistency between the “inoperable” period of time that the “Vaeate Confidence” report now allows storage of spent fuel in BWR’s of any plant and the fact that the DESIGN LIFE of the thick canisters is only 40 years.

These issues have been addressed in the whitepaper on HELMS, which makes Harden’s Extended Life, Local, Monitored, Surface storage, and a formal petition submitted to the NRC for Rule Making.

The complete issue can be found here:
http://coupwrl.org/Comissa/helmspropaosal

The NRC docket is here: https://www.regulations.gov/docket?D=NRC-2018-0017

The public comment period ends on June 5.

I suggest that perhaps this should be placed on the agenda, and I would be happy to attend to present it and answer questions.

For your convenience, I am attaching the HELMS whitepaper and HELMS NRC Petition.
DCisc
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

COMMITTEE MEMBERS
ROBERT J. MEYER
PETE LAM
FER D. FISCHER

JUNE 8, 2018

ATTN: MR. TIM STRAW
INTERIM ASSOCIATE DIRECTOR
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE
AGENDA PACKET

DEAR MR. STRAW:

Enclosed please find a copy of the Agenda Packet for the next meeting of the Diablo
Canyon Independent Safety Committee which will be held in Avila Beach on June 13-14, 2018.
Would you please file this packet in the Reference Department and make it available to the
public.

Thank you for your cooperation and assistance in this matter.

R.W.R.
Enclosure

R.W.R.

OFFICE OF LEGAL COUNSEL
ROBERT W. ROTH
ASSISTANT LEGAL COUNSEL

Diablo Canyon
INDEPENDENT SAFETY COMMITTEE (DCISC)

PUBLIC MEETING:

Wednesday Afternoon,
June 13th 1:30 P.M.
Introductions, public comments and communications to the Committee
Business session including discussion of agenda
of Committee activities, scheduling and plans during 2018; review of the
DCISC's open public meeting agenda:

Mr. Brian Burton
Mr. Steve Adams
Mr. Brian Burton
Mr. Michael Wiesman
Mr. Tom Durnin
Mr. Tom Durnin
Mr. Michael Wiesman
Mr. Tom Durnin
Mr. Michael Wiesman
Mr. Tom Durnin
Mr. Brian Burton
Mr. Brian Burton
Mr. Michael Wiesman
Mr. Tom Durnin
Mr. Michael Wiesman
Mr. Tom Durnin
Mr. Michael Wiesman
Mr. Tom Durnin
Mr. Michael Wiesman
Mr. Tom Durnin

Thursday Afternoon,
June 14th 1:00 P.M.
Introductions, public comments and communications to the Committee:
Further informational presentations by PG&E on plant safety and operations,
including performance during the twelfth refueling outage (R-320); further
discussion of administrative, legal, regulatory and financial matters.

Wednesday Evening,
June 13th 8:30 P.M.
Public comments and communications to the Committee:
Informational presentations by PG&E on plant safety and operations,
including the state of the plant, plant performance, operational highlights and station
operations, and an update on long-term local project planning after
the California Public Utilities Commission's decision to require PG&E to
report on plans for the Diablo Canyon Power Plant's (DCPP) present schedule
and progress on the plant'superpower plant upgrade plan,
which has been sufficient to meet the Commission's standards.

Please plan to attend!
For further information call
1-800-439-6598 or visit:
www.dcisc.org.

A copy of the meeting agenda packet may be
viewed at the PG&E's website:

Thursday Morning,
June 14th 9:00 A.M.
Introductions, public comments and communications to the Committee:
Further informational presentations by PG&E on plant safety and operations,
including NRC enforcement actions, NRC performance indicators, reportable
events and notices of violation and issuance of 
NRC NRC issue report, and plans for the Diablo Canyon Power Plant's
superpower plan, including the status of the Nuclear Power Plant Initiative
and its implementation.

Avila Lighthouse Suites
Avila Lighthouse Suites
Point San Luis Conference Center
First & San Francisco Streets
Avila Beach, California

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PRESS RELEASE:

PUBLIC MEETING

OF THE

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE (DCISC)

WITH:
The Members of the Independent Safety Committee:
Dr. Robert J. Rudnitz
Dr. Peter Lenn
Dr. Pat F. Peterson

WHAT:
An opportunity for the public to observe and receive information concerning the activities of the Independent Safety Committee including recent fact finding visits and informational presentations concerning safety-related issues at Diablo Canyon Nuclear Power Plant:

▷ Committee Business Session - Wednesday afternoon,
    Review of the Open Items List and Fact Finding Reports.
▷ Presentation on the State of the Plant including Station performance, key events, operational highlights.
▷ Update on long-term capital project planning after the December 2024 Diablo Canyon outage.
▷ Update on the Electric Reliability Plan and ongoing efforts to retain sufficient numbers of licensed operations department staff.
▷ Update on NRC performance indicators, licensee event reports, features of NRC’s draft inspection, and reactor inspectors’ licensing.
▷ A presentation on the seismic probabilistic risk assessment project results and the status of the review of the truss analysis.
▷ Performance during the current refueling outage for Unit 2 (2024).
▷ Committee discussion of a potential role for the DCISC following closure of the Operating License and a post-shutdown role ex ante and engagement of a consultant to review decommissioning issues.

WHERE:
Avila Lighthouse Suites - Point San Luis Conference Center
First & San Francisco Street
Avila Beach, CA

WHEN:
Wednesday and Thursday - June 14-15, 2023

TIMES:
1:30 p.m. to approx. 3:30 p.m. (Wednesday, June 14)
5:30 p.m. to approx. 7:45 p.m. (Wednesday, June 14)
9:00 a.m. to approx. noon (Thursday, June 15)
1:00 p.m. to approx. 3 p.m. (Thursday, June 15)

FOR FURTHER INFORMATION:
Including on these and other topics reviewed by the Independent Safety Committee or the specific dates and times for particular presentations
Contact 1-800-331-6090
or review the meeting agenda online at www.dcisc.org

The Committee’s policy is to schedule public meetings in locations that are accessible to people with disabilities. The Point San Luis Conference facility is an accessible facility and hearing assistance devices are available. The meeting will be live streamed in real time at:
http://www.let’smeetofficial.com/meetings demonstrates how to access real-time streaming
This may be a particularly useful and informative time for him to visit. Tonight, PGE is convening their Double Decommissioning Engagement Panel for the first time here in SLO. It will be webcast, and I am attaching their proposed agenda, which lists the webcast site near the top (same video vendor and service as you use. AOP Video, www.aop-video.org). The webcast will be archived, and when it is available I will forward it to David Victor. Given ongoing discussions about the role of the DCSC in a period of decommissioning, the timing seems favorable to seek his input, given his several years of work in the SONGS community.

I look forward to a productive next meeting.

Yours truly,

DAVID WEISMAN
Outreach Coordinator
Alliance for Nuclear Responsibility
www.anr.org

From: Bob Budsing [mailto:budsing@paradise.net]
Sent: Wednesday, May 30, 2018 12:14 PM
To: [Redacted]
Cc: perferson@me.com; peterlent@cadl.com
Subject: Re: David Victor to attend next DCSC meeting?

Dear David,

I am not sure as to whether David Victor has accepted our invitation, or not. I recall hearing that he had a possible conflict; Perhaps Bob Ratcliffe can respond one way or the other.

Bob Budsing

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On 5/30/2018 1:02 PM, David Weisman wrote:

Dear Bob et al,

I realize we are about 2 weeks away from the next DCSC meeting in SLO. I was wondering how your offer to David Victor to attend and speak of his decommissioning experience at SONGS was received? Was he agreeable and have arrangements been made for him to attend your next meeting here in SLO?
Diablo Canyon Power Plant Public Tour
With Members of the Diablo Canyon Independent Safety Committee

At 9:30 a.m. on the morning of Wednesday, June 13, 2018, the Diablo Canyon Independent Safety Committee will conduct an inspection tour of certain accessible areas at the Diablo Canyon Nuclear Power Plant. This tour will take approximately three and a half hours and will be open to a limited number of members of the public. The tour will not enter the protected area of the plant.

Because the plant is an operating nuclear facility, the number of participants must be limited and space will be reserved on a first-come, first-served basis. Reservations, which must be made in high demand, will be accepted for up to more than four immediately family members per call, each of whom must be at least ten years of age. Personal information including, but not limited to, address, birth date, social security number, gender and telephone number are required when making a reservation. You will be required to present an NFC or approved form of identification which must include a photo to take the tour. The Committee makes every effort to make its public tour accessible to individuals with disabilities. If you plan to attend and need special accommodations, please so indicate when making your reservation. Free security check-ups are required of all attendees in compliance with the Department of the US Nuclear Regulatory Commission (NRC) and Pacific Gas & Electric Company. Hand-held metal detector wands or physical checks may be performed. No photographs are permitted. Appropriate attire is required of all participants. Long pants and shirt, closed toe, flat shoes must be worn. Hard hats, safety glasses and hearing protection may be required and if required will be provided. No sandals, cut-out or other shoes with large flaps or heels, totes, stilettos or similar are allowed. No smoking, photography or the use of cell phones is permitted.

Reservations can only be made by calling the Committee's toll-free number:

Commander: 800-893-9265


Between the hours of 9:00 A.M. and 5:00 P.M. on Tuesday, May 29, 2018, all reservations will be made.

Be sure to call the three-digit number listed above.

To: info@DCISC.org

From: Annie Aguiriga

Subject: RE: Senate Bill 1090:
Letter to Sen. Moonings Office from Diablo Canyon Independent Safety Committee

Hi, Robert,

Thank you so much for the information. Very much appreciated.

As always, certainly do not hesitate to contact me with any questions or concerns.

All the best,

Annie Aguiriga
Assistant District Director
OFFICE OF SENATOR WILLIAM W. MOONING
California State Senate Majority Leader
PO Box 20949, Sacramento, CA 95820
Tel: 916-651-4317
Fax: 916-651-4373

From: info@DCISC.org [mailto:info@DCISC.org]
Sent: Wednesday, May 23, 2018 5:26 PM
Cc: DCISC@ATT@WilliamLawrence; Bob Bradshaw; Peter Peterson; Peter Lam; D'Vene Lナー; Ferman Wadud

Subject: RE: Senate Bill 1090:
Letter to Sen. Mooning's Office from Diablo Canyon Independent Safety Committee

Ms. Aguiriga,

Per your prior communications with Bob Raths at this office, and the action taken by the DCISC yesterday at its meeting, attached please find a signed copy of the Safety Committee's letter concerning Senate Bill 1090, as introduced by Senator Bill Mining.

Tomorrow morning we will also send the original of the letter to Sen. Moonings office via FedEx, and will fax another copy to Legislative Director Bethany Walesi (at 916-651-4917).

Thank you for your courtesy and attention to this matter.

- Robert R. Wallington, DCISC Legal Counsel

From: info@DCISC.org

Sent: Friday, May 25, 2018 5:22 PM
To: "Rochelle Becker"
Cc: Rochelle Becker @dcisc.org

Subject: RE: Today's letter SB 1090

Attachments:

Rochelle, attached is a copy of the letter concerning SB 1090 as approved by the DCISC during the May 22 meeting in Berkeley.

My apologies for not getting this out to you sooner; I was out of the office for a minor medical appointment on Wednesday and all day yesterday.

I wish you a most memorable Memorial Day weekend with your family,

Best regards,

Bob Raths

--- Original Message ---

From: Info@DCISC.org [mailto:info@DCISC.org]
Sent: Tuesday, May 22, 2018 11:50 AM
To: "Rochelle Becker" rochelle.becker@dcisc.org
Cc: Info@DCISC.org

Subject: RE: Today's letter SB 1090

Rochelle. I am sorry I did not see your email until after the meeting - the pre-meeting draft is on our website and when I get back to the office I will produce the final draft meeting version. I will send a copy when it is ready.

Hope that will work, again my apologies,

Bob

--- Original Message ---

From: Rochelle Becker [mailto:rochelle.becker@dcisc.org]
Sent: Tuesday, May 22, 2018 9:35 AM
To: info@dcisc.org

Subject: Today's letter SB 1090

Hi Bob

Might you have a copy of the draft letter that you can share re: SB 1090?

Thanks

In peace

Rochelle

Sent from my iPhone
Good morning,

Here are the two power point presentations we will be reviewing at today’s IPPR meeting. They are:

1) DCP Seismic PPA – Negar Jahangir will lead this discussion; and
2) 2017 Long-Term Seismic Plan – You will lead this discussion.

For those who are dating in, this completes the transmission of documents that will be shared at this afternoon’s meeting. For those attending in person, hard copies of the documents will be available.

Thanks,
Valerie Winer
Chief, GEC Regulatory Relations
Pacific Gas and Electric Company
415-370-7179 (x)

From: Winer, Valerie
Sent: Tuesday, May 22, 2018 6:37 PM
To: Zemon, David; David Zemon; Zemon, David
Cc: Maurath, Garr; Maurath, Garr
Subject: Diablo Canyon Probabilistic Risk Assessment

I have attached the following documents that will be discussed tomorrow’s meeting:

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1) 2017 Long-Term Seismic Plan Report – this is the longer, narrative document about PG&E’s LISP activities in 2017. PG&E will bring a few hard copies of this report to the IPPR meeting tomorrow, if you prefer not to print this document tonight.
2) Numerous documents exaggerated from PG&E Seismic PPA submittal on Peer Review Issues. While PG&E is unable to provide the entire document, because it and the associated models are proprietary, PG&E provides the excerpted pages from the Report that address the peer review feedback. These files are: a) 29-3 App. X Review; b) 29-3 App. I Review; c) 29-3 App. I Review; d) 29-3 App. J Review; e) 29-7 App. X Review; f) 29-7 App. J Review; g) 29-9 App. X Review; h) 29-9 App. J Review; and i) 29-9 App. PG&E will also touch on these issues in its presentation on the Seismic PPA.

Power Point presentations on the Seismic PPA and highlights of the 2017 LISP are forthcoming. We will bring a few hard copies of these presentations tomorrow as well for your convenience.

Valerie Winer

From: Zemon, David
Sent: Tuesday, May 22, 2018 1:00 PM
To: Maurath, Garr; Maurath, Garr
Cc: Zemon, David; Zemon, David
Subject: Diablo Canyon Probabilistic Risk Assessment

I have attached the following documents that will be discussed tomorrow’s meeting:

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I previously sent the NRC Probabilistic Risk Assessment, but I’m re-attaching it [see attached] just in case. Since that document is 570 pages, we will not be printing out hard copies of the meeting.
Diablo Canyon
INDEPENDENT SAFETY COMMITTEE (DCISC)
Public Meeting:

Wednesday Afternoon,
June 15th, 1:30 P.M.
Introductions, public comments and communications to the Committee; business session including discussion of Committee activities, scheduling, and plans during 2016; review of the DCISC’s Open Item List and reports on fact finding visits by Members and Technical Consultants to Diablo Canyon Power Plant (DCPP), and discussion of administrative, legal, regulatory and financial matters.

Wednesday Evening
June 15th, 5:30 P.M.
Public comments and communications to the Committee; informational presentation by PG&E on plant safety and operations, including the “State of the Plant,” plant performance, operational highlights and station activities, and an update on long-term capital project planning after issuance of the California Public Utilities Commission Decision to retire DCPP by 2035 including the Plant Investment Review and the Project Review Working Group processes, and an update on the Employee Retention Plan including efforts to retain sufficient numbers of licensed Operations Department staff.

Thursday Morning,
June 16th, 9:00 A.M.
Introductions, public comments and communications to the Committee; further informational presentations by PG&E on plant safety and operations, including NRC enforcement actions, NRC Performance Indicators, reportable events and notices of violation and notice issued by NRC Resident Inspectors, a report on the results of the Seismic Probabilistic Risk Assessment project including the status of review of the business case at DCPP and its environs; and a report on a fact finding visit by a Member and technical staff on site.

Please plan to attend!
For further information call
1-800-439-4668 or visit the
Committee’s website at www.dcsu.org
A copy of the meeting Agenda packet may be
available at the Cal Poly Library’s Reference
Department and the Agenda packet is available
on the DCISC’s website. Each session of a
public meeting of the DCISC is available
directly during the meeting by visiting
www.dcsu.org and viewing it in a
downloadable format. Those interested in the
Committee’s website’s
WEBCASTS RECORDINGS LIVE OR SUBSEQUENTLY
ARCHIVED, PLEASE VISIT THE MEETING’S
WEBSITE TO WEBSIDE THE ADMINISTRATION
ON THE COMMITTEE IS

Avila Lighthouse Suites
Avila Lighthouse Suites
Paint San Luis Obispo County
First & San Francisco
Avila Beach, California

In Peace

Rochelle Becker, Executive Director
Alliance for Nuclear Responsibility
PO 1328
San Luis Obispo, CA 93406
www.ancr.org

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G.2 – 109
G.2 – 110
Bob Rathsie
For the ECSC

From: rochelle.becker [mailto:rochelle.becker@gmail.com]
Sent: Friday, June 15, 2018 12:00 PM
To: ECSC info@dcsc.org; Cothren, Justin@Energy; Justin.Cothren@energy.ca.gov; Barter, Kevin@Energy; Kevin.Barter@energy.ca.gov
Subject: New decommissioning draft regulations

Dear DCSC and CEC:

The Alliance received this information on Wednesday and thought it might be helpful as we move towards closure at Diablo.

Attached are four draft Regulatory Guides that the NRC placed in ADAMS recently.

Regulatory Guides are intended to flesh out/clarify NRC's expectations regarding regulations.

These draft Reg Guides accompany the NRC's draft decommissioning rulemaking effort.

The NRC is not soliciting public comments on these draft Reg Guides. It looks like they issued the drafts at this time to help people develop comments on the draft decommissioning rule when (and if) it is published in the Federal Register for public comment.

In Peace
Rochelle

Rochelle Becker, Executive Director
Alliance for Nuclear Responsibility
PO 1328
San Luis Obispo, CA 93406
www.anr.org

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Rochelle - I do not believe any of the DCSC took your comments as any sort of personal attack and I know I did not.

On the contrary, I think the Members were, like me, very interested in and appreciative of receiving the information you provided concerning the possible affect and political implications of the Committee's SB 1090 letter but satisfied with their rationale for confining their comments only to those issues they believe could affect operational safety - and certainly in that ven they agree and share the goal of AANR and all the other settling parties (and any reasonable person) that the plant continue to operate safely until and other cessation of generation.

Best for a good afternoon,
Bob R

From: rochelle.becker [mailto:rochelle.becker@gmail.com]
Sent: Friday, June 15, 2018 2:38 PM
To: info@DCSC.org
Subject: Re: New decommissioning draft regulations

You're welcome, Bob. I hope our comments on the letter did not seem like a personal attack as I think we all want the same thing - for Diablo to operate safely until it closes, no matter when that occurs.

Inpeace
Rochelle

On Fri, Jun 15, 2018 at 6:13 PM, info@DCSC.org <info@dcsc.org> wrote:

Rochelle -

Thank you for your email with the attachments which I have provided to our Members and the Technical Consultants. Any thanks for your comments and the information you provided at the public meeting this week.

I know that the Members value and appreciate your and Dave's contributions and input on behalf of AANR.

Take care and have a good weekend.

Best regards,
Bob Rathsie

From: rochelle.becker [mailto:rochelle.becker@gmail.com]
Sent: Thursday, June 28, 2018 10:29 AM
To: DCSC-info@dcsc.org
Subject: New seismic info

The technical issue here relates to long-period motions, and whether magnitude saturation actually occurs at those frequencies. Several large earthquakes around the world in recent years have produced surprising measurements which have tended to strongly reinforce Dr. Hart's apprehensions. While long period motions are not generally the frequencies of greatest concern for components of nuclear power plants, DCNSP's magnitude saturation issue (where PG&E has asserted that an 8.0M is of no greater concern than a 6.5M) combined with the absence of local data about near-field earthquakes made the quoted statement from PG&E's top guy extremely problematic.

"This goes to the heart of the matter - 'The magnitude saturation effects are a consequence of the lack of evidence for high magnitude events.'"

More recently, PG&E has acknowledged this lack of evidence for high magnitude events.

In Peace
Rochelle Becker, Executive Director
Alliance for Nuclear Responsibility
PO 1328
San Luis Obispo, CA 93406
www.anr.org
SPRA Areas of Assessment

Seismic Core Damage Frequency (SCDF): Seismic risk is defined as the likelihood of a core damaging accident caused by an earthquake
- SCDF = 2.78 E-5/yr.

Seismic Large Early Release Frequency (SLERF): The likelihood of an earthquake induced accident that results in a large, early release of radiation
- SLERF = 5.37 E-6/yr.

Key Scenario Drivers:
- Station Blackout (for SCDF)
- Instrumentation Failure
- Building Failures (e.g., Auxiliary, Containment)
- Containment Exterior Shell Failure (for SLERF)
- Steam Generators Failure
- Containment Isolation Failures

SPRA development process

Objective: To Determine:
- The likelihood of a seismically induced Core Damaging accident (SCDF) and
- The likelihood of a seismically induced accident that results in a large, early release of radiation (SLERF)
- Potential risk contribution from structures, systems and components

Key elements of the process are:

1. Seismic Hazard Analysis (SHA)
   - PSHA (SSC, GMC, SSHAC Level III)
   - Foundation Input Response Spectra (FIRS)

2. Seismic Fragility Response (SFR)
   - Structural Models
   - Screening and Walkdowns

3. Seismic Probabilistic Risk Assessment (SPR)
   - Plant Logic Model
   - Human Reliability Analysis
   - Contact Chatter
   - Quantification

- Peer Review Technical Adequacy Assessment
  - PW/ROG Peer Review Assessment Findings and Observations (F&Os)
  - PW/ROG, Peer Review Assessment of Resolution of F&Os

Seismic Hazard/Risk reevaluation;
Key Milestones

March 2012: NRC Request for Information on Seismic Hazard Update, Post Fukushima Issued

November 2013: Plant "Seismic Walk Downs" for Units 1&2 Submitted to NRC

March 2014: NRC Staff Accepts "Seismic Walk Downs" Letter

March & December 2015: Hazard Update Screening Evaluation (Initial & Supplemental) submitted to NRC

December 2016: NRC Staff Hazard Assessment letter issued, indicating "Proceed with SPRA"

April 2018: Updated/Upgraded SPRA Submitted to NRC

Mid-2018/2019: NRC RAI and Potential Audits
Hazard Curve & GMRS at Control Point

A Preliminary informal comparison of available industry results shows that DCPP risk results are close to the industry median (Draft-2017).

Approximately 20 SPRAs were REQUIRED by the NRC; 5 have been completed, a few cancelled. ECD is end of 2019.

Mitigation Strategy Assessment Example

Hazard Overall Assessments

NRC Staff Assessment of PSHA Concluded:

The NRC staff reviewed the information provided by the licensee for the reevaluated seismic hazard for the DCPP site. Based on this review, the NRC staff concludes that the licensee conducted the seismic hazard reevaluation using present-day methodologies and regulatory guidance, appropriately characterized the DCPP site given the information available, and met the intent of the guidance for determining the reevaluated seismic hazard. Based upon the preceding analysis, the NRC staff concludes that the licensee’s SHSR provided an acceptable response to Requested Information.

Further, the NRC staff concludes that the licensee’s reevaluated seismic hazard is suitable for use in the other seismic assessments associated with the 50 54(f) letter (i.e., NRC letter dated 12/21/2016 to PG&E).

Seismic Hazard

Seismic Hazard Reevaluation
Calculation of Foundation Input Response Spectrum (FIRS)

- Defines ground motion at foundation level of specific structure
- Developed for:
  - Containment structures
  - Auxiliary building
  - Turbine building
- Horizontal FIRS:
  - Computed using a combination of empirical and analytical site amplification
  - Consistent with the general approach used for calculation of the GMRS
- Vertical FIRS computed using Gülerce and Abrahamson (2011)

Vibratory and Non-Vibratory Hazards (At Foundations)

- Vibratory ground motion hazard
  - Assessed in 2014 and 2015
  - Approved for use in SPRA by NRC Staff Assessment
  - Independent peer review against ASME/ANS PRA Standard
- Develop structure-specific foundation inputs
  - Foundation input response spectra (FIRS)
  - Input time series for structural analysis
- Non-vibratory hazards considered:
  - Seismic slope stability
  - Tsunami
  - Secondary fault rupture

Time Series for Structural Analysis

- Suites of 30 spectrally matched 3-component time series were developed
- Seed time series selected based on M, R, $V_{s30}$, and usable frequency range
- Started with 100 and reduced to 40:
  - Spectral shape
  - Cross correlation requirement
- Reduced from 40 to 30 based on duration distribution
- Modified time series to match target FIRS
  - Horizontal FIRS was modified accommodate peak-to-trough variability
  - Vertical FIRS used directly

Hazard insights

- Close seismic sources control the total hazard. Hosgri, Shoreline, Los Osos, and San Luis Bay Faults contribute 90+% of total hazard above 0.3 g
- Median ground motion models and total uncertainty models dominate the ground motion characterization
- Significant reduction in the uncertainties associated with seismic source characterization:
  - Slip rates of faults are well constrained
  - Close distance saturation of large magnitude events
  - High seismicity rate
  - Four close sources
**Fragility**

**Definition:** Fragility of a system, structure or component is the conditional probability of its failure at a given hazard input level.

![Graph showing probability of failure vs. ground acceleration](image)

**Structure Response Analysis**

- **Objective:**
  Evaluate realistic seismic responses of structures for use in fragility evaluations. Developing ground motion response at each component location.
  Foundation Input Response Spectra (FIRS), Time Histories and Soil profiles were used as key input.

- **Probabilistic Soil-Structure Interaction analysis**
  - Containment Structure
  - Auxiliary Building
  - Turbine Building
  - Consider variables that affect the seismic response
    - Ground motion
    - Soil stiffness and damping
    - Structure stiffness and damping

**Non-vibratory hazards**

- Tsunami flooding
  - Vector hazard analysis
  - Consider combination of ground motion and tsunami flooding
  - Tsunami generating by offshore landsides

- Slope deformation
  - Seismic slope displacement considered for several components
  - Probabilistic methodology used to define deformation hazard curve
  - Considers simplified dynamic model of slope and consideration of alternatives models and parameters

- Secondary fault rupture
  - Consider the potential to impact Auxiliary Salt Water (ASW) pipes
  - Vector hazard considering ground motion and fault displacement

**Flowchart**

- **Fragility Reevaluation**
  - **Probabilistic SSI**
  - In-Structure Response
  - Fragility Calculations
  - Designs
  - Structures / Components
  - Fragilities
  - Documentation
**Structure Response**

New Detailed 3D Finite Element Models

**Auxiliary Building**

**Turbine Building**

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**SPRA**

- Updated SRL
- Reliability Analysis Validation
- Structures / Components Fragilities Data
- Seismic Fragility Assessment
- Address Peer Review
- Quantify SPR

**Summary**

- New components were added to the updated model
- Fragilities were calculated, using site specific data primarily by the Separation Of Variables (SOV) methods approved by the NRC
- The capacities represent both units; the lowest capacity is in the model,
- Firewater sprinkler piping in the Aux building (Seismic risk contributor; operator actions credited to mitigate potential flooding)
- 480V Ventilation Duct crossing Auxiliary and Turbine Building with no Seismic gap. (see figure)
- Fragility parameters (capacity and uncertainties) were computed and input into the PRA model

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**Seismic PRA Update / Upgrade**
Insights - Important Components/Structures

- Component/Structural importance is measured by comparing the relative contribution of risk from different component/structural failure scenarios.

- Components most important to seismic risk are:
  - Condensate Storage Tank, Firewater Storage Tank, Firewater piping - Failure will result in core damage due to a loss of AFW water supply for seismically induced SBO scenarios.
  - Main control room vertical boards, PCPS - Failure prevents mitigation of most scenarios due to a loss of control.
  - Non-load bearing wall failures in EDG rooms, 4KV rooms and DC bus rooms impact important components and cause a loss of vital power.
  - RCP Shutdown Seals (SDS) reduced seismic risk by 50%.

- Structures most important to seismic risk are:
  - Auxiliary Building - Failure results in core damage. Turbine building - failure results in SBO. Containment building - failure results in core damage and release.

Insights - Important Operator Actions

- Certain FLEX mitigation strategies are very important to maintaining a low seismic risk level.
- DC load shedding actions taken in response to an extended loss of offsite power. In conjunction with use of FWST for AFW water supply, allows for continued operation of AFW in an SBO scenario.
- Manual control of AFW in the event of a complete loss of AC and DC power.
- Other important actions include isolation of the FWST upon a seismically induced firewater piping failure.
Independent Peer Review Assessments

The NRC required an Independent Peer review process (per NEI 12-13 guidance document) to validate Technical Adequacy and compliance to ASME/ANS SPRA standards requirements.

Phase 1:
- Peer review assessment was initiated in May 2017. (kick off) Provided all documents (One month off-site reviews, Q&A's).
- Team of 10 independent subject matter experts, 4 US-NRC observers and 2 Japanese NRC observers.
- One week onsite (at San Luis Obispo), face-to-face review in June 2017.
- Peer review report identified Facts and Observations (F&Os) and issued a report in September 2017.

Phase 2
- Independent Assessment to review and close resolutions to F&Os from the September 2017 peer review report.
- Onsite (at San Francisco) in November 2017.
- Final closure report in March 2018.

Appropriate documents were revised to incorporate changes and recommendations by the Peer Review Team. All F&Os were addressed and successfully closed.

Next Steps

Regulatory:
- NRC Staff technical assessment anticipated to take approximately one year (Based on comparison with Vogtle's experience).
- Anticipating interactions with NRC Staff (e.g., RAIs) to provide additional clarifications and documents and a potential Audit.
- NRC will form an internal panel of experts according to NTTF 2.1, Phase II process to decide if any additional actions are required.

PG&E-DCCP Commitments:
- Update LTSP assessment by revising all affected procedures and documents using insights from the updated hazard and SPRA.
- Modify the 480v ventilation duct to meet the design basis and the updated seismic displacements. (1R21, 2R21)
F&O resolution:

- Peer Review Question (F&O 20-3):

  - The peer review panel noted that the density of the performed tests is not sufficient to determine the correct density profile. However, the data collection methodology used to determine the density profile was not addressed. The density profiles, which are derived from the site data, must be consistent with the density profile determined using the site data.

- PG&E Response to F&O 20-3:

  - To improve the calculation, an improved D/PDP, D/DPP, and D/DPPP were used to evaluate the density profiles. The density profiles are derived from the site data and are consistent with the density profile determined using the site data.

- Independent Review Team Assessment:

  - The independence of the density profiles is confirmed with the site data.

F&O 20-3, CLOSED

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F&O resolution:

- Peer Review Question (F&O 20-9):

  - The peer review panel noted that the density of the performed tests is not sufficient to determine the correct density profile. However, the data collection methodology used to determine the density profile was not addressed. The density profiles, which are derived from the site data, must be consistent with the density profile determined using the site data.

- PG&E Response to F&O 20-9:

  - To improve the calculation, an improved D/PDP, D/DPP, and D/DPPP were used to evaluate the density profiles. The density profiles are derived from the site data and are consistent with the density profile determined using the site data.

- Independent Review Team Assessment:

  - The independence of the density profiles is confirmed with the site data.

F&O 20-9, CLOSED

---

F&O resolution:

- Peer Review Question (F&O 20-7):

  - The peer review panel noted that the density of the performed tests is not sufficient to determine the correct density profile. However, the data collection methodology used to determine the density profile was not addressed. The density profiles, which are derived from the site data, must be consistent with the density profile determined using the site data.

- PG&E Response to F&O 20-7:

  - To improve the calculation, an improved D/PDP, D/DPP, and D/DPPP were used to evaluate the density profiles. The density profiles are derived from the site data and are consistent with the density profile determined using the site data.

- Independent Review Team Assessment:

  - The independence of the density profiles is confirmed with the site data.

F&O 20-7, CLOSED
Questions?

Agenda

- Seismic Probabilistic Risk Assessment (SPRA)
- Long Term Seismic Program (LTSP) 2017 Research Activities
  - Seismic and geodetic monitoring
  - Seismic source characterization
  - Ergodic ground-motion characterization
  - Non-ergodic ground-motion characterization
  - Hazard methodology
  - Hazard testing and validation
  - Fault rupture hazard model development
**Ergodic vs. Non-ergodic**

- **Ergodic** models
  - Trades space for time
  - Global datasets used to define ground motion at a specific location
  - Required due to limited earthquake data
- **Partially non-ergodic** models
  - Ergodic and non-ergodic components of the model
  - Uses local information to refine the estimates of ground motion
  - Uncertainty depends on data availability:
    - Areas with data have less uncertainty
    - Areas without data have more uncertainty

**Quantifying Contributors to Uncertainty**

**LTSP Research Strategy – Path Effects**

**Hazard Components**

- **Ground motion calculation:**
  - Median: Source + Path + Site
  - Uncertainty
- **Significant reduction in the uncertainties associated with seismic source characterization**
  - Fault slip rates are constrained
  - Close distance saturation of large magnitude events
  - High seismicity rate
  - Four close sources
Geodetic Networks

- Initial install in 2003
- 9 sites
- Raw GPS data are archived at the Northern California Earthquake Data Center (NCEDC)

Point Buchon Ocean Bottom Seismometer (OBS) Array

- Part of AB1632 program
- Improve:
  - EQ detection
  - EQ location and association
  - Constraints on focal mechanism
- Two generations:
  - Cabled (2013-2014)

Instrumentation and Monitoring

Seismic Network

- Initial install in 1987
- Currently 15 digital 3-component stations:
  - Vel. sensors (M<3)
  - Acc. sensors (M>3)
- Complements existing USGS network
- Data telemetered to SF and shared with USGS/NCSN
**SmartMeters**

- New meters will be instrumented with accelerometers
- Record EQs with millions of meters
- Unprecedented amount of data
- In 2017:
  - Selected calibrated chip
  - Evaluated noise and limitations
- Data valuable for non-ergodic GMMs and spatial correlation

**OBS Deployments**

- Cabled Array
- Autonomous Array

**Seismic Source Characterization**

**OBS Program Review**

- Environmental
  - Continental Shelf
  - Seafloor Coupling
  - Noise
- Instrumentation
  - Time Corrections
  - Power
- Earthquake Locations
  - Improved Depth Control
  - Improved Focal Mechanisms
San Luis Obispo Bay 3D Seismic Reflection Mapping

- Seismic imaging of offset late Pleistocene shorelines and channels
  - Shoreline FZ: Dextral slip rate of 0.05-0.09 mm/yr
  - Oceano FZ: Vertical slip rate 0.005-0.07 mm/yr
- 6.5 km long section of the Shoreline fault zone clearly imaged
  - Increased overall length of SFZ (Pt Buchon to Pt. Sal) - 45 km
  - Increased maximum magnitude of rupture limited to SFZ to M 6.7
- Equivocal evidence of Holocene (<10 ka) rupture along either the Shoreline or Oceano fault zones
  - Limited by low slip rates
  - 2-3 m acoustic resolution

- In review at the Bulletin of the Seismological Society of America

Hosgri Fault Zone Offshore Point Sal

San Luis Obispo Bay 3D Seismic Reflection Mapping

- Development of an alternative model to explain the uplift of the Irish Hills
- San Luis Obispo Bay 3D seismic-reflection mapping
- Point Sal Hosgri Fault Zone 3D seismic-reflection mapping
- Fault studies – Eastern Los Osos Fault trenching study
- USNS Bartlett seismic profile interpretation
- Post-processing of single channel USGS sparker data offshore central California
- PG&E SSC integration into SCEC Community Fault Model
Ergodic Ground Motion

- Development and validation of SCEC kinematic broadband platform (BBP)
- Validate Fourier Amplitude Spectra from simulations for structural response
- Dynamic rupture based simulation workshops/planning
- Develop new site attenuation parameter (kappa) scaling models
- Hard rock site characterization guidelines
- UCSB geotechnical array data processing
- Expand empirical database

Seismic Source Characterization

Post-Processing of Single Channel USGS Sparker Data Offshore Central California

- Post-processing to correct statics (remove swell motion)
- Predictive convolution (suppress short-path multiples: bubble pulse, ghosts)

Non-ergodic ground-motion

Development of spatial correlation models for CA path effects

- Use NGA-West2 dataset to develop partially non-ergodic model for CA
- Non-ergodic terms for:
  - Source
  - Path with cell-specific attenuation
  - $V_{S30}$ scaling
- Coefficients computed for a range of periods
- Manuscript under preparation

Non-ergodic ground-motion

Build new Central CA 3D crustal model

- SCEC simulates using full 3D tomography models
- Incorporate existing information on:
  - near-surface seismic velocities
  - basin structures
  - fault structures
- USGS will integrate constraints:
  - Gravimetric
  - Aeromagnetic
  - Geological modeling

Non-ergodic ground-motion

Ergodic Ground Motion

Validate Fourier Amplitude Spectrum (FAS) from simulations

- Previous validation efforts have focus on amplitude – not correlation
- Compare FAS correlation structure between simulated and record ground motions
- Correlation influences how systems (e.g., structures) respond to loading
- Simulations have less correlation than observed ground motions
- Less correlation results in lower structural demand

Non-ergodic ground-motion

- Development of GMPE for California using continuous regionalization
- Development of spatial correlation models for CA path effects
- Build new 3D crustal model for Central CA
  - Collect and process seismic data
  - Improve velocity model using 3D tomography
- Run 3D simulations for path effects in Central CA
- Development of new methods and data for constraining path effects
- Evaluate updated CyberShake simulations for path effects
- USGS Workshop: velocity models for strong ground-motion modeling
Hazard Testing and Validation

DCPP hazard constraints from precarious rocks

- Test ground motion hazard using sensitive geologic features (e.g., precariously balanced rocks)
- Fragility established from 3D stability analysis using realistic EQ time series
- Results are used to trim unrealistic hazard branches

Non-ergodic ground-motion

Apply Central CA 3D crustal model

- 3D EQ simulations used to derive parametric path effects
- Develop a validation procedure against observed ground motions
- Identify areas in 3D model requiring improvement
- Improvement of SCEC 3D broadband

Fault rupture hazard

Statistical tools evaluating fault rupture

- Limitations of current fault rupture models/methods:
  - current data sets are limited
    - data quality
    - completeness
    - documentation
  - site effects are not considered
  - a physical basis for scaling is not available
  - statistical methods to deal with fault rupture data have not been developed:
    - unequal sampling
    - biased sampling
    - data gaps
  - the few available models for secondary rupture
  - there is no standard software for computing rupture hazard
- 2017 initial work on a statistical model of fault rupture was started

Hazard methodology

Add capability for fully non-ergodic ground motion models to the hazard code

- Next round of ground motion models will incorporate non-ergodic parameters
- Hazard codes need to be updated to support these models
- PG&E supported modification of HAZ45 to include spatially varying coefficients
- Collaborating with EDF to have OpenQuake modified as well
From: Rachelle Baker <rbaker@esri.com>
To: Wen, Valerie
Cc: Zamar, David; Mauroth, Gary@Energy; Cochran, Justin@Energy; nakai@pge.com; leving@coastal.sacramento.gov; bgoboo@co.sacramento.ca.us; timd@conservation.ca.gov; Rachelle@ikal.org; john@dkinseygreen.com; asran@hansch@coastal.ca.gov; Timothy@govt@conservation.ca.gov; Robert@Anderson@coastal.ca.gov; Nishanka; Shatt; kachhuber; Jeffrey; Paul@marsh@energy.ca.gov; crane@co.sacramento.ca.gov; Joseph@freeman@coastal.ca.gov; Tom@juster@coastal.ca.gov; Rich@and@arroyo@co.sacramento.ca.gov; Rich@and@arroyo@co.sacramento.ca.gov; richard@mcKnight@esri.com; richard@mcKnight@esri.com; Bob@riemers@calinter@gov; info@dlisc.org
Subject: Re: IPFP May 21st - Agenda discussion

Hello Valerie,

AANR would like to request one hard copy.

In peace
Rachelle

Sent from my iPhone

Tuesday, May 22, 2018 1:43 PM (California Time Zone)

On May 22, 2018, at 4:36 PM, Wen, Valerie <VW@3.com> wrote:

Hi all,

I have attached the following documents that will be discussed at tomorrow’s meeting:

1. 2017 Long Term Seismic Plan Report - This is the longer, narrative document about PG&E’s LTP activities p. 2017. PG&E will bring a few hard copies of this report to the IPFP meeting tomorrow. If you prefer to not print this document tonight.
2. Numerous documents excerpted from PG&E Seismic PRA submittal on Peer Review Issues. While PG&E is unable to provide the entire document, because it and the associated models are proprietary, PG&E provides the excerpted pages from the Report that address the peer review feedback. These files are: d) 20-3 App. X Review; N 20-3 Peer Review... e) 20-7 PGE; d) 20-7 App. X Review; d) 20-7 Peer Review... f) 20-9 PGE; d) 20-9 App. X Review; d) 20-9 Peer Review... and g) 20-9 PGE. PG&E will also touch on these topics in its presentation on IPFP Seismic PRA.

Power Point Presentations on the Seismic PRA and Highlights on the 2017 LTP are forthcoming. We will bring a few sets of these presentations tomorrow as well for your convenience.

Valerie Wen

Sent: Tuesday, May 22, 2018 3:45 PM
To: Mauroth, Gary@Energy; Zamar, David@Energy; Mauroth, Gary@Energy; Nakai, Nakai@PGE; Cochran, Justin@Energy; leving@coastal.sacramento.gov; bgoboo@co.sacramento.ca.gov; timd@conservation.ca.gov; john@dkinseygreen.com; asran@hansch@coastal.ca.gov; Timothy@govt@conservation.ca.gov; Robert@Anderson@coastal.ca.gov; Nishanka; Shatt; kachhuber; Jeffrey; Paul@marsh@energy.ca.gov; crane@co.sacramento.ca.gov; Joseph@freeman@coastal.ca.gov; Tom@juster@coastal.ca.gov; Rich@and@arroyo@co.sacramento.ca.gov; richard@mcKnight@esri.com; richard@mcKnight@esri.com; Bob@riemers@calinter@gov; info@dlisc.org
Subject: Re: IPFP May 21st - Agenda discussion
The Diablo Canyon Independent Safety Committee ("DCISC") hereby submits its comments concerning California Senate Bill 1099, introduced by Sen. Bill Monning on February 12, 2018, which, if approved, would require in part that the California Public Utilities Commission ("CPUC") approve bill funding by PG&E contractors for the Diablo Canyon Nuclear Power Plant ("Diablo Canyon") employee retention program as originally proposed in PG&E’s Application 16-09-056 dated August 11, 2016, to retire Diablo Canyon by 2025.

Background about the DCISC

The DCISC was established as one of the terms of a settlement agreement entered into by the Director of Radiation Advocates ("DRA"; now known as the Office of Radiation Advocates) of the California Public Utilities Commission ("CPUC"), the Attorney General ("AG") for the State of California, and Pacific Gas and Electric Company ("PG&E"). The settlement agreement, dated June 24, 1984, was intended to cover the operation and revenue requirements associated with Diablo Canyon's two 1,080 megawatt pressurized water reactors located in San Luis Obispo County for the 30-year period following the commercial operation date of each unit. The agreement also included two appendices: Appendix A, which included various provisions; and Appendix B, which included amendments and addenda.

The DCISC is made up of recognized technical experts in the nuclear power field who have visited the plant and held public meetings near the plant almost every month since 1992 and know the value to the safety of operations in maintaining an experienced, high-performing plant staff, which now numbers approximately 1,500 persons.

Discussion of the issue

On June 21, 2016, PG&E announced a Joint Proposal with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Worker Local 1245, Coalition of California Utility Employees and the Alliance for Nuclear Responsibility to retire Diablo Canyon at the expiration of the current operating license from the NRC in 2024 for Unit 1 and 2025 for Unit 2. On August 11, 2016, PG&E filed Application 16-08-056 with the CPUC for approval of the retirement of Diablo Canyon, implementation of the Joint Proposal, and recovery of assisted costs, including employee retention incentives through proposed rate-making.

Under the Joint Proposal, PG&E would continue to operate Diablo Canyon at current power levels until retirement, with commitments to maintaining the safe operation of Diablo Canyon and providing resources and assistance to transitioning workers. To ensure continued safe operations under the Joint Proposal, PG&E stated that it would be critical to retain existing employees, who are well-trained and highly qualified, throughout the remaining seven-year period of power operation. To accomplish this, PG&E proposed to provide employee retention incentive payments of 15% per year.

The California Public Utilities Commission ("CPUC") recently adopted the Joint Proposal and included employee retention incentive payments as part of the approvals necessary to retire Diablo Canyon.

The DCISC believes that a well-designed and appropriately funded employee retention incentive program is essential to the plant’s safe operation until retirement. While the DCISC does not know what precise funding level is appropriate, the 15% program seems to us to be inadequate, based on our recent interactions with the plant staff.

The DCISC strongly believes that continued operation of the power plant through the proposed retirement date of Diablo Canyon License 1 and 2 in 2024 and 2025, respectively, in a safe manner requires retaining those existing members of the trained workforce who are vital to operating the plant safety. For this reason, the employee retention program as originally approved in the Joint Proposal in Application 16-08-056 should be treated as if it were the cut-off date in the CPUC Decision 18-01-022. A retention program needs to be designed and funded that effectively accomplishes the needed staff retention objectives for those employees who have vital roles in achieving nuclear safety.

On behalf of myself and the other members of the Diablo Canyon Independent Safety Committee, please convey our thanks to Senator Monning for the opportunity in reviewing and commenting on CA, Senate Bill 1099. It is our hope that this letter will contribute to the Senate’s assessment of these important issues and their potential to adversely affect the future safety of Diablo Canyon. Should you have any questions or comments about the DCISC’s comments, please do not hesitate to communicate with us.

Very truly yours,

Peter Lam, DCISC Chair
G.2 – 191

From: Rochelle Becker <rochellekleaver@gmail.com>
To: info@DCISC.org
Sent: Tuesday, May 22, 2018 12:18 PM
Subject: Re: Today's letter SB 1090

No problem Bob,

As usual I found the call-in difficult for public discussion, I'm not sure the final draft is helpful or fully accurate, but I did my best.

See you in June
In peace
Rochelle

Sent from my iPhone

> On May 22, 2018, at 11:49 AM, info@DCISC.org <info@DCISC.org> wrote:
> Rochelle - sorry I didn’t see your email until after the meeting. I've
> updated the page to reflect the final post-meeting version. I'll send
> you a copy of our position.
> Regards,
> Rochelle
> I hope that will work, again my apologies,
> Rochelle
> Bob
> --- Original Message ---
> From: Rochelle Becker <rochellekleaver@gmail.com>
> Sent: Tuesday, May 22, 2018 9:35 AM
> To: info@DCISC.org
> Subject: Today’s letter SB 1090
> 
> Re: Bob
> 
> Might you have a copy of the draft letter that you can share re: SB 1090?
> 
> Thanks
> In peace
> Rochelle
> 
> Sent from my iPhone
> 

G.2 – 192

CGNP continues to oppose the transmission from the DCISC of the attached letter to Senator Monning.

CGNP members witnessed Senator Monning’s Anti-DCPP comments during three (3) recent California state Senate hearings as noted below, CONP has reason to believe that anti-DCPP letters are pushing DCISC to publish its letter of support for SB 1090 (Monning). SB 1090 still remains on the California State Senate Appropriations Committee suspense file. The status of A.16-08-056 remains OPEN/REOPENED at the CPCU website. This letter should not be sent in its present form until any CPCU decision regarding the status of DCPP is final. As you know, CONP intends to challenge the legality of the CPCU decision regarding A1608056 in the California State Court of Appeals. CONP expects to prevail on the merits of our case, which we have successfully established in the record of A1608056.

In the alternative, the language of the DCISC letter should clearly reflect the tentative nature of the decision to advance DCPP in 2015. Any other action regarding the Monning letter by the DCISC calls into question its political independence and objectivity regarding DCPP.

Sincerely,

Gene Nelson, Ph.D. Legal Assistant and Government Liaison Californians for Green Nuclear Power, Inc. (CGNP)

https://CGNP.org website
(863) 963-4693 cell
Gnelson@CGNP.org email

At 07:35 PM 5/21/2018, you wrote:

Dr. Nelson—

This will confirm receipt of your message on behalf of Californians for Green Nuclear Power. The message with its attachments will be included in the record of the DCISC's consideration of SB 1090.

Thank you for contacting the Committee.

Best regards,

Robert Rathie
DCISC Ast. Legal Counsel
(863) 439-4658
info@DCISC.org

From: Gene Nelson, Ph.D. <gnelson@cgnp.org>
Sent:: Monday, May 21, 2018 4:14 PM
To: info@DCISC.org
Subject: CONP's Continued Opposition to DCISC's Letter to Senator Monning

Dear Attorney Rathie:

Thank you for your message.

The message with its attachments will be included in the record of the DCISC's consideration of SB 1090.

Thank you for contacting the Committee.

Best regards,

Robert Rathie
DCISC Ast. Legal Counsel
(863) 439-4658
info@DCISC.org

From: Gene Nelson, Ph.D. <gnelson@cgnp.org>
Sent: Monday, May 21, 2018 4:14 PM
To: info@DCISC.org
Subject: CONP's Continued Opposition to DCISC's Letter to Senator Monning

Dear Attorney Rathie:

This will confirm receipt of your message on behalf of Californians for Green Nuclear Power.

The message with its attachments will be included in the record of the DCISC's consideration of SB 1090.

Thank you for contacting the Committee.

Best regards,

Robert Rathie
DCISC Ast. Legal Counsel
(863) 439-4658
info@DCISC.org

From: “Gene A. Nelson, Ph.D.” <gnelson@cgnp.org>
Date: Mon, May 21, 2018 4:14 pm
To: gnelsen@cgnp.org

All:

CGNP has already expressed its opposition in writing to the DCISC regarding their support for SB 1090 (Monning). We have raised concerns about how losing 10% of California's firm generating capacity - that cost-effectively provides needed voltage and frequency stability to the California power grid - would be a disaster.

My impression is that Senator Monning is applying pressure to the DCISC to support his harmful bill that makes it easier to shut down DCPP. I've heard Senator Monning speak at three (3) recent California state Senate committee hearings in Sacramento. He is clearly a friend of Diablo Canyon Power Plant (DCPP). He chooses to patronize the talking points that have been developed by anti-DCPP groups such as AANR.

Thus, I'm requesting that you take some time to either send a comment to
As requested, this will confirm receipt of your message with the attachments. When the draft letter which will be considered by the DCISC at the May 22 public meeting is in final form it will be posted on www.dcnpc.org and I will provide you with a copy.

Thank you for respecting the DCISC and for your interest in its activities.

Best regards,

Robert Rathie
DCISC Asst. Legal Counsel
(800)439-4688
info@dcisc.org

-----Original Message-----
From: Gene A. Nelson, Ph.D. <hkenelson@cnmp.org>
Sent: Thursday, May 10, 2018 3:09 PM
To: Per Peterson, Ph.D. <peterson@berkeley.edu>; Robert Rathie <rathy@willinglaw.com>; Bob Budzinski, Ph.D. <budzinski@pacbell.net>; Lam Peter <petra61@gmail.com>
Subject: CONP's initial response to DCISC's announcement of a special meeting on 05 22 18 RE: SB 1090

Dear Dr. Nelson:

As you know, the Diablo Canyon Independent Safety Committee will hold a meeting on Tuesday, May 22, 2018, at the Graduate Hotel's Room 100, 2600 Durant Avenue, Berkeley, CA at 10 AM for the purpose of considering approval of comments on Senator Mimi Green's SB 1090 concerning Diablo Canyon Power Plant and to receive public comment. As requested, a copy of a draft letter which the Committee will consider at that time is attached for your information. The letter is also posted on our website.

A call in number has been arranged for the meeting by calling (1-800) 309-2350 and entering passcode 4394688. The meeting will be livestreamed at www.dcisc.org and on www.cnmp.org.

Please contact me with any questions.

Sincerely,

Robert Rathie
DCISC Asst. Legal Counsel
(800)439-4688
info@dcisc.org

--- Original Message ---
From: hkenelson@cnmp.org To: government@cnmp.org; Per Peterson, Ph.D. <peterson@berkeley.edu>; Bob Budzinski, Ph.D. <budzinski@pacbell.net>; Lam Peter <petra61@gmail.com>
Sent: Friday, May 11, 2018 12:03 PM
Subject: CONP's initial response to DCISC's Announcement of a Special Meeting on 05 22 18 RE: SB 1090

Dr. Nelson:

3

4

California's Green Nuclear Power, Inc. (CGNP) Californians for Green Nuclear Power, Inc
1375 East Grand Ave Ste 103 #223
Arroyo Grande, CA 93420
(805) 363-4697 cell

government@cnmp.org email

Content-Type: application/pdf; name="DCISC Comment Letter re CA Senate Bill 1090 - May 22 2018 Public Meeting Draft.pdf"
Content-Disposition: attachment; filename="DCISC Comment Letter re CA Senate Bill 1090 - May 22 2018 Public Meeting Draft.pdf"

Content-Type: application/pdf; name="CGNP to DCISC RE SB 1090 - 05 17th 18.pdf"
Content-Disposition: attachment; filename="CGNP to DCISC RE SB 1090 - 05 17th 18.pdf"
Dear DCISC,

 Diablo Canyon Power Plant should NOT be shut down in 2025 because doing so will make it impossible for California to reach its 2050 goal of 100% zero-carbon electricity. Renewables come with vast land requirements, they need fossil fuel back-up, and their intermittency makes the grid less stable. Nuclear power has none of these drawbacks, and DCIPP in particular is one of the safest and least run nuclear power stations on the planet.

The only reason renewables can compete at all with nuclear is because of the abnormal high subsidies per kWh they receive, which makes the societal cost of electricity. Any subsidy needed to keep nuclear power competitive would be far lower. Because nuclear can deliver so much more energy per dollar of subsidies, that alone should be reason enough to keep DCIPP running past 2025.

Sincerely,
Michael Phlissari
mepillary@ial.com
Gene Nelson: Diablo Canyon — myths and realities

* May 16, 2018 8:30 PM PDT

Pacific Gas and Electric is one of the largest investor-owned utilities in the nation.

An independent and nonprofit California Public Utilities Commission (CPUC) intervener, Californians for Green Nuclear Power Inc. (CGNP) was established in 2012. CGNP's primary goal is to maintain the economic and environmental benefits of Diablo Canyon Power Plant's continued safe operation beyond 2025.

Privately, plant workers appreciate CGNP's advocacy. You already heard PG&E's perspective. Clarifications of some commonly-held beliefs about Diablo Canyon follow and may contain some surprises:

Diablo Canyon will close in 2025. *Unlikely*. In 2016, CGNP became the only adversarial party when PG&E requested permission from CPUC to abandon the final plant in 2025.

For its filings, CGNP petitioned the help of credentialed physicists and nuclear engineers, and attorneys experienced in safety and environmental law.

CGNP's filings provided an abundance of evidence in support of its objections to PG&E's application. PGNP's evidence included voluminous sworn testimony; PG&E provided to the CPUC in 2018 to recover licensing costs in 2045.

In 2010, PG&E considered the most cost-effective approach among 18 well-documented alternatives to keep the plant running. In its 2016 application, PG&E concludes otherwise, after burning and closing the plant with $3 billion-plus in speculative, unsupported cooling system costs.

After CPUC granted conditional approval for Diablo Canyon's continued operation, CPUC's decision approving the abandonment application, CGNP filed an application for appealing the CPUC's decision.

If the CPUC rejects the application, CGNP will bring the case before the state appeals court system. CPNP's counsel is experienced in these cases, and CPUC has every expectation to prevail on the merits of its case there.

Diablo Canyon power is expensive. False. PG&E's 2010 filing clearly established the plant was cost-competitive than fossil-fired generation, and far less expensive than the price of solar and wind when the taxpayer-funded subsidies are removed. For example, the troubled-plagued Trump Solar plant's cost to PG&E is about 10 times Diablo Canyon's.

Diablo Canyon is safe. True. The plant has operated safely and reliably since 1984. Per-unit of power generated, U.S. nuclear power is safer than solar, and far safer than fossil-fired generation that kills thousands annually via air pollution.

Diablo Canyon's power is abundant. True. It economically generates the equivalent of five Hoover Dams annually, with zero carbon emissions.

Diablo Canyon powers our region's economy. True. It is the largest Central Coast private-sector employer, annually providing $1 billion in payroll and expenditures, and $1.2 billion in sales of electricity. If the plant is abandoned, those specialized jobs will disappear, forcing many highly-skilled workers to relocate. A regional economic depression could follow.

Solar and wind could replace Diablo Canyon. False. Neither is reliable to provide power for California, the world's fifth-largest economy. Because solar and wind are not always available when needed, both require massive amounts of backup power from gas or coal. DCCP was designed to last a century and is currently maintained by PG&E. The plant generates power 24/7, day or night, storm or calm, drought or flood.
POCE is apparently motivated to abandon Diablo Canyon prematurely only in exchange for the public interest in
exchange for the natural monopoly to provide local residences with electricity. To learn more, visit our website: https://poce.org or attend our public meetings.

Gene relies on POCE's government liaison and legal assistant. He recently won a

Info@DCISC.org

From: Aguilar, Annie (mailto:Annie.Aguilar@sem.ca.gov)
Sent: Thursday, May 17, 2018 5:31 PM
To: info@DCISC.org
Cc: info@DCISC.org
Subject: Re: DCSC Comments on SB 1090

Hi Bob,

Thank you so much I'll be sure to livestream the meeting next Tuesday.

All the best,

Annie

Get Outlook for OS

On Thu, May 17, 2018 at 5:00 PM -0700, "info@DCISC.org" <info@DCISC.org> wrote:

Annie: You should have already received our USPS mailed notice of the meeting but I wanted to provide you with a copy of the draft letter on SB 1090 and a copy of the "courtesy notice" that will be emailed to certain "interested parties." (As the "most interested" of those parties - you're the first recipient)

We published and mailed out the usual legal notice and the agenda, notice and a copy of the letter is now on our website.

Thanks, as always, for your assistance with this important matter and don't hesitate to give me a call if you want to discuss.

I should be in the office most of tomorrow (Friday).

Best,

Bob (courtesy notice text follows)

The Diablo Canyon Independent Safety Committee will hold a meeting on Tuesday, May 22, 2018, at the Graduate hotel's Boardroom conference room located at 1000 Durant Avenue, Berkeley, CA at 10 AM for the purpose of considering approval of comments on Senator Mimi's CA Senate Bill 1090 regarding Diablo Canyon Power Nuclear Plant and to receive public comment. A copy of a draft letter which the Committee will be considering at that time is attached for your information.

A call in number has been arranged for the meeting by calling (1-800) 399-2350 and entering passcode 4394688. The meeting will be livestreamed on www.10-a-week.org and on www.dcisc.org.

Please feel free to contact me with any questions.

Sincerely,

Robert Rathie
DCSC Asst. Legal Counsel
Hi Bob,

It was wonderful speaking yesterday, and thank you for reaching out regarding a letter of support for SB 1080. If the Orange County Independent Safety Committee would like to send a letter of support, please address the letter to Senator Munding and Assemblymember Cunningham, and provide the letter on organization letterhead. Letters can be either mailed or faxed to the below address:

Mailing address
Office of Senator Munding
State Capitol, Room 333
Sacramento, CA 95814

Fax
916-351-4917
Attn: Bethany Wosfall, Legislative Director

We very much appreciate your support on SB 1080. As always, certainly do not hesitate to contact me with any questions or concerns. Look forward to our meeting in June! Thank you, and have a wonderful weekend!

All the best,

Amie Aquilina / Assistant District Director
Office of Senator William W. Munding
California State Senate Majority Leader
3020 Park Street Suite 229 | San Luis Obispo, CA 93401
Ph: 805-549-3748 | Fax: 805-549-3799
Dear Attorney Rathsie: I appreciate receiving this information. I look forward to the DSCIC updates.

Gene

Ox Mt, May 11, 2018 1:02 pm. Info@DSCIC.org wrote:

> Dr. Robert

> As requested, this will confirm receipt of your message with the attachments. When the draft letter which will be considered by the DSCIC at the May 21 public meeting is in final form it will be posted on www.dsicc.org and I will provide you with a copy.

> Thank you for contacting the DSCIC and for your interest in its activities.

> Best regards,

> Robert Rathsie

> DSCIC Ass't Legal Counsel

> (800)4549-4688

> info@dscic.org

> — Original Message —

> From: Gene A. Nelson, Ph.D. (gnelson@gov.legal)

> Sent: Thursday, May 10, 2018 8:59 PM

> To: Dr. Robert Rathsie, Ph.D. (optionalsn@nucbr.gov, 510-841-9794, kaiwen, rudawitz, lani@milford.gov)

> In: Info@dscic.org

> Subject: DSCIC’s Initial Response to DSCIC’s Announcement of A Special Meeting on 05 22 18 RE SB 1090

> cc: Senator Kevin De Leon, and Senator Jim Beall

> DSCIC – SB 1090

> Subject: DSCIC’s Initial Response to DSCIC’s Announcement of A Special Meeting on 05 22 18 RE SB 1090

> Importance: High

> Date: 05 May 2018

> From: Gene A. Nelson, Ph.D.

> To: Robert Rathsie, Ph.D.

> Subject: DSCIC’s Initial Response to DSCIC’s Announcement of A Special Meeting on 05 22 18 RE SB 1090

> Dear Robert,

> In response to your email of May 9, 2018 regarding the DSCIC Special Meeting on May 22, 2018 regarding SB 1090 and a possible rebuttal letter, I am forwarding this letter to you.

> I hope this letter is helpful to you and that you find the DSCIC’s position on SB 1090 is reasonable.

> Best regards,

> Gene Nelson, Ph.D.

> Government Liaison California for Nuclear Energy

> 1375 East Grand Ave Ste 105

> P.O. Box 623

> Davis, CA 95616

> Email: gnelson@gov.legal

> Phone: 510-841-9794

> Fax: 510 454-3884

> Website: www.cafe.org

> More on SB 1090: http://www.cafe.org/sb1090

> More on SB 1090: http://www.cafe.org/sb1090

> Regards,

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> More on SB 1090: http://www.cafe.org/sb1090

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> Regards,
From: info@DCISC.org
Sent: Saturday, May 5, 2018 2:42 PM
To: Aguilera, Annie
Cc: info@DCISC.org
Subject: RE: From the Office of Senator Manning

Annie - thanks again - we're working on getting the timing out for the Members individual review (per Begley Kenny requirement) and considering cost-estimates. I will keep you posted and I'm sorry for not getting back to you yesterday.

Have a great weekend,
Bob

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From: Aguilera, Annie [mailto:Annie.Aguilera@sen.ca.gov]
Sent: Friday, May 4, 2018 1:34 AM
To: info@DCISC.org
Subject: RE: From the Office of Senator Manning

Hi Bob,

I think we are hoping to get SB 1390 off the Senate floor by the end of the month. The last day for bills to pass out of the House of origin is June 1st so we would be helpful to have a letter before that date. However, if that is not feasible, a letter of support after June 1st to help the bill pass through the House.

Thank you!
Best,

Annie Aguilera / Assistant District Director
OFFICE OF SENATOR WILLIAM W. MONING
California State Senate Majority Leader
1026 P St, Suite 201 | San Juan Capistrano, CA 92675
Ph: 855.549.3771 | Fax: 805.549.3779

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From: G.2-219

G.2-220

Annie - thank you for this information, I appreciate your help with this matter.

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From: info@DCISC.org
Sent: Monday, April 30, 2018 12:30 PM
To: David Weissman
Cc: info@DCISC.org
Subject: RE: From Bob Budnitz

TO David Weissman
FROM: Bob Budnitz

I've seen nothing, and I'm sure the rest of our DCISC group hasn't either because we all share everything we see. It is the last day of April. Generally, whatever is submitted goes immediately into the public domain from this point.

Bob

On 4/30/2018 11:19 AM, David Weissman wrote:

Dear Dr. Budnitz,

I hope this email finds you well.

I note on my calendar that it is April 30th. I believe this to be the day by which PG&E was to finally submit their “final” revised SFRA draft update at the last step in the SSHAC process.

Do you know if it has been submitted yet (or previous DCISC meetings you had indicated you’d seen draft versions)?

If so, do we need to search the ADAMS database to locate it? Or has PG&E made it available to the DCISC and posted it on the state for public access?

Thanks for any updates you might have on this final report.

Yours truly,

DAVID WEISSMAN
Outreach Coordinator
Alliance for Nuclear Responsibility

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G.2-221

G.2-222
Letter to Justin Cochran, PhD.
April 17, 2018
Page 1.

Thank you for your consideration of this letter and for your valuable assistance to the Committee in its important work. Should you wish to discuss any matter concerning the Committee or matters discussed in this or Dr. Wattenmeier’s letter, please feel free to contact me through the office of the DCISC legal counsel at (831) 407-100 or (800-431-2223), or by email to info@dcisc.org or pacific@e-mail.com. The Committee looks forward to continuing its interaction with the California Energy Commission and to continuing to work with you and to seek your input and advice.

Sincerely,

Peter Lam
Chair

Cc:
Dr. Robert J. Budzis
Dr. Paul Wattenmeier
Mr. Richard D. Ederer
Mr. John von Hippel

For: Peter Lam
Page 2
April 4, 2018

operations for the purpose of assessing the safety of operations and suggesting any recommendations for safety operations.**

California is an exceptionally active state and the close proximity of nuclear facilities to populated regions dictates a higher level of safety and degree of independent review by technical experts. Access to the independent, technical experts and plant safety professionals of the DCISC members has provided significant benefit to both the state, local, and public agencies since its formation.

The presence of an independent, expert, technical perspective provides clear benefit to the state, local agencies, and local government who can engage with DCISC staff on pertinent issues through critical stages of Diablo Canyon’s operations and decommissioning.

The state, host communities, and other stakeholders have a vested interest in a public, transparent, and timely decommissioning process. Community trust is maintained in the form of state-supported, recognized experts that review and report on relevant safety issues and topics related to Diablo Canyon. The DCISC provides a public, open approach that is transparent, inclusive, objective, informed, and independent. Each year, the three public meetings are held in the local community, providing a venue that allows the public and local government to directly engage with the community and the plant operator. This inclusive process helps to achieve the essential public trust required for an extended decommissioning process.

I hope that these comments, in combination with other stakeholder’s recommendations, continue to ensure a timely and transparent process. I would welcome to express any support and gratitude to the Diablo Canyon Independent Safety Committee and the staff for their excellent work they accomplish each year in support of their charter.

Please send any correspondence related to this letter to Justin Cochran, Ph.D., Senior Nuclear Policy Advisor, California Energy Commission, MB-30, 1519 Ninth Street, Sacramento, CA 95814-5512. You can also email Justin.Cochran@energy.ca.gov

Robert R. Wattenmeier
Chair and State Liaison Officer to NRC
From: "info@DCISC.org" <info@DCISC.org>
Date: Monday, March 26, 2018 10:41 AM
To: Steve Carlson <scarlton@ucsd.edu>
Cc: "info@DCISC.org" <info@DCISC.org>
Subject: RE: Invitation from the Diablo Canyon Independent Safety Committee

Steve –

The schedule you proposed should work very well for the Committee and we certainly appreciate you and Dr. Victor being willing to accommodate our meeting schedule.

Go ahead and make your plans to implement as schedule and I will be in contact with you before the meeting so that we can further coordinate and make the visit as easy as possible. Please feel free to contact me at any time should you have any questions or if I can assist in any way.

My thanks again to you and please thank Dr. Victor for me as well.

Bob

From: Steve Carlson <scarlton@ucsd.edu>
Date: Thursday, March 29, 2018 9:43 AM
To: info@DCISC.org
Subject: RE: Invitation from the Diablo Canyon Independent Safety Committee

Dear Bob,

As long as it works for the meeting, our plan would be below:

- **Arrive 11:45am on 24 October, stay near SFP**
- **Attend Morning session**
- **Depart SFP at 12:15 on the 25th**

Do you have any concerns on this? If not, I will plan on implementing.

All best,

Steve Carlson

Laboratory of International Law and Regulation
School of Global Policy and Strategy
University of California, San Diego
9350 Gilman Drive #0519
La Jolla, CA 92030-0519
Tel: 858-822-7628

G.2 – 227

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From: "info@DCISC.org" <info@DCISC.org>
Date: Tuesday, March 13, 2018 5:25 AM
To: "info@DCISC.org" <info@DCISC.org>
Cc: Steve Carlson <scarlton@ucsd.edu>
Subject: RE: Invitation from the Diablo Canyon Independent Safety Committee

Bob

Thanks much for your note. In October I have an advisory board meeting in Boston some three days. By copy I ask Steve in my office to see if I could fly back from Boston the morning of the 23rd (leaving on 23rd, I assume, and then I would fly myself into San Luis Obispo) for something early afternoon on the 25th. That that may not align with when you would need me at your meeting.

Another option, which may be viable in June, is to ask Dan Stetson or Jerry Kern from the CEP to join you. They are part of the CEP leadership, along with me.

All best,

David G. Victor

Laboratory of International Law and Regulation
School of Global Policy and Strategy
University of California, San Diego
9350 Gilman Drive #0519
La Jolla, CA 92030-0519
Tel: 858-822-7628

G.2 – 228

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From: Steve Carlson <scarlton@ucsd.edu>
Date: Monday, March 19, 2018 12:03 PM
To: "info@DCISC.org" <info@DCISC.org>
Subject: RE: Invitation from the Diablo Canyon Independent Safety Committee

Dear Bob,

The committee generally schedules a session from 8:30/9:00 AM – Noon and reconvenes from 1 PM to afternoon meetings on the second day of its public meetings in order that Members and Consultants can make travel commitments.

We could schedule David’s remarks for either the morning or afternoon session on October 25 – whichever might be feasible and work best for him.

Appreciate your message and efforts. Please let me know if you need further information.

Bob

Tel: 800-699-4688

info@dcisc.org

From: "info@DCISC.org" <info@DCISC.org>
Date: Monday, March 19, 2018 1:58 PM
To: "info@DCISC.org" <info@DCISC.org>
Subject: RE: Invitation from the Diablo Canyon Independent Safety Committee

Dear Bob,

What is the latest time that is feasible for David to arrive at your location on the 25th? I am trying to map out a plan where at all possible.

All best,

Steve Carlson

Laboratory of International Law and Regulation
School of Global Policy and Strategy
University of California, San Diego
9350 Gilman Drive #0519
La Jolla, CA 92030-0519
Tel: 858-822-7628

G.2 – 229

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However, the recognition that additional time will necessarily better inform any eventual recommendation by the Committee was expressed and affirmed by the Membership on several occasions and it was recognized that any post-shutdown role for the DCISC would necessarily involve a reduced scope. The Open Items list will now be reviewed in the effort to identify items that might be expected to remain and for which in context of post-shutdown decommisioning. The Technical Consultants will be working on a matrix of decommisioning activities identified on the control/reduced post-shutdown Open Items list and set those activities against a timeline which will be reviewed at the June public meeting.

To give you an idea of the scope of the current activities of the Committee in reviewing DCPE operations, I’ve attached a copy of the Open Items list prepared for the February public meeting.

The entire discussion on this topic from the February public meeting is available on streaming video (accessed through our website: www.dcisc.org “Meeting Videos” under the video for February 8, Agenda Item XX, http://cal-scan.org/dep/DP/?view=stream&owner=DCISC&it=2018-02-08

Thank you for your prompt response to the Committee’s invitation and I hope we can meet in person one of these days in Avila Beach; please accept my apologies for having taken this time to respond and acknowledge your email. I was out of the office for most of yesterday afternoon.

With best regards,

Bob Ruttle

---

From: "info@DCISC.org" <info@DCISC.org>
Date: Saturday, March 10, 2018 12:44 PM
To: "info@DCISC.org" <info@DCISC.org>
Cc: Steve Carlson <scarlton@ucsd.edu>
Subject: RE: Invitation from the Diablo Canyon Independent Safety Committee

Dr. Victor

I know the DCISC Members and Technical Consultants (we have two very experienced consultants with nuclear power backgrounds assisting the Committee) will be so appopriate, as I am, that your schedule will not allow you to accept the invitation to attend the Committee’s next public meeting coming this coming June.

Following the June meeting, the next public meeting of the Committee is scheduled to be held in October 24-25, 2018, and when we would invite and will frame your attendance at the October 2018 meeting and if you decide to accept the invitation.

The DCISC schedule for this year’s meetings can be found at the following URL: www.dcisc.org.

G.2 – 230

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From: "info@DCISC.org" <info@DCISC.org>
Date: Saturday, March 10, 2018 1:10 PM
To: "info@DCISC.org" <info@DCISC.org>
Cc: Steve Carlson <scarlton@ucsd.edu>
Subject: RE: Invitation from the Diablo Canyon Independent Safety Committee

Dr. Victor

I know the DCISC Members and Technical Consultants (we have two very experienced consultants with nuclear power backgrounds assisting the Committee) will be so appopriate, as I am, that your schedule will not allow you to accept the invitation to attend the Committee’s next public meeting coming this coming June.

Following the June meeting, the next public meeting of the Committee is scheduled to be held in October 24-25, 2018, and when we would invite and will frame your attendance at the October 2018 meeting and if you decide to accept the invitation.

The DCISC schedule for this year’s meetings can be found at the following URL: www.dcisc.org.

G.2 – 230

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From: "info@DCISC.org" <info@DCISC.org>
Date: Sunday, March 10, 2018 7:21 PM
To: "info@DCISC.org" <info@DCISC.org>
Cc: Steve Carlson <scarlton@ucsd.edu>
Subject: RE: Invitation from the Diablo Canyon Independent Safety Committee

Dear Dr. Victor,

On behalf of the Members of the Diablo Canyon Independent Safety Committee (DCISC), Dr. Peter Lam, Robert J. Buchrich and Per Peterson, I am contacting you for the purpose of extending to you an invitation, in your capacity of Chairman of the SCNGS Community Engagement Panel, to attend the next public meeting of the DCISC to be held in Avila Beach, California, on Wednesday and Thursday, June 13-14, 2018.

Thank you in advance for your consideration of this invitation.

Best wishes,

Steve Carlson
The DCISC was established by the California Public Utilities Commission (CPUC) as part of a Settlement Agreement entered into in June 1986 between the Office of Ratepayer Advocates, the California Attorney General and PG&E. Its three members are appointed by the Governor, the California Attorney General and the Chairman of the California Energy Commission, respectively. The Committee's charge is to review Diablo Canyon Power Plant (DCPP) operations for the purpose of assessing the safety of those operations and making recommendations concerning plant safety.

As you may be aware, in January the CPUC approved the retirement of PG&E's Diablo Canyon Nuclear Power Plant (DCPP) and ordered PG&E to cease generation operations and to cease operating Unit 1 no later than 2024 and Unit 2 no later than 2025. In connection with decommissioning DCPP, PG&E is now accepting applications to serve on the DCPP Decommissioning Engagement Panel which will provide information and guidance to the community on the decommissioning process.

At their October 2017 and February 2018 public meetings the Members discussed with interested members of the public whether PG&E would continue to review issues related to plant shutdown decommissioning, including but not limited to the cooling and storage of highly radioactive spent fuel. During these discussions Mr. Robert Kane and Mr. David Weisman suggested that you might be able and willing to share any important insights concerning the experience of the Los Angeles Edison Community Engagement Panel and Mr. Weisman shared with the DCISC their July 15, 2014, memo with your testimony to the HRC entitled “Decommissioning at San Onofre and the Community Engagement Experience.”

This invitation is cordially extended to you to attend the June 2018 meeting and to share any concerns, recommendations or suggestions regarding the formation or function of the DCPP Decommissioning Engagement Panel or the experience of the Los Angeles Edison Community Engagement Panel. Any insight or thoughts you may have concerning the matter and merits of the DCISC's role during the decommissioning period or any other issues related to the decommissioning of DCPP are invited.

In connection with this email, the DCISC will soon be releasing its annual report for the fiscal year ending June 30, 2017. This report will provide an overview of the activities and accomplishments of the Committee during the past year, including its role in the decommissioning process. The report will also include an update on the status of the decommissioning project and future plans.

Thank you for your continued support of the DCISC and for your interest in the important work that we do. We look forward to seeing you at our next public meeting.

Sincerely,

Robert Kane
DCISC Member

DCISC
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

Committee Members
Robert J. Moose
Peter C. Lam
Peter F. Epstin

March 28, 2018

Dear Mr. Ahijian,

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclosed a compact disk containing the completed report, with PG&E's response incorporated therein, for your information and file.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Radie
DCISC Assistant Legal Counsel

RWR:ms
Enclosed
Cc: w/o excl.: DCISC Members
DCISC
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE
COMMITTEE MEMBERS
ROBERTJ. RONNITZ
PETER LAM
PETER J. PETERSON

March 28, 2018

Mr. Blaire Jones
Senior Manager, Communications
Diablo Canyon Power Plant
Energy Education Center
6588 Ontario Road
San Luis Obispo, CA 93405-8000

Re: Diablo Canyon Independent Safety Committee;

Dear Mr. Jones:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E’s response incorporated therein, for your information and files. A compact disk is also being sent to Vice President, Nuclear Generation and Chief Nuclear Officer Mr. James Welsh, Mr. Jon Friske, Vice President, Power Generation, Mr. Cary Harbor, Director of Nuclear Business Operations, Jennifer Pizzuto, Esq., PG&E Law Department, Mr. Mark Krause, Director Government Relations, Mr. John Lindsey, Communications Representative, Ms. Suzanne Hove, Lead Manager, Government Relations, and Mr. Hector Garcia, Chief Nuclear Officer Support Manager at Diablo Canyon. The two bound volumes which comprise the Annual Report were sent previously to Mr. Welsh.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Ratnie
DCISC Assistant Legal Counsel

RWR:ms
Enclosure
Cc w/o encl.: DCISC Members

OFFICE OF LEGAL COUNSEL - ROBERT R. WELLINGTON - 897 CASK STREET - SUITE D - MONTEREY - CA - 93940
TELEPHONE 831-373-7194 - FAX 831-373-1769 - INFO@DCISC.ORG

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DCISC
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE
COMMITTEE MEMBERS
ROBERT J. RONNITZ
PETER LAM
PETER J. PETERSON

March 28, 2018

Mr. Gregory L. Haus
District Representative
U.S. Representative Hon. Salud Carbajal
20th Congressional District - California
1411 Marsh Street, Suite 205
San Luis Obispo, California 93401

Re: Diablo Canyon Independent Safety Committee;

Dear Mr. Haus:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E’s response incorporated therein, for your information and file.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Ratnie
DCISC Assistant Legal Counsel

RWR:ms
Enclosure
Cc w/o encl.: DCISC Members

OFFICE OF LEGAL COUNSEL - ROBERT R. WELLINGTON - 897 CASK STREET - SUITE D - MONTEREY - CA - 93940
TELEPHONE 831-373-7194 - FAX 831-373-1769 - INFO@DCISC.ORG

G.2 – 237
Dear Mr. Lindsay:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E's response incorporated therein, for your information and files. A compact disk is also being sent to Vice President, Nuclear Generation and Chief Nuclear Officer Mr. James Walsh, Mr. Jon Fiske, Vice President, Power Generation, Mr. Cary Harbor, Director of Nuclear Business Operations, Jennifer Post, Esq., PG&E Law Department, Mr. Mark Knauss, Director Government Relations, Mr. Blair Jones, Senior Manager, Communications, Ms. Suzanne Hon, Lead Manager, Government Relations, and Mr. Hector Garcia, Chief Nuclear Officer Support Manager at Diablo Canyon. The two bound volumes which comprise the Annual Report were sent previously to Mr. Walsh.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Rahbie
DCISC Assistant Legal Counsel

RWR:ms
Enclosure
Cc: w/o enc.: DCISC Members

OFFICE OF LEGAL COUNSEL. ROBERT R. WELLINGTON - 555 CASA STREET - SUITE D - MONTEREY - CA - 93940
TELEPHONE: (831) 373-2384. FAX: (831) 373-2937. E-MAIL: OFLC@DCISC.ORG

DCISC
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

March 28, 2018

Mr. Cary O. Harbor
Director Nuclear Business Operations
Diablo Canyon Power Plant
P.O. Box 56
Mail Code 104/4415
Avila Beach CA 93424


Dear Mr. Harbor:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E's response incorporated therein, for your information and files. A compact disk is also being sent to Vice President, Nuclear Generation and Chief Nuclear Officer Mr. James Walsh, Mr. Jon Fiske, Vice President, Power Generation, Mr. Blair Jones, Senior Manager, Communications, Mr. John Lindsay, Communications Representative, Mr. Mark Knauss, Director Government Relations, Ms. Suzanne Hon, Lead Manager, Government Relations, Mr. Hector Garcia, Chief Nuclear Officer Support Manager, and to Jennifer Post, Esq. of PG&E's Law Department. The two bound volumes which comprise the Annual Report were sent previously to Mr. Walsh.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Rahbie
DCISC Assistant Legal Counsel

RWR:ms
Enclosure
Cc: w/o enc.: DCISC Members

OFFICE OF LEGAL COUNSEL. ROBERT R. WELLINGTON - 555 CASA STREET - SUITE D - MONTEREY - CA - 93940
TELEPHONE: (831) 373-2384. FAX: (831) 373-2937. E-MAIL: OFLC@DCISC.ORG

G.2 – 240
Dear Mr. Barker:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E’s response incorporated therein, for your information and files. A compact disk is also being sent to Chairman Wiesemiller and Dr. Clothier. The two bound volumes which comprise the Annual Report were sent previously to Chairman Wiesemiller’s office.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Rathke
DCISC Assistant Legal Counsel

RWR:ms
Enclosure
Cc w/o encl.: DCISC Members
Ms. Maria Salinas
California Public Utilities Commission
Energy Division
505 Van Ness Avenue
San Francisco, California 94102

Re: Diablo Canyon Independent Safety Committee;

Dear Ms. Salinas:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E’s response incorporated therein, for your information and files. Compact disks are also being sent to Mr. James Ralph, Mr. Eric Greene and Mr. David Zitter. The two bound volumes which comprise the Annual Report were sent previously to the office of the CPUC Executive Director and Mr. Truman Burns of ORA.

The Members of the Committee welcome and invite any thoughts and comments which you might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Radie
DCISC Assistant Legal Counsel

RWRs
Enclosure
Cc w/o end: DCISC Members

OFFICE OF LEGAL COUNSEL - ROBERT R. WELLS - 417 CASE STREET - SUITE 20 - MONTEREY - CA - 93940
TELEPHONE (831) 645-0744; FAX: 645-0757; EMAIL: INFO@DCISC.ORG

G.2 – 247

Mr. Ron Alop
Emergency Services Manager
Office of Emergency Services
County of San Luis Obispo
San Luis Obispo, California 93408

Re: Diablo Canyon Independent Safety Committee;

Dear Mr. Alop:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E’s response incorporated therein, for your information and files. A compact disk is also being sent to Vice President, Nuclear Generation and Chief Nuclear Officer James Weisach, Mr. Jon Franke, Vice President, Power Generation, Mr. Cary Harbor, Director of Nuclear Business Operations, Mr. Mark Krause, Director Government Relations, Mr. Blair Jona, Senior Manager, Communications, Mr. John Lohmey, Communications Representative, Ms. Suzanne Hom, Lead Manager, Government Relations, and Mr. Hector Garcia, Chief Nuclear Officer Support Manager at Diablo Canyon. The two bound volumes which comprise the Annual Report were sent previously to Mr. Weisach.

The Members of the Committee welcome and invite any thoughts and comments which you might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Radie
DCISC Assistant Legal Counsel

RWRs
Enclosure
Cc w/o excl: DCISC Members

OFFICE OF LEGAL COUNSEL - ROBERT R. WELLS - 417 CASE STREET - SUITE 20 - MONTEREY - CA - 93940
TELEPHONE (831) 645-0744; FAX: 645-0757; EMAIL: INFO@DCISC.ORG

G.2 – 249
DCISC
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE
COMMITTEE MEMBERS
ROBERT J. ROSENZWEIG,
PETER LAW,
PETER F. PETIGNOT
WEBSITE - WWW.DCISC.ORG

March 27, 2018

Mr. Hector Garcia
Chief Nuclear Officer Support Manager
Pacific Gas & Electric Company
Diablo Canyon Power Plant
P.O. Box 56
Mail Code 10416/661
Avila Beach, California 93424


Dear Mr. Garcia:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We endorse a compact disk containing the completed report, with PG&E’s response incorporated therein, for your information and files. A compact disk is also being sent to Vice President, Nuclear Generation and Chief Nuclear Officer James Welsh, Mr. Joe Franks, Vice President, Power Generation, Mr. Cary Harber, Director of Nuclear Business Operations, Mr. Mark Krauss, Director Government Relations, Mr. Blair Jones, Senior Manager, Communications, Mr. John Lindsey, Communications Representative, Ms. Suzanne Hosen, Lead Manager, Government Relations, and to Jennifer Post, Eng. of PG&E’s Law Department. The two bound volumes which comprise the Annual Report were sent previously to Mr. Welsh.

The Members of the Committee welcome and invite any thoughts and comments which you might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Rathie
DCISC Assistant Legal Counsel

RWR:ms
Enclosure
Cc: w/o encl.: DCISC Members

OFFICE OF LEGAL COUNSEL - ROBERT J. ROSENZWEIG - 907 CASAT STREET - SUITE 100 - MONTEREY - CA - 93940
TELEPHONE (831) 425-4500 EXT 1044 - FACSIMILE (831) 425-7482 - INFO@DCISC.ORG

G.2 - 251

DCISC
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE
COMMITTEE MEMBERS
ROBERT J. ROSENZWEIG,
PETER LAW,
PETER F. PETIGNOT
WEBSITE - WWW.DCISC.ORG

March 27, 2018

Mr. James Welsh
Vice President, Nuclear Generation & Chief Nuclear Officer
Pacific Gas & Electric Company
Diablo Canyon Power Plant
P.O. Box 56
Avila Beach, California 93424


Dear Mr. Welsh:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We endorse a compact disk containing the completed report, with PG&E’s response incorporated therein, for your information and files. A compact disk is also being sent to Mr. Joe Franks, Vice President, Power Generation, Mr. Cary Harber, Director of Nuclear Business Operations, Jennifer Post, Eng. of PG&E’s Law Department, Mr. Mark Krauss, Director Government Relations, Mr. Blair Jones, Senior Manager, Communications, Mr. John Lindsey, Communications Representative, Ms. Suzanne Hosen, Lead Manager, Government Relations, and Mr. Hector Garcia, Chief Nuclear Officer Support Manager at Diablo Canyon. The two bound volumes which comprise the Annual Report were sent previously to your office.

The Members of the Committee welcome and invite any thoughts and comments which you might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Rathie
DCISC Assistant Legal Counsel

RWR:ms
Enclosure
Cc: w/o encl.: DCISC Members
Dear Mr. Swain,

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee voted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E’s response incorporated therein. Please make it available to the public. Compact disks are also being sent to the San Luis Obispo County, Arroyo Grande, and Shell Beach public libraries. The two bound volumes which comprise the Annual Report were sent previously to the Reference Department Desk at Kennedy Library.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,
Robert W. Rathie
DCISC Assistant Legal Counsel

G.2 – 255

County Library
County of San Luis Obispo
Arroyo Grande Branch
800 W. Branch
Arroyo Grande, California 93402

Re: Diablo Canyon Independent Safety Committee;

March 28, 2018

Dear Librarian:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee voted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E’s response incorporated therein. Please make it available to the public. Compact disks are also being sent to the San Luis Obispo County Library, to the Shell Beach County Branch Library and to the R.E. Kennedy Library at Cal Poly. The two bound volumes which comprise the Annual Report were sent previously to the Reference Department Desk at the Cal Poly Library.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this annual report. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,
Robert W. Rathie
DCISC Assistant Legal Counsel

G.2 – 255
flooded, what can the possibility do right now to replace containers in repair them. Holtec President said it would not be feasible to repair containers without introducing another cause for breaking in steam lines used.

14. The NRC released a December 2017 report on the Department of Energy spent fuel storage. Most of this is relevant to commercial spent fuel. I highly recommend you read this. It discusses the importance of recording fuel and fuel transfers to be inspected, maintained, monitored and retrievable. Risks of hydrogen explosions and other major problems can result, if this is not done.

15. The NRC has been stating its insufficient humidity at San Onofre for moisture to dissolve salt on the reactors, which is one of the major triggers for cracks to start in the containers. You also state, once a crack starts, it can go through the wall in 16 years. San Onofre receives frequent daily fog, onshore winds and surf. Please reevaluate or position on the reactors. Here is a photo of a typical morning or evening at San Onofre. I suggest your material engineers, such as Darrell Dunn, make this screen saver if they have any doubts about the humidity at San Onofre.

Thank you,
Dorna Gilmour
SanOnofreSafety.org
984-204-7704

On 12/2/2018 1:51 PM, McNelley, David wrote:
Ms. Gilmour - I am responding to your email inquiry to Pierre Savoie of the NRC’s Division of Sport Fuel Management regarding news reports of loose bolts found in Holtec containers at Vermont Yankee. We received a similar inquiry from Mr. Paul Gantier of Beyrand Nuclear. Our response is below.

5. Tom Palmisano admitted they had no safe way to unload these containers back into the pool and it has never been done at any location. He said hear from the fuel assemblies in dry storage would be over 200 degrees C. Putting hotter assemblies back into a cooler pool would be a major "freezing problem". My technical research on this issue confirms that. This is one reason the NRC should stop approving hotter fluid into dry storage and should stop approving higher burnup fuel. Higher burnup fuel only makes the problem worse with in the clad. aluminium alloy fuel plates, changing hydrogen gas explosions risk, in all its temperature risks. Zincium hydrides ignite at 270 degrees C.

6. Tom said we would need a hot cell to safely unload. It’s clear the NRC’s reasoning for saying dry storage is safe is based on false assumptions that fuel would not need to be unloaded, would never have through-wall cracks, and would never be loaded incorrectly. Therefore, the NRC should mandate that hot cells at every facility with dry storage. The dry storage container technical specifications you approve requires that fuel must be able to be unloaded in both wet (pool) and dry (hot cell) fuel handling facilities. Yet, you allow empty pools to be deployed and do not require hot cells. I am not aware of any US. locations with hot cells large enough to unload PWR containers and refuel fuel assemblies into new containers. The TAN facility (the only one large enough to do this) was demolished.

7. Palmisano said broken to broken and bent pins (bolts) have been found. This is typically a hot cell control design problem for Holtec. The NRC should require independent quality control and discontinues the 50.59 process for Holtec. They have demonstrated they do not have the skill set for management ability to perform this work. I recommend the NRC complete an independent investigation of the Holtec manufacturing facility and process to ensure there are no other problems. After, I’m sure you know, this is a symptom and not the root cause. The root cause is this change has never happened if adequate management, quality and design control measures were in place.

8. Please halt all Holtec installations in the country until this and potentially related issues are investigated and all issues resolved.

9. Please use this opportunity to evaluate the current NRC standards that allow unacceptable containers to be used with no ability to unload them. Please only require proven thick-wall cans designed to be inspected, maintained and repaired in a manner to PREVENT leaks, explosions and collapses -- and just monitored AFTER leaks occur. At San Onofre and elsewhere, too much is at risk to do otherwise. California provides 40% of the US. curo exports and exports. It’s located adjacent to the 1-4 international flyway. California is the 4th largest economy in the world. A radioactive explosion of one or more of these Chemweb fuel storages will change permanent evacuations, destabilize the local economy, national economy and perhaps the world economy. The health and safety of a large portion of the US. population is being put at risk because your standards are useless. Our national food and water supply is being put at risk. Now is the time this must be solved, before it is too late. Please be honest with the elected officials and regulators and tell them the truth about how close we are to these Chemweb fuel storages in the country anywhere. They need to know before it is too late. Our federal community can help give you the courage you need to do the right thing.

10. See attached press release from Edison regarding the defective shield design. Please let me know if you have any comments or corrections or additions to what they have written.

11. Palmisano said they are loading the containers at 28 W/kg. Since this is a record high temperature (over double what San Onofre has done in the past), are you independently verifying that the corotation cooling through the air vents is adequate to keep the fuel from becoming damaged. Please do this and share the results with me.

12. Palmisano said they are not treating high burnup fuel damaged, so they are not putting in damaged fuel. Since you know high burnup fuel can become damaged during dry storage, and NRC staff said they want Holtec to confirm high burnup fuel in dry storage has not become damaged before transport, how can this possibly be accomplished?

13. NRC staff also told Holtec they want to confirm there are no partial cracks in the containers before transport, how can this be accomplished with no method to inspect existing containers. And if they did

5. Tom Palmisano admitted they had no safe way to unload these containers back into the pool and it has never been done at any location. He said hear from the fuel assemblies in dry storage would be over 200 degrees C. Putting hotter assemblies back into a cooler pool would be a major "freezing problem". My technical research on this issue confirms that. This is one reason the NRC should stop approving hotter fluid into dry storage and should stop approving higher burnup fuel. Higher burnup fuel only makes the problem worse with in the clad. aluminium alloy fuel plates, changing hydrogen gas explosions risk, in all its temperature risks. Zincium hydrides ignite at 270 degrees C.

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13. NRC staff also told Holtec they want to confirm there are no partial cracks in the containers before transport, how can this be accomplished with no method to inspect existing containers. And if they did...
SCE Reviewing Used Fuel Storage Canister Fabrication Changes

ROSEMEAD, Calif., March 22, 2016 — Southern California Edison is evaluating a vendor’s fabrication modifications to some used nuclear fuel storage canisters at the San Onofre nuclear plant.

Tom Palmisano, SCE vice president and chief nuclear officer, said the utility temporarily paused work transferring San Onofre’s used fuel to the dry storage canisters while it evaluated fabrication changes to components inside the bottom portion of some of the canisters. SCE already has validated the canisters continue to perform their safety function.

The vendor, Holtec International, revised an internal component called the basket shim. In 2015, the shiny help center the basket, which houses the used fuel and fosters the flow of helium to transfer heat from the fuel. SCE began its review after discovering a loose piece of a shim (4 inches by 1/16 inch) while preparing to load a canister.

“Safety is our top priority,” said Palmisano. “Our first step was to confirm the fabrication change poses no safety risk to workers or the public. We also directed the manufacturer to conduct extensive evaluations to ensure we have a comprehensive understanding of the change. Additionally, we briefed the U.S. Nuclear Regulatory Commission and have kept the regulator apprised of our actions.”

Holtec is supplying SCE with 73 canisters to store spent nuclear fuel. 30 have the original shim basket design, which is used extensively in the industry, and 43 have the new shim basket, also used at some plants.

In addition to its own review, SCE asked Holtec and MPR, an independent engineering firm, to review the original shim basket design to ensure it remains consistent with the NRC licensing criteria and safety requirements for used fuel storage and transportation. Both concluded that the original design meets the commission’s criteria. Separately, Holtec is conducting an internal root cause evaluation to determine what caused the loose piece observed in one of the canisters.

SCE has resumed fuel transfer work, loading the 30 canisters with the original design. The remaining canisters with the new design are on hold until Holtec completes its root cause evaluation.

SCE began loading and transferring fuel into dry storage in January and has placed four loaded canisters with the newer basket shim in the concrete core facility at San Onofre. The canisters’ eligibility for on-site storage purposes was confirmed through an analysis by Holtec that was reviewed by SCE and MPR.

SCE has updated the San Onofre Community Engagement Panel every few months on the company’s commitment to safe storage of spent nuclear fuel, including a short presentation on SCE’s defense in depth approach to fuel storage.
CGNP Response to proposed California SB 1090

March 17, 2018  San Luis Obispo, CA

Intervenor Californians for Green Nuclear Power, Inc. (CGNP) http://CGNP.org has proposed a much better solution for California ratepayers and the environment. The solution is for the CPUC to obey existing California legislation and reject PG&E’s harmful proposal to abandon Diablo Canyon (DCPP) in 2025.

CGNP recently uncovered evidence that PacifiCorp, a Berkshire Hathaway Energy Company has "lobbied" federal and state officials with over $10 million dollars (on a par with ENRON) to accept PacifiCorp's dirty coal power from Wyoming after 2025. Plus, PacifiCorp has "lobbied" (er bribed) the CPUC with almost $1 million since 2009! It would take time to build the power lines that could bring that power from places like PacifiCorp's massive Jim Bridger Coal Power Plant - power lines which ratepayers would fund - a likely reason for the delay to 2025!

The result would be that California ratepayers will be paying more for their electricity - and endure more air pollution - as the pollution would drift from Wyoming to California if DCPP is prematurely and wastefully abandoned in 2025. Solar and wind are only "ON" about 1/5 of the time, while California needs 100% "ON" power such as produced by DCPP. CGNP has forced a reopening of this CPUC proceeding by filing an Application for Rehearing in A.16-08-008 on January 16, 2018. A legal battle is in the offing.

CGNP held its fourth annual rally to support the continued safe operation at a St. Patrick’s Day Rally across the street from the SLO County Government Center at 1055 Monterey St. from 10:00 AM to Noon. (See photos) CGNP supporters came out and wore their green - and the forecasted rain held off! We rallied to protect DCPP’s safe, reliable, abundant, inexpensive, and emission-free power.

Gene Nelson, Ph.D. CGNP Government Liaison  (805) 363 - 4697 Government@CGNP.org

Here are some photos from CGNP’s St. Patrick’s Day rally. Higher quality images available on request.
DCISC
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

COMMITTEE MEMBERS

ROBERT F. BOWNIEZ
PETER LAM
JERI F. PETERSON

WEBSITE: WWW.DCISC.ORG

March 15, 2017

Ms. Suzanne Hom
Lead Manager, Government Relations
PacifiCorp Gas & Electric Company
456 Figueira
San Luis Obispo, CA 93401

Re: Diablo Canyon Independent Safety Committee;

Dear Ms. Hom:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E's response incorporated therein, for your information and files. A compact disk is also being sent to Vice President, Nucleare Generation and Chief Nuclear Officer James Welich, Mr. Jon Franks, Vice President, Power Generation, Mr. Gary Hart, Director of Nuclear Business Operations, Mr. Brian Jones, Senior Manager, Communications, Mr. John Ludby, Communications Representative, Mr. Jason Garcia, Chief Nuclear Support Manager, and to Jennifer Post, Esq. of PG&E's Law Department. The two bound volumes which comprise the Annual Report were sent previously to Mr. Welich.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Rathie
DCISC Assistant Legal Counsel

RWR:ms
Enclosure

Cc with encs: DCISC Members

DCISC
WEB SITE: WWW.DCISC.ORG

March 28, 2018

Mr. Ken Alex
Senior Policy Advisor
Director, Office of Planning and Research
Office of California Governor Edmund G. Brown Jr.
State Capitol
Sacramento, California 95814

Re: Diablo Canyon Independent Safety Committee;

Dear Mr. Alex:

At its October 18, 2017, public meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. We enclose a compact disk containing the completed report, with PG&E's response incorporated therein, for your information and files. The two bound volumes which comprise the Annual Report were sent previously to the Governor's office.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this and the previous DCISC annual reports. If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert W. Rathie
DCISC Assistant Legal Counsel

RWR:ms
Enclosure

Cc with enc s: DCISC Members

G.2 – 271

G.2 – 273
From: Rochelle Becker <rochellebecker@gmail.com>
Sent: Thursday, March 8, 2018 10:54 AM
To: DCSCat@DCSC.org
Subject: RE: SONGS - David Victor

Thanks for the update Bob, I hope the dates will work for David. The applications for the "Decommissioning Engagement Panel" will be reviewed beginning on March 23rd. David provided some excellent advice in advance of the meeting.

In Peace
Rochelle

On Thu, Mar 8, 2018 at 10:54 AM, DCSafety@DCSC.org <dcscsafety@dcsc.org> wrote:

Rochelle — the dates for the next DCSC public meeting are Wednesday and Thursday, June 13-14, 2018, with a tour to be scheduled the morning of the meeting, June 13.

I have had the issuance of the DCSC’s invitation to Mr. Victor on my “to do” list from February and plan to get an email out to him today or tomorrow, but the above are now firm dates for the next public meeting.

I share your hope that Mr. Victor may be able to attend — and I thank you for your email (which has prompted me to get moving and send him the invite).

Best,
Bob

From: Rochelle Becker (mailto: rochellebecker@gmail.com)
Sent: Thursday, March 8, 2018 9:04 AM
To: DCSafety@DCSC.org
Subject: RE: SONGS - David Victor

Hi Bob,

G.2 – 275

From: info@DCSC.org
Sent: Friday, March 2, 2018 10:23 AM
To: Megan Hey
Cc: info@DCSC.org
Subject: RE: Notice of & Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Hi Megan —

I have attached the Prov-Cost & Recommendations paper from the February 8, 2018, DCSC public meeting in both PowerPoint pdf/PowerPoint formats.

I need to point out that the "Primary Conclusion and Recommendation" (Powerpoint Slide 13) was not formally adopted by the Committee and no direction was given at the February public meeting as to advising the CAIC of the three entities (the Governor, the AG and the state) of the members about a post-shutdown role for the Committee.

However, the recognition that additional time will necessarily better inform any eventual recommendations by the Committee was expressed and affirmed by the Membership on several occasions and it was recognized that any post-shutdown role for the DCSC would necessarily involve a reduced scope. The Open Items List will now be reviewed in the effort to identify items that might be expected to remain and/or evolve in context of post-shutdown decommissioning. The Technical Consultants and Attorney are to work on a matrix of decommissioning activities (identified on the revised/reduced post shutdown Open Items List) and set those activities against a timeline which will be reviewed at the June public meeting, along with any other information (including decommissioning if Mr. David Victor of the SONGS Community Engagement Panel) is able to accept the Committee’s invitation to attend its June meeting and present information.

The entire discussion is available on streaming video accessed through our website — www.dcsafety.org — "Meeting Videos" is the video for February 8, Agenda Item XX.

http://www.dcsafety.org/videos/Streamed/2018/2018_02_08.mp4

Hope all is well with you and thanks for contacting me. Please let me know if you need additional information.

Bob

From: Megan Hey [mailto:Megan.Hey@dgcla.com]
Sent: Thursday, March 1, 2018 5:34 PM
To: info@DCSC.org
Subject: RE: Notice of Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

I had a need to reach out to David Victor today and I mentioned the DCSC’s interest in having him come to your next meeting. He appears interested, but I was not sure of the dates in June and did not wish to speak for the DCSC.

I have asked several questions regarding the SONGS CEP (advice and caution) at the Decommissioning Panel for Diablo is under formation.

I hope David will be able to share his insight at your June meeting, but I leave the invite to the DCSC,

In Peace
Rochelle

Rochelle Becker, Executive Director
Alliance for Nuclear Responsibility
PO 1328
San Luis Obispo, CA 93406
www.anrc.org

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From: Megan Hey [mailto:Megan.Hey@dgcla.com]
Sent: Thursday, February 8, 2018 3:54 PM
To: info@DCSC.org
Subject: RE: Notice of Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Hi Bob —

Could you please email me a scan/photo of the Powerpoint slides you presented at the 2/18/18 meeting concerning the Committee’s potential existence/role during decommissioning?

Thanks.
Best —
Meg

From: Megan Hey [mailto:Megan.Hey@dgcla.com]
Sent: Thursday, February 8, 2018 3:54 PM
To: info@DCSC.org
Subject: RE: Notice of Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Hi Bob —

I got your email. Actually, when Mr. Bridgitz and I spoke, I mentioned that I doubted that I would be able to attend the quarterly meeting next week. Indeed, I can’t make it. I will certainly review the meeting on SL-DAY when it’s available. And somehow, I’m sure I’ll make it up to a meeting in person. Thanks for continuing to keep me in the loop about the Committee.

Best —
Meg

From: info@DCSC.org [mailto:info@DCSC.org]
Sent: Friday, January 19, 2018 9:30 PM
To: Megan Hey [mailto:Megan.Hey@dgcla.com]
Cc: info@DCSC.org
Subject: Notice of & Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Dear Ms. Hey,

The next public meeting of the Diablo Canyon Independent Safety Committee (DCISC) will be held on Wednesday and Thursday, February 7-8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility in Avila Beach, California. A draft agenda for the meeting is attached.

Since the last public meeting of the DCISC in October 2017, the California Public Utilities Commission affirmed the removal of PG&E’s Diablo Canyon Nuclear Power Plant (DCPP) in Decision 18-01-022 issued on January 11, 2018. The Decision orders PG&E to retire Unit 1 no later than by 2024 and Unit 2 no later than 2025, and it also addresses a number of related issues in connection with the cessation of generation operations at DCPP.

At the DCISC’s October 2017 meeting the matter of whether the DCISC might continue to review activities related to post-shutdown decommissioning of the power plant, including but not limited to the cooling, transfer and storage of highly radioactive spent fuel, was raised by several persons. Discussion of that matter has been placed on the agenda for February 8 under Agenda Item XX. and, on behalf of DCSC Members, I invite the Committee to participate in the meeting and to share any concerns, recommendations or suggestions regarding a continuing role for the DCISC during the decommissioning period following termination of generation operations at DCPP, or other issues related to decommissioning activities or within the DCISC’s purview.

Should you be unable to attend the DCSC Members would welcome receiving any comments you might wish to provide. Comments may be emailed to the Committee at info@DCSC.org or mailed to the Office of the
CONFIDENTIALITY NOTICE: This communication with its contents may contain confidential and/or legally privileged information. It is solely for the use of the intended recipient(s). Unauthorized interception, review, use or disclosure is prohibited and may violate applicable laws including the Electronic Communications Privacy Act. If you are not the intended recipient, please contact the sender and destroy all copies of the communication.
From: Linda Seeley
Sent: Wednesday, February 14, 2018 10:41 AM
To: 'Linda Seeley'
Cc: 'Donna Gilmore', 'Lucy J Swanson'; info@DCISC.org
Subject: RE: DCISC October & December 2017 Fact-Finding Reports
Attachments:

Linda — thank you for your very nice words,

Two of the four fact-finding reports approved by the Committee at the February 2018 public meeting included information on the Committee’s review of matters concerning dry cask storage. Those were the October 30-31 and December 13-14, 2017 FF Reports and I have attached both here.

You will find the December report to be the more detailed and most current review of the two reports. (The October FF report presents the status of dry cask storage, leading up to August 2017, as at the time of the visit in October there had been no changes in the status of spent fuel since that time.)

More all is well with you, and as always thanks for your interest in the DCISC and its activities.

Best regards,

Bob

From: Linda Seeley [mailto:lindaseeley@gmail.com]
Sent: Wednesday, February 14, 2018 7:31 AM
To: Bob@DCISC.org
Cc: Donna Gilmore [mailto:donnagilmore@gmail.com]; <donnagilmore@gmail.com>; lucyjswanson@canada.com
Subject: Fact-Finding Report

Dear Bob,

At the last DCISC meeting, I requested a copy of the dry storage fact-finding report. You said that there was a copy of it in the hard copy on the back table in the room, but I was not able to find it there.

Can you please send it electronically to Donna Gilmore, Jane Swanson (copied) and me?

Thanks for your good work.

Linda Seeley
MFP

From: Linda Seeley [mailto:lindaseeley@gmail.com]
Sent: Monday, February 12, 2018 7:39 PM
To: info@DCISC.org
Subject: Re: David Victor

Great, thank you so much!

On Mon, Feb 12, 2018 at 6:28 PM lds@DCISC.org <info@DCISC.org> wrote:

Dear Linda — thank you for providing the information with your email regarding criticism of Mr. Victor in context of the community engagement process for SONGS and DCISP.

I will, of course, provide your email to our Members and Technical Consultants and can follow up with you concerning any additional information they may request.

As always, thank you for contacting the DCISC; it was good to see you at the meeting last week.

Best regards,

Bob Rathie

From: Linda Seeley [mailto:lindaseeley@gmail.com]
Sent: Sunday, February 11, 2018 8:34 AM
To: Bob@DCISC.org
Subject: David Victor

Dear Members of DCISC,

Ever since the announcement of the Incipient Community Engagement Panel for Diablo Canyon, the internet has been ablaze with criticism of PG&E’s invitation to David Victor for advice on CEPS. It’s my understanding that David Victor is no more than a hired gun in the nuclear industry and that he has hindered, rather than helped, the community engagement process.

I do not know David Victor, But there are many whom I do trust in San Clemente who have nothing but criticism for his handling of the SONGS process.

I hope that you will see fit to proceed with caution in any reliance on David Victor’s advice or suggestions for engagement. If you would like me to give you names and emails for those reliable people who have showered so much criticism on his abilities, please feel free to contact me.

Thanks.

Linda Seeley
m3636@pacbell.net
https://www.santamaria.org/grassrootsnetwork/teams/nuclear-free-camps-united
805-234-1769

Ever since the announcement of the Incipient Community Engagement Panel for Diablo Canyon, the internet has been ablaze with criticism of PG&E’s invitation to David Victor for advice on CEPS. It’s my understanding that David Victor is no more than a hired gun in the nuclear industry and that he has hindered, rather than helped, the community engagement process.

I do not know David Victor, But there are many whom I do trust in San Clemente who have nothing but criticism for his handling of the SONGS process.

I hope that you will see fit to proceed with caution in any reliance on David Victor’s advice or suggestions for engagement. If you would like me to give you names and emails for those reliable people who have showered so much criticism on his abilities, please feel free to contact me.

Thanks.

Linda Seeley
m3636@pacbell.net
https://www.santamaria.org/grassrootsnetwork/teams/nuclear-free-camps-united
805-234-1769

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Thanks.

Linda Seeley
m3636@pacbell.net
https://www.santamaria.org/grassrootsnetwork/teams/nuclear-free-camps-united
805-234-1769

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Thanks.

Linda Seeley
m3636@pacbell.net
https://www.santamaria.org/grassrootsnetwork/teams/nuclear-free-camps-united
805-234-1769
Two Bills Introduced To Improve Safety, Security At San Onofre Nuclear Plant

Wednesday, February 7, 2018
By City News Service

The first pair of hearings, the Nuclear Power Plant Decommissioning Act, would provide a "meaningful role" for state and local communities in the cleanup and preparation of decommissioning plans for retired nuclear plants, it also requires the NRC to publicly approve or reject every such plan, which is not currently required, according to Harris.

The bills are co-sponsored by Senate President Pro Tem, Ed Hernandez, D-Whittier, and Senate Majority Leader, Toni Atkins, D-San Diego. Both bills have been referred to the Committee on Utilities and Energy.

"As nuclear power reactors like San Onofre undergo the decommissioning process, we must ensure that every necessary measure is taken to protect the surrounding communities and environment," Atkins said.

"This bill ensures that decommissioning nuclear power plants process adheres to reasonable safety procedures that have been on the books for decades." San Onofre closed in 2013 and it is currently in the process of being decommissioned.

"I am encouraged to see that some of the state's most experienced lawmakers are supporting this crucial legislation," Harris said. "I am glad that we can do what is needed to properly decommission these plants and ensure the safety of all Californians who live near them."

The hearing will be held in Building 200 of the San Onofre Nuclear Generating Station.

The bill would establish a decommissioning fund to be used to pay for the cost of decommissioning. The fund would be financed through a fee imposed on the owners of the retired nuclear power plants.
CONGRESS.GOV

S.2396 - Safe and Secure Decommissioning Act of 2018

115th Congress (2017-2018) | Date: April 3, 2017

Sponsor: Sen. Harkin, Saralene G. D. (919) Introduced: 02/07/2018
Committee: Senate - Environment and Public Works
Latest Action: Senate - 02/07/2018 — Read here and referred to the Committee on Environment and Public Works. (As Amended)
Tracker: Introduced | Passed Senate | Passed House | To President | Became Law

Text: S.2396 — 115th Congress (2017-2018)

There is one version of the bill.

Text available as: HTML, PDF (This and previous versions). DOC (PDF provides a complete and accurate display of this text.)

Shown Here:
Introduction in Senate (02/07/2018)

115TH CONGRESS
2D SESSION
S. 2396

To amend the Atomic Energy Act of 1954 to prohibit certain waivers and exemptions from emergency preparedness and response and security regulations.

IN THE SENATE OF THE UNITED STATES
FEBRUARY 7, 2018

Mr. HARRIS (for himself, Mr. SANDERS, Mr. MARKEY, and Mrs. GILLIBRAND) introduced the following bill:
which was read twice and referred to the Committee on Environment and Public Works

A BILL

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info@DCISC.org

From: info@DCISC.org
Sent: Friday, February 9, 2018 5:41 PM
To: Linda Seeley
Cc: info@DCISC.org
Subject: RE: The orphan tsunami of 1700—Japanese clues to a parent earthquake in North America

Dear Linda—Thank you for providing the information below on the USS publication. I will provide the information and your email to our Members and Consultants.

Thank you for taking your time to attend the meeting this week. I know the Members value your input and appreciate your interest in the DCISC and its activities.

I wish you a very good weekend,

Bob Rathke
DCISC Asst. Legal Counsel
1-800-439-4668
info@DCISC.org

From: Linda Seeley [mailto:info@dcisc.org]
Sent: Monday, February 5, 2018 11:11 AM
To: info@dcisc.org
Subject: The orphan tsunami of 1700—Japanese clues to a parent earthquake in North America

Dear DCISC,
This report was forwarded to me this morning. Very relevant to the new tsunami info at Diablo Canyon. Thanks,
Linda Seeley
https://pubs.usgs.gov/publication/pb7077

The orphan tsunami of 1700—Japanese clues to a parent earthquake in North America

Professional Paper 1707

Brian F. Atwater *, Satoko Mursumi-Rokkaku, Kenji Satake, Yoshinobu Tsuji, Kazue Ueda, and David K. Yamaguchi

Prepared in cooperation with the Geological Survey of Japan (National Institute of Advanced Industrial Science and Technology), the University of Tokyo, and the University of Washington

By:
First posted September 15, 2005
Revised December 1, 2015
For additional information, contact:
Brian Atwater
U.S. Geological Survey at Department of Earth and Space Sciences
University of Washington 353130
Seattle WA 98195-1310
206-530-5307
atwater@usgs.gov

Summary

A puzzling tsunami entered Japanese history in January 1700. Samurai, merchants, and villagers wrote of minor flooding and damage. Some noted that no parent earthquake had been felt; they were wondering what had set off the waves. They had no way knowing that the tsunami had been spawned during an earthquake along the coast of northwestern North America. This orphan tsunami would not be linked to its parent earthquake until the middle 1990s, through an extraordinary series of discoveries in both North America and Japan.
The **Orphan Tsunami of 1700**, now in its second edition, tells this scientific detective story through its North American and Japanese clues. The discoveries underpin many of today's precautions against earthquakes and tsunamis in the Cascadia region of northwestern North America. The Japanese tsunami of March 2011 called attention to those hazards as a mirror image of the transpacific waves of January 1700.

**Suggested Citation**


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Professional Paper

**Series number:**
1707

**DOI:**
10.3133/pp1707

**Edition:**

**Year Published:**
2005

**Language:**
English, Japanese

G.2 – 295

```
From:     DCSafety@DCISC.org
Sent:     Friday, February 9, 2018 5:26 PM
To:       'Rochelle Becker'
Cc:        info@DCISC.org
Subject:  RE: David Victor

Rochelle - Thank you for the contact information for David Victor.
As you know from the meeting on Wednesday, the Committee intends to extend an invitation to Mr. Victor to attend the June 13-14, 2018 public meeting and to address remarks to the Members on decommissioning issues.

It was good to see you again and I very much hope you're having a great visit with your daughter (as always, AHRR was able represented by David at the meeting on Thursday).

Best for a great weekend,

Bob Rusche

--- Original Message ---
From: Rochelle Becker [mailto:rochellesavv@gmail.com]
Sent: Wednesday, February 7, 2018 5:44 PM
To: dcsafety@dcisc.org
Subject: David Victor

David.victor@bcdc.edu
Sent from my iPhone
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G.2 – 298
Florida Power & Light applies for second license renewal for Turkey Point nuclear reactors

Published on February 6, 2018 by Aaron Gutsler

Florida Power & Light Co. (FPL) applied for a second 20-year license renewal for reactors at its Turkey Point nuclear plant in Miami-Dade County, making a fifth for Unit 3, a nuclear plant.

"In 2016, the company plans to conduct additional upgrades on the existing nuclear units that are expected to further boost their output by a combined 40 megawatts of capacity, and it also will file with the NRC to renew the next operating license," FPL said in a statement. "Renewing the licenses would allow the units to operate until 2052 and 2053 and save FPL customers billions of dollars by avoiding the need for other more expensive power generation."

Nuclear Energy Institute (NEI) Senior Project Manager of Lifeline Extension and New Technology, Jerald Hanson said, "The groundbreaking second extension follows years of research by the NEI’s Long-Term Operations Program, the Department of Energy's Light Water Reactor Sustainability Program and the NRC to help achieve safe long-term operation of nuclear reactors."

"Aggressive inspections, innovative maintenance and repair techniques, continuous upgrading and replacement of parts and systems, and lessons from fuel plant operating experience will ensure nuclear power plants continue to operate safely into the future," Hanson said.

Those practices will likely become more critical in the future because half of the nation’s nuclear plants will have been in operation for at least 60 years by 2040. A planned second license renewal program would enable plants to remain in operation for up to 80 years.

As for Turkey Point, Units 3 and 4 were licensed as initial license renewal in 2002 and would be in operation through 2032 and 2033 under that application, respectively.

"Turkey Point operations generate an estimated $1.7 billion of economic output annually, employing more than 400 full-time employees and hundreds of contract workers who live in nearby communities," FPL said. "Annual refueling outage requires more than 2,600 additional personnel to visit the plant, supporting local lodging, restaurants and hundreds of other local businesses."
From: Charlie McKeel <c.mckeel@deq.idaho.gov>
Sent: Wednesday, February 7, 2018 10:14 AM
To: Bruce Gibson <Bruce.Gibson@dea.idaho.gov>
Cc: info@DCSCS.org
Subject: RE: Notice of & Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Mr. McKeel – there is no call in number for participating by telephone for the meeting.

The meeting can be viewed in real time on live stream video through our website www.deq.state.id.us or through www.scri- pper.org. Both will have links to the live stream feed which starts today at 1:30 PM (the link to the deq website is currently under that to the agenda for the meeting but we will soon have posted it more prominently).

Bob Rabie

From: Bob Rabie <b.rabie@deq.state.id.us>
Sent: Wednesday, February 7, 2018 8:50 AM
To: info@DCSCS.org
Subject: FW: Notice of & Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Hello Mr. Rabie, is there a call in number for this meeting?

Dear Supervisor Gibson:

I want to thank you for attending the June 2017 public meeting of the Committee, during which Committee Special Technical Consultant Dr. Robert Sewell made his presentation on the tsunami hazard. I am writing now to let you know that the next public meeting of the Diablo Canyon Independent Safety Committee (DCISC) will be held on Wednesday and Thursday, February 7-8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility in Avila Beach, California. A draft agenda for the meeting is attached.

Since the last public meeting of the DCISC in October 2017, the California Public Utilities Commission approved the retirement of PG&E’s Diablo Canyon Power Plant (DCPP) in Decision 18-01-043 issued on November 1, 2018, The Decision orders PG&E to retire Unit 1 no later than by 2024 and Unit 2 no later than 2035, and it also addresses a number of related issues in connection with the cessation of generation operations by DCPP.

At the DCISC’s October 2017 meeting the matter of whether the DCISC might continue to review activities related to post-shutdown decommissioning of the power plant, including but not limited to the cooling, transfer and storage of highly radioactive spent fuel was raised by several persons. Discussion of that matter has been placed on the agenda for February 8 under Agenda Item XX, and, on behalf of DCISC Members, an invitation is cordially extended to you to attend the meeting and to share any concerns, recommendations or suggestions regarding a continuing role for the DCISC during the decommissioning period following termination of generation operations at DCPP, or other issues related to decommissioning activities or within the DCISC’s purview.

Should you be unable to attend, the DCISC Members would welcome receiving any comments you might wish to provide. Comments may be emailed to the Committee at info@DCSCS.org or mailed to the Office of the DCISC Legal Counsel, 837 Cass Street, Suite D, Morro Bay, CA 93440. All comments received will be provided to the Members for their consideration and will become part of the DCISC’s public record.

Of course, the Committee Members would welcome your attendance and remarks by any of the other Members of the Board of Supervisors and please let them know that an invitation to attend and address the Committee is extended to them as well.

Each public meeting of the DCISC is open to the public and the discussions during the February 7-8, 2017 meeting may be viewed through a link on the DCISC website http://www.deq.state.id.us or through www.scripper.org. DCISC public meetings are also archived on the internet, indexed to the meeting agenda, and may be accessed at the above websites. Information on the DCISC and its Members and on various topics related to DCPP is available on its website, as are the dates for future public meetings.

Please let me know if you plan to attend the February 2018 public meeting and if you would like to address the DCISC on any topic and I will ensure that sufficient time is reserved for your remarks.

Sincerely,

Robert Rabie
Ass. DCISC Legal Counsel
I'll share this information with the Committee.

I hope you and John can find some time next week on Wednesday or Thursday to attend the public meeting. (The discussion on whether the Committee should seek for a new location on its behalf) is a continuing one to review decommissioning while there is still fuel in the pools is expected to take place around 10:30-10:45 AM on Thursday morning.

Thanks again.
Bob.

From: Newport, Christopher [mailto:Christopher.Newport@erc.gov]
Sent: Thursday, January 25, 2018 6:43 PM
To: Newport, Christopher [mailto:Christopher.Newport@erc.gov]
Cc: Info@DGSC.org; [mailto:info@dgsc.org]
Subject: RE: DGSC Public Meeting on February 7-8, 2018

Chris & John,

I thought I would let you know that in response to invitations issued, we now expect attendance at the meeting by Mr. Annie Agnew, Assistant District Director for State Senator Bill蒙曼on and by SD Supervisor Dr. Bruce Gibson (both on Thursday morning) and also by Ms. Shelly Akabian, U.S. Senator Feinstein’s District Director for Central CA. Ms. Akabian is expected to attend on both Wednesday and Thursday.

Hop you can find some time to attend also.

Best regards,
Bob

From: info@DGSC.org [mailto:info@dgsc.org]
Sent: Thursday, January 25, 2018 10:41 AM
To: Newport, Christopher [mailto:Christopher.Newport@erc.gov]
Cc: Info@DGSC.org
Subject: RE: DGSC Public Meeting on February 7-8, 2018

Chris - thank you, much appreciated.

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entire agenda packet, including the Minutes of the October 2017 meeting, will be posted on our website at www.dgsc.org very soon.

Hopefully you might be able to find some time to attend some portion of the February public meeting next week — you are always most welcome.

I also wanted to check and see if you might provide me with a list of the NRC inspection activities for 2018. I know this would help inform our Members and Consultants at the public meeting and we’ve had a suggestion from a member of the public to post some of the NRC’s recent inspection reports on our website. Would this be acceptable to the NRC? (I imagine it is likely public information anyway….)

Please give me a call if you should have any questions or require further information.

Best regards,
Bob Rathe
Assist. DGSC Legal Counsel
1-800-439-4698
info@dgsc.org
G.2 – 311

Info@DCISC.org

From: Gene A. Nelson, Ph.D. <gnelson@cgsp.org>
Sent: Wednesday, February 7, 2018 11:51 AM
To: Zimor, David
Cc: Gene Nelson, Ph.D.; Info@DCISC.org; Peter Lam; Per Peterson; Bob Budnitz
Subject: RE: Purpose of Evacuation Plan for SONGS Appears to be to prevent RE-Commissioning
Attachments: 08-06-14.PDF; 08-05-14.PDF
Importance: High

07 February 2018 1:21 AM PST

Dear Attorney Zimor:

Thank you for your prompt and informative response. Dr. Budnitz’s attached 2014 “Draft for Review” was responsive to the information that CGIR is seeking as it contrasted PG&E’s successful installation of DCP replacement steam generators in 2008-2009 with the SONGS 8 owners subsequent failed installation of replacement steam generators.

I plan to meet with Drs. Budnitz, Peterson, and Lam later today at the Diablo Canyon Independent Safety Committee meeting in Avila Beach, California.

I will be discussing this information, among other matters, with them.

Gene Nelson, Ph.D.
Government Liaison
Californians for Green Nuclear Power, Inc.
Avanos Grande, CA
Government@CGSP.org (805) 363-4697 cell

On Tue, February 6, 2018 6:24 pm, Zimor, David wrote:

> Dr. Nelson,
> > Attached you will find two documents filed in the SONGS proceeding
> > (9.12-01-013) that can be found on the CPUC’s website (https://appx.cpuc.ca.gov/page?t=40110)= a motion filed by Ruth Heinrichs on August 5, 2014 asking the Commission to re-open the record in the SONGS investigation, and the attachment to that motion,
> > Dr. Budnitz report – draft for review would be more accurate – it referenced in the motion and presented in its entirety in the attachment as Exhibit 4. To my knowledge, the report is not part of the record in the SONGS proceeding.
> > I have not yet found the document you requested regarding evacuation at the SONGS site.
> > David Zimor, Esq.
> > Public Utilities Regulatory Analyst
> > California Public Utilities Commission – Energy Division
> >

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> SOS Van Ness Avenue
> San Francisco, CA 94102
> (415) 703-1575
> DAVID.ZIMOR@CPUC.CA.GOV<mailto:DAVID.ZIMOR@CPUC.CA.GOV>
> 
> From: Zimor, David
> Sent: Tuesday, February 06, 2018 12:09 PM
> To: government@CPUC.org
> Cc: Info@DCISC.org; Peter Lam; Per Peterson; Bob Budnitz
> Subject: RE: Fwd: Purpose of Evacuation Plan for SONGS Appears to be to prevent RE-Commissioning
> 
> Mr. Nelson,
> 
> I am not familiar with a “SONGS Report” from 2014, but that does not preclude its existence. I would be happy to try and track down this report, but I would appreciate your assistance – if you can forward me a copy or link to the 2014 article by Mr. Bauder that you referenced, that would help me narrow my search.
> 
> David Zimor, Esq.
> Public Utilities Regulatory Analyst
> California Public Utilities Commission – Energy Division
> SOS Van Ness Avenue
> San Francisco, CA 94102
> (415) 703-1575
> DAVID.ZIMOR@CPUC.CA.GOV<mailto:DAVID.ZIMOR@CPUC.CA.GOV>
> 
> From: Bob Budnitz <mailto:bobbudnitz@verizon.net>
> Sent: Monday, February 05, 2018 9:36 PM
> To: government@CPUC.org; EnergyCommissioner@CPUC.org;
> Cc: Info@DCISC.org; Peter Lam; Per Peterson; David Zimor
> 
> Subject: RE: Fwd: Purpose of Evacuation Plan for SONGS Appears to be to prevent RE-Commissioning
> 
> TO: Gene Nelson
> FROM: Robert Budnitz
> COPY TO: David Zimor, CPUC
> CPUC CO-DCSC Colleagues (P, Lam, P, Peterson, DCSC Counsel’s office)
> 
> Everything I will write below is a matter of public record, and is totally unrelated to any work that I have done or that we are continuing to do in my role as a member of the Diablo Canyon Independent Safety Committee.
>
> Since September 2013, I have had a disclosing contract with the Calif.
> UCW wrote scope to its parolees) to provide technical analysis and
> advice to them concerning the issue of the steam generator failure(s)
> at SONGS.
> >
> > 2. On that contract, I did a small amount of work in late 2013 and the
> > first half of 2014, but have done nothing for the CPUC since, although
> > the contract remains in place.
> >
> > 3. As part of that early work, I did some informal technical advising
> > to the CPUC staff, and wrote some short memorandum material in draft
> > form on some technical issues, but I never did submit anything
> > formally in writing to them on any technical material.
> >
> > 4. I am therefore surprised by your reference in your email note to me
> > today concerning a SONGS report that was somehow attributed to me by
> > somebody else in 2014. I know of no such report that I ever wrote in
> > final form,
> >
> > 5. My original technical contact at the Cali. UCW was Don Lathren.
> > However, he has retired, and my current technical contact at the Cali.
> > UCW is DAVID ZIMOR, who took over at their technical contact with me
> > when Lathren retired. You can of course ask him. I have included him
> > on the distribution for this email note to you in the "cc" line.
> > Therefore, you can find his email address on this email note if you
> > wish to contact him. His phone number is (615) 703-1273.
> >
> > Sincerely,
> > Robert Budritz
> > ........................................
> > Robert J. Budritz
> > Baubritz Scientific Consulting 734 The Alameda
> > Berkeley CA 94707
> > (Phone) 510.521.0777
> > Email: budritz@pacbell.net
> >
> > [Attachment]
> >
> > -----------------------------
> > On 2/5/2018 8:37 PM, Gene A. Nelson, Ph.D. wrote:
> >
> > Dear Bob:
> >
> > In the context of the DGSC record,
> >
> > I believe that you have made an error in your SONGS report.
> >
> > I would like to remind you that I have been referenced in
> > Reporter Don Bauder’s 2014 article, We are requesting
> > that.
> >
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> >
> > From: DGSC.
> > I assume that it came to me as a member of
> > the
> >
> > DGSC, although I don’t know for sure, so I am forwarding this both
> > to you and to Peter Lam — to Peter for his information, and to you
> > because
> >
> > I think that this may merit including in our tabulation of
> >
> > information incoming to the DGSC from the public,
> >
> > Bob
> >
> > [Attachment]
> >
> > -----------------------------
> > Forwarded Message
> >
> > Subject: Purpose of Excavation Plan for SONGS Appeals to be to prevent
> >
> > Issue: Commissioning
> >
> > Date: Mon, 5 Feb 2018 12:52:07 -0700
> >
> > From: Gene A. Nelson, Ph.D.
> ><government@cgnp.org>mailto:government@cgnp.org>
> >
> > Reply-To: government@CGNP.org;mailto:government@CGNP.org>
> >
> > To: Don Bauder <don.bauder@mac.com>mailto:don.bauder@mac.com>
> >
> > CC: Bob Budritz, Ph.D.
> >
> > In 2016, Californians for Green Nuclear Power, Inc. (CGNP) attempted
> >
> > to
> >
> > obtain CPUC party status in the investigation of SONGS - and to
> >
> > include
> >
> > re-commissioning as one of the options to consider. CPNP did not have
> >
> > sufficient knowledge or resources to counter Southern California
> >
> > Edison’s
> >
> > The opposition to CPNP becoming a party, CPNP continues to believe
> >
> > that their rejection from this investigation was improper. I’ve
> >
> > attached a
> >
> > story from the 22 July 2016 San Diego Union Tribune that summarizes
> >
> > our
> >
> > interest in SONGS re-commissioning,
> >
> > I’ve also attached your 19 November 2014 San Diego Reader article
> >
> > regarding the absurdly high cost of California electric power with
> >
> > some
> >
> > G.2 – 316
> follow-on information. In contrast to CGNP, the anti-nuclear power group
> "Citizen's Oversight" was permitted to become a party to the CPUC
> SONGS
> >
> > investigation and will likely be receiving substantial intervenor
> > compensation (paid for by the ratepayers) for its anti-nuclear power
> > activism. Appended to your article is the text of a 2014 Citizen's
> > Oversight press release - and some information copied from the
> > Citizen's
> > Oversight website today that underscores their opposition to the SONGS
> > nuclear power station - and the fact on 30 January 2018 Ray Lutz
> > signed on
> > to the so-called "better deal" for San Diego Gas & Electric (SDG&E)
> > ratepayers - when the reality is that SDG&E rate power rates are some of
> > the
> > highest in the lower 48 U.S. states. While SONGS was generating
> > electricity, SDG&E power rates were not as exorbitant,
> >
> > My investigation of this issue was motivated in part by the questions
> > asked by my CGNP colleagues Carl Wurzt and Alexander Carnava, Ph.D.,
> > below,
> > When I add together all of these elements - and my knowledge of
> > nuclear
> > power plant siting, I believe that there is a simple purpose for the
> > plan
> > to excavate the SONGS site to 80 feet, which is to insure that a new
> > nuclear power plant may never be built at the site. Of course, the
> >
> > In 2015 I was obsessed with trying to find out whether Sempra
> > subsidiary Southern California Gas (SDG&G) makes a profit on gas it
> > sells to
> > Sempra subsidiary San Diego Gas & Electric (SDG&E).
> > Obviously, if SDG makes up their gas and SDG&E buys it, the electric
> > utility can claim it as an expense and go to CPUC, hat in hand, for a
> > raise
> > In rates, This obscene dynamic encourages SDG&E not to be frugal, but
> > to
> > turn as much gas as possible to generate electricity on behalf of
> > building,
> > company Sempra.
> > Energy companies have become expert at concealing these "affiliate
> > transactions", as I'm sure they have with how to justify digging
> > through
> > feet of rock (maybe Sempra has a new subsidiary: "Southern California
> > Excavation"). But there is no requirement to make this
> > information public, and if you give a thief the keys to your car he
> > will
> > very likely drive it away.
> > We could tell the public that most of this money is being wasted on
> > things that will provide no measurable public health benefit. Then the
> > public will say, "there's big nuclear again, telling us there's
On Feb 6, 2015, at 6:57 PM, Alex Cannara
<ccannara@dadglobal.net> wrote:

On Feb 6, 2015, at 6:57 PM, Alex Cannara
<ccannara@dadglobal.net> wrote:

> G.2 – 323

> be
> some contamination? (in other words, we're not even talking about
> contamination that is known to be there?) if one were to do an
> objective
> $dollars per life saved analysis on this requirement, i can't imagine
> what
> the result would be (literally trillions of dollars per life saved,
> even
> returning LNT?),
> i hear that the public is quite upset over having to bear that cost,
> why don't we (and CSMP) tell the public that most of this money is
> being wasted, on things that will provide no measurable public health
> benefit? wouldn't that be perhaps our best chance to generate real
> public
> opposition to these extreme standards and resulting costs?!
> acknowledge
> that this would not do anything to get the plant reopened, but....
> finally, is the utility actually going to make a profit on these
> extreme (and needless) costs? i have to wonder if they agreed to close
> the
> plant because the state promised them that they would allow them to
> make a
> huge profit on an enormous, ratepayer-funded decommissioning cost, it's kind of
> like how the state is offering PG&E the opportunity to make large
> profits
> A fellow on FB Nuke Warriors raised this question, so I gave a small
> answer -- anyone want to suggest a thorough one?
> "i recently asked someone involved with the san onofre decommissioning project
> what it will cost (he said $4.4 billion) and why it's costing so much
> compared to other decommissioning projects (such as the twin-reactor zien
> project, which only cost $1 billion). he said it was due to "the state", i.e.,
> ridiculous dose standards and a requirement that they pulverize and
> dig up
> all the dirt/rock under the plant, 80 ft. down (much more than what
> was
> required for other decommissioning projects). i think i heard something similar
> have,
> is it also true that, due to the exorbitant cost, and the premature
> shutdown, the decommissioning is not enough to cover it, so the ratepayers
> and
> others are being charged to make up the difference?
> is this requirement based on some ridiculous standard for
> contamination level of bare rock, etc.? further, do they have
> to dig
> all this up merely because there is a small chance that there might
> on the cost of (needlessly) replacing Diablo with new (renewable?)
> generation, with no grant, opposition or fuss, CA, and the NGOs will do
> anything to get rid of nuclear (as opposed to fossil), including
> miscrobes
> the ratepayers and heaping huge costs on them?"
>
> Thanks,
>
> Alex

G.2 – 324
From: Bob Budzitz <budzitz@pacbell.net>
To: Gene Nelson <gnelson@chmp.org>
Cc: Peter Lam, Per Peterson, Dimitri David

Subject: Forthcoming Message

Date: Wed, February 5, 2014 11:40 am

Dear Gene,

Thank you for your interest in the proposed construction of a new nuclear power plant at Diablo Canyon. We are both committed to ensuring that the project is completed in a safe and environmentally responsible manner.

In my role as a public interest advocate, I have been monitoring the progress of the project closely. I am pleased to report that the construction schedule is on track and that the project is expected to be completed on time.

I look forward to hearing your thoughts on the project and how we can continue to work together to ensure its success.

Sincerely,
Bob Budzitz

G.2 – 327

obtain CECP party status in the investigation of SONGS - and to include re-commissioning as one of the options to consider. CECP did not have sufficient knowledge or resources to cover Southern California Edison’s strong opposition to CECP becoming a party. CECP continues to believe that their exclusion from this investigation was improper. I have attached a story from the 22 July 2012 San Diego Union Tribune that summarizes our interest in CECP re-commissioning.

I have also attached you 19 November 2012 San Diego Reader article regarding the allegedly high cost of Rhode Island electric power with none follow-up information. In contrast to CECP, the anti-nuclear power group “Citizens Oversight” was permitted to become a party to the SONGS investigation and will likely be receiving substantial intervenor compensation (paid for by the cases) for the anti-nuclear power activism. Attached to your article at the end of a 2014 Citizen’s Oversight press release - and some information copied from the Citizen’s Oversight website today that underscores their opposition to the SONGS nuclear power station - and the fact on 30 January 2013 Roy Lutz signed on to the so-called “Better Deal” for San Diego Gas & Electric (SDG&E) taxpayers - when the reality is that SDG&E power rates are among the highest in the lower 48 U.S. states. While SONGS was generating electricity, SDG&E power rates were not so exorbitant.

My investigation of this issue was motivated in part by the questions asked by my CECP colleagues Carl Muse and Alexander Canara, Ph.D. below.

When I add together all of these elements - and my knowledge of nuclear power plant siting, I believe that there is a simple purpose for this plan to abandon the SONGS site to 80 feet, which is to provide that a new nuclear power plant may never be built at the site. Of course, the taxpayers will pay for this absurd and harmful siting decision.

As I write this, the SONGS situation stinks of ongoing corruption. I would like to discuss this issue with you in greater detail with the goal of helping you update your article - and discuss CECP’s strong and ongoing opposition to the destruction of a perfectly good nuclear power plant that may still be cost-effectively repaired.

G.2 – 329

On 25/08/2015 3:37 PM, Gene A. Nelson, Ph.D. wrote:

Dear Bob,

Thanks for inclusion of this information the CECP record. However, CECP would be very interested in reviewing your SONGS report referenced in Reporter Tom Bauder’s 2014 article. We are requesting that you forward a copy to us.

Given the conflicting interest of Sempa being a large owner of SONGS, I believe that the SONGS SBR project was designed to fail with limited supervision and monitoring. The DOE report states that the SONGS plant could fail - and the SONGS project would not have been exempted from NRC oversight and review as it was certainly not a "like versus like" replacement of the current generation of plants as occurred at Diablo Canyon Power Plant in 1998 and 2003.

Gene Nelson, Ph.D. CECP: Government Liaison Arroyo Grande, CA

On Mon, February 5, 2014 1:10 pm, Bob Budzitz wrote:

To: Sub Bates, CECP: Government Liaison; John Bauder, CECP

Subject: Forthcoming Message

Dear Bob,

I am pleased to report that the project is on track and expected to be completed on time. I look forward to hearing your thoughts on the project and how we can continue to work together to ensure its success.

Sincerely,
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G.2 – 328

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Sincerely,
Bob Budzitz

G.2 – 328
Information please, and if you give me the key to your car, I will very likely drive it away.

We could tell the public that most of this money is being wasted on things that will provide no measurable public health benefit. Then, the public will say, "There’s no more nuclear, there’s nothing to be worried about when WINDMILLS will sit there, right under our feet. For MILLIONS OF YEARS!!!" This is what you can tell the people. We have a long way to go.

Shortly after activating F嗜U and funding energy companies to open their books to the public, this would be an in-state solution might be legislation forcing these companies to provide evidence of value for rate increases. Of course, the details:

What will I be getting from my monovalent electricity, for my higher electricity bill, that I’m not getting now? These are concepts even California politicians can understand - they translate to votes. A bill

Don’t even think about it.

On Feb 4, 2018, at 4:57 PM, Alex Camara <acamara@sonomaregions.org> wrote:

A fellow on PB Nuke Watchers raised this question, so I gave a small

embryo - anyone want to suggest a treatment?...:

I recently asked someone involved with the San Onofre decommission project what it would cost the state (4 billion) and why it’s coming up so much compared to other decom projects (such as the Suisun BWR decom project, which only cost 50 million). He said it was due to the state, i.e.,

ridiculously slow standards and a requirement that they pulverize and dig up all the dirt/concrete under the plant, 90 ft. down much more than what was required for other decom projects. I think I heard something similar here.

If it’s also true that, due to the excessive cost, the plant will never

shutdown, the decom fund is not enough to cover it, so the regulators and others are being charged to make up the difference...

Is this requirement based on some ridiculous standard for contamination level (0% love rock, etc.)? Furthermore, so they have to dig all this up merely because there is a small chance that there might be some contamination? In other words, we’re not even talking about contamination that is known to be there? If one were to do an objective

pollard life saved analysis on this requirement, I can’t imagine what the result would be (literally trillions of dollars per life saved, even assuming 100%).

I think that the public is quite upset over having to bear that cost. Why don’t we (and OSHPD) tell the public that most of this money being wasted on things that will provide no measurable public health benefit? Wouldn’t that be perhaps our best chance to generate real public opposition to these extreme standards and resulting costs? I acknowledge that this would not do anything to get the plant closed, but...

Finally, do you actually go up to make a profit on these extreme (and needless) costs? I have to wonder if they agreed to close the plant because the state promised them that they would allow them to make a huge profit on an enormous, ratepayer-funded decom cost. It’s kind of like how the state is paying PG&E the opportunity to make large profits on the cost of (merely) replacing Diablo with new (renovated) generation, with no real opposition or dues, OK, and the NGOs will do nothing to get rid of nuclear (as opposed to fossil), including licensing the ratepayers and hanging huge costs on them."

Thanks,

Alex

From: info@DCISC.org
Sent: Monday, February 5, 2018 3:35 PM
To: [email protected]
Cc: info@DCISC.org

Subject: Notice of Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Shelly – glad you can make the afternoon session on Wednesday and the meeting on Thursday. There was indeed a typo on the agenda I sent out with my January 30 email. That agenda was an early version but has not changed substantially since then (and I’ve corrected the dates on the online version of the meeting agenda).

The meetings dates are Wednesday, February 7 and Thursday, February 8.

Thank you for taking the time to see the Committee in operation. I know our Members and Consultants are most appreciative, as am I.

Looking forward to seeing you this coming Wednesday in Avila Beach.

Best,

Bob

From: [email protected] (mailto:[email protected])
Sent: Monday, February 5, 2018 1:13 PM

To: info@DCISC.org

Subject: Notice of Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Hello Robert!

Thank you for the notice and meeting agenda. Sorry for the delay in response.

I am planning to attend the afternoon session on Wednesday and the meeting on Thursday, February 7 & 8. Am I one of the agenda there at an afternoon on the 8th?... Is that a typo?

Looking forward to seeing you and meeting the committee.

Best,

Shelly H. Alston

safety@dcisc.org

Subject: Notice of Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

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safety@dcisc.org

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Looking forward to seeing you and meeting the committee.

Best,

Shelly H. Alston

safety@dcisc.org
Each public meeting of the DCISC is broadcast on the internet and the discussions during the February 7-8, 2017 meeting may be accessed through a link on the DCISC’s website http://www.dcisc.org or through www.speicher.com. DCISC public meetings are also archived on the internet, indexed to the meeting agenda, and may be accessed at the above websites. Information on the DCISC and its Members and on various topics related to DCP is available on its website, as are the dates for its future public meetings.

Please let me know if you plan to attend the February 8, 2017 public meeting and if you would like to address the DCISC on any topic and I will be happy to provide you with the agenda. Let me know if you require any additional information.

I hope 2018 is starting out to be a good year for you.

Sincerely,

Bob Kyle
Asst. DCISC Legal Counsel
(805) 439-6048
info@dcisc.org
We would tell the public that most of this money is being wasted on things that will provide no measurable public health benefits, then the public will say, "there’s big nuclear again, telling us there’s nothing to be worried about when ANYTHING at all is happening there, right under our feet, for MILLIONS OF YEARS." This is what Tony Earley had to put up with decades, and it’s almost enough to make you understand why he’s giving up on Diablo Canyon.

Short of reinstating PUC and forcing energy companies to open their books to the public, the only in-state solution might be legislation forcing them to provide evidence of value for rate increases. Screw the details; what will I be getting from my monopoly electricity provider? For my higher electricity bill, that I’m not getting now? These are excerpts even California politicians can understand - they translate to votes.

Carly
Sent from my iPad

On Feb 6, 2018, at 6:17 PM, Alex Cannara (canne7g@gmail.com) wrote:

A fellow on FBN Next Wave raised this question, so I gave a small answer -- anyone want to suggest a thorough one?...

"I recently asked someone involved with the San Onofre decom project what it will cost the 66.6 billion and why it’s costing so much more compared to other Dorn projects (such as the twin-reactor Zion project, which only cost $31.5 billion). He said it was due to "the state," i.e., ridiculous deep standards and a requirement that they replace and dig up all the dirt/rock under the plant, 20 ft. down (much more than what was required for other decom projects). I think I heard something similar here.

Is it also true that, due to the extensive cost, and the premature shutdown, the Odeon fund is not enough to cover it, so the ratepayers and others are being charged to make up the difference?

Is this requirement based on some ridiculous standards for contamination levels (of base rock, etc.)? Furthermore, do they have to dig all this up merely because there is a small chance that there might be some contamination? (In other words, we’re not even talking about contamination that is known to be there? If you were to do an objective dollars per life saved analysis on this requirement, I can’t imagine what the result would be (vastly trillions of dollars per life saved, even assuming D07?).

I hear that the public is quite upset over having to bear that cost. Why don’t we (and D07) tell the public that most of this money is being wasted, on things that will provide no measurable public health benefit? (One wonders if they perhaps our best chance to generate real public opposition to those extreme standards and resulting costs? I acknowledge that this would not do anything to get the plant reopened, but...)

Timely, is the utility actually going to make a profit on these extreme (and needless) costs? I have to wonder if they agreed to close the plant because the more promised than they would allow them to make a huge profit on an enormous, ratepayer-funded decom come? It’s kind of how the state is offering PG&E the opportunity to make large profits on the cost of (nondiscoverable) replacing Odeon with new renewable generation, with no sort of opposition or loss. OK, and the NWS will do anything to get rid of the nuclear (as opposed to fossil, including appealing the ratepayer and making the ratepayers pay for it."

Thanks,

Alex
In addition, Palmisano said, "I've not been maintaining equipment because it's retired. There's no salvage value. It's all going to be removed and disposed of as part of decommissioning." Palmisano said he did not know of any cases in which a decommissioned plant was revived.

"Nobody has ever closed a plant permanently and re-licensed and restarted a plant," Palmisano said, "Nobody has ever done it before." A former president of the American Nuclear Society, who has called the shutting down of San Onofre "a tragedy for California," said earlier this year that bringing the plant back online at this point is "impossible.

Don Hofmeier, president of Maryland-based Excel Services, which has expertise in recommissioning nuclear plants, said, "The only way to re-license it is under all the current standards, not the standards to which it was initially designed and built. And you'd have to license it all over again. And the time and the effort and the cost of that is just unmountable."

Nelson said his group has "made some crude estimates" that getting San Onofre producing electricity again would cost about $1 billion.

That's a hefty sum but Nelson said it's significantly cheaper than the $4.7 billion proposed in the original settlement approved by the CPUC.

Still, the obstacles appear to be huge — ranging from the technical challenges of reopening the plant to the question whether the CPUC grants GNP status as a party intervener — not to mention the intense response that would come from anti-nuclear activists at the prospect of ever bringing San Onofre back online.

"Yes, this is definitely an uphill battle," Nelson said. "But we recognize the stakes are too big and that's why we're not throwing in the towel yet.

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Reader

California electricity rates top nation's — by far

Utilities commission assures Wall Street that profits will remain high

By Don Bart, Nov. 19, 2014


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RESIDENTIAL ELECTRIC RATES PER MONTHLY 1000 KILOWATT HOURS

| San Diego Gas & Electric | $323.00 (1) |
| Southern California Edison | $260.50 (2) |
| Median of U.S. utilities | $123.91 (3) |

(1) Includes City of San Diego provided by SDG&E to Richard Rider
(2) Jacksonville Electric Authority, July 2014
(3) Jacksonville Electric Authority

Richard Rider

Jacksonville Electric Authority (https://www.jea.com/ 8th largest community-owned electric utility) tracks electricity rates around the nation. https://www.jea.com/my_account/understand_my_bill/rates/Get_2017_Residential_Rates_Survey based on monthly 1000 kilowatt-hour usage. In July of this year, the most expensive utility was Southern California Edison at $323.00 for 1000 kilowatt hours. Edison has shut down for four years. Because San Diego Gas & Electric (part of San Diego-based Sempra) stopped providing data to Jacksonville recently after it got too much bad publicity for consistently being the most expensive, or among the most expensive, of the utilities. But Richard Rider, chairman of Jacksonville Electric Authority, asked San Diego Gas & Electric to reveal its rates for certain inland consumers, representing the bulk of the City of San Diego. The local utility charged a whopping $323 per 1000 kilowatt hours. "That's 29 percent higher than the highest utility on the [Jacksonville] list — Southern California Edison," says Rider. Rider asked San Diego Gas & Electric if it wanted to dispute Rider's number and never heard back.

The costs at Pacific Gas & Electric are difficult to calculate because it charges different rates to different communities. Like San Diego Gas & Electric, it doesn't submit its rates to Jacksonville. Four years ago, its rate was $241.95 in Fresno, that rate no doubt has gone up considerably since then, says Rider, putting Pacific Gas among the most expensive.

Get this: In the July 2014 Jacksonville survey, the median for United States electric utilities was $123.91. Rates at San Diego Gas & Electric, Pacific Gas & Electric, and Southern California Edison are more than twice the national median. "What is little known by California residents is how astonishingly high California electricity rates are compared to just about anywhere," says Rider.
A classic case is the commission’s maneuvering to make ratepayers cough up $3.3 billion over the shuttering of the San Onofre nuclear plant. Steam generators built to last 40 years failed after 2 years. The commission hired an expert, Dr. Robert Budnitz, to look into the failure. In an early report, he wrote just what the commission didn’t want to read — that his study would address critical questions: “What error(s) led to the tube failure(s)? Who made those errors?” The commission, which didn’t want to think about errors, tucked his initial study away and refused to provide it to the press until pressured to do so.

Said Aguirre and Severson in a filing with the commission, “[Edison] used its backdoor access to commissioners Pevey and [Mike] Florio to keep the investigation of the commission’s agenda for at least five months.” The stall continued, and the commission, Edison, SDG&E, and a purported watchdog, the Utility Reform Network, “pied together a secret plan to end [Budnitz’s] investigation,” noted Aguirre and Severson.

Suddenly, those four groups came out with an announcement: they had reached a compromise to decide how much Edison would get from ratepayers. They never mentioned it would cost ratepayers $3.3 billion, but Aguirre caught it by submitting the press of this strange argument. Nonetheless, administrative law judges approved the so-called compromise, and unless there is a delay or commissioners vote down the gift (very unlikely), Southern California Edison will be richly rewarded for screwing up and then screwing ratepayers, including SDG&E customers. The commission vote is slated for this Thursday, November 20.

Edison is so confident that the commission will do its bidding that it has filed a document with the Securities and Exchange Commission stating that the effect of the so-called compromise will not have “a material impact on future net income.”

Aguirre and Severson argue that the commission cannot make a decision without permitting Dr. Budnitz to complete his study of what went wrong. “A record is required before any allocation can be determined just and reasonable” under the utilities code, argue Aguirre and Severson. “The proposed decision puts the utilities first and ratepayers second.” The commission is “shooting the ratepayers first, then asking the utilities questions later.”

Selected Comment (11/20/14):

Here is an update on the continuing story about the $3.3 billion Edison order replacement steam generator debacle that our Utilities want SoCal ratepayers to pay for:

CPCU MEETING THURSDAY ON $3.3 BILLION BALLOT SETTLEMENT FOR SAN ONOFRE

Where: California Public Utilities Commission (CPCU) HQ, 505 Van Ness Avenue, Room 2130, San Francisco, CA 94102 When: Thursday, 11/20 9:30am What: Commissioners meeting where the five-member governing board of the CPCU will approve or deny the proposed decision to adopt the $3.3 billion settlement

The meeting will be WERCAST at this address: http://www.sacommisioner.com/cpcu.html

— Please note that you need a “realPlayer” to successfully play the video. Visit Real.com to download the free player (do not pay for the premium player, you do not need it)

Ratepayer Call to express your views: You can call in and express your views and/or send an email with your comments to: Telephone: 656-849-8390 or 415-703-2074 Email: public.adopter@cpcu.ca.gov

BACKGROUND On Jan 31, 2013, the San Onofre Nuclear Station had an emergency shutdown due to errors made in the design of new steam generators (SG) which were expected to last 11 months earlier. The plant has never restarted and in June 2013, the plant operator, Southern California Edison (SCE) decided to close the plant permanently and discontinue questions attempts to restart the plant. The CPCU is the regulator and they are required to review any plant that it is no longer operating. They attempted to start this review in mid 2012, but in secret negotiations with CPCU President Michael Penney, documented in emails, the start of the OU was delayed until October of 2012. We are still trying to prove appropriate negotiations to split the proceeding into two phases, and the most important phase last — the actual investigation into the problem of Steam Generator Replacement Project — so that it never would occur.

On March 17 of this year, SCE, SDG&E, TURN (The Utility Reform Network, a ratepayer advocacy group located in SP), and CAL (the office of Ratepayer Advocate, an arm of the CPCU that is supposed to represent ratepayers) provided a settlement document to the world that was “felt enshrinen already and allowing no changes or negotiations by other parties. The settlement was for $3.3 billion, $0.4 billion less than the original (invalid) request by SCE and SDG&E, but requiring that the ratepayers cover the losses incurred by SCE and SDG&E, while still allowing them to pursue litigation with subcontractors/Intelvisi-Hym’s financials (MMI) and their insurance carrier RES (Nuclear Energy Insurance Limited)

They held a ridiculously short evidentiary hearing, led Attorney Mike Aguirre was able to — in his cross examination of SCE President Ron Linstiger — to get the admissions that there was nothing in the record to allow the Commission to adequately evaluate the claims of ratepayers, that SCE acted imprudently, and thus the settlement is unfair.

Meanwhile, last week, Citizens Oversight and a number of ratepayer plaintiffs filed a class-action lawsuit in federal court to stop the Real “taking” of rates from consumers for a plant that has generated one watt of power for nearly three years. Ratepayers are STILL PAYING for the plant as if it were still operating.

REFERENCES: http://www.oppnw.org/Common/StrtSelOno.htm — Our project to stop the restart of the plant http://www.oppnw.org/Common/InstnTheEntSett.htm — The project to stop this unfair settlement http://www.oppnw.org/Common/Mt444.htm — Excerpts of the settlement evidentiary hearing. All law students should watch and study this to see an accomplished trial attorneys proof. SCE President Ron Linstiger to admit the settlement is unfair.

Contact: Ray Lutz, Citizens Oversight 619-820-5371 / raylutz@citizensoversight.org

Roy Lutz is an active opponent of nuclear power. See http://citizensoversight.org/ for details. An excerpt from their home page follows:

Rampant Corruption

We have obtained more than 7,200 pages of emails and other correspondence as a result of the OIPPA (California Public Records Act) request by the City of San Bruno regarding the PG&E Gas Line Explosion in San Bruno in 2010, which killed 8, injured scores, and demolished city books in San Bruno. These emails show a pattern of close cooperation between the CPCU – the California Public Utilities Commission – and the utilities they are supposed to regulate, including PG&E. We are still digesting these but an initial reading shows a pattern of collusion to manipulate stock prices, coordinate press releases, shop for judges and rig the proceedings to benefit the utilities. We believe this culture of corruption goes beyond isolated incidents and is systemic in extent.

- The documents as we received them, and our press release and motion to stay the proceedings in the San Onofre investigation:
This survey is a comparison of utilities throughout the United States for the quarter beginning October 1, 2017. This quarterly rate comparison is for residential customers and includes base rates, fuel adjustment charges, and applicable franchise fees per 1,000 kWh.

LOCATION | COMPANY | KWH 1000
--- | --- | ---
Southern California | Southern California Edison | 264.46
Faribanks, AK | Golden Valley Electric Assn** | 272.67
Long Island, NY | Long Island Power Authority** | 197.69
Anchorage, AK | Chugach Electric Assn, Inc** | 185.49
Los Angeles, CA | Department of Water & Power** | 183.86
Newark, NJ (other portions of NJ) | Public Service Electric & Gas Co.* | 167.87
Marlinton, WV | Mountain Gas & Electric* | 160.37
Milwaukee, WI | We Energies* | 149.52
Columbus, OH | South Carolina Electric & Gas* | 147.53
Ft. Meade, FL | City of Ft. Meade** | 143.56
Pasco, RI | Pasco Utility District* | 141.50
Key West, FL | Keys Energy Services** | 140.00
Silver, DE | City of Dover (Delmar Riv. G.E)** | 136.63
Las Vegas, NV | Nevada Power Co.* | 135.76
Sacramento, CA | Sacramento Mun. Util Dist** | 134.40
Midwest Utilities | Gulf Power Co.* | 134.10
Gainesville, FL | Gainesville Regional Util* | 131.55
Albany, GA | Athens Electric Power Co.* | 131.21
Birmingham, AL | City of Birmingham** | 130.17
Chicago & Northern IL | Commonwealth Edison Co.* | 129.43
Phoenix, AZ | Salt River Project** | 128.77
Alabama (Portions of) | Alabama Power Co.* | 127.02
N.E. FL & S.E. GA | Okaloosa Electric** | 127.70
Salt Lake City, UT | Rocky Mountain Power** | 121.60
Ft. Pierce, FL | Florida Power Utilities** | 120.84
Colorado Springs, CO | Colorado Springs Utilities** | 119.42
Reno, NV | Sierra Pacific Power Co.* | 117.71
Jamestown Beach, FL | Beaches Energy Services** | 116.91
Vero Beach, FL | City of Vero Beach** | 116.08
Orlando, FL | City of Orlando** | 116.04
Homestead, FL | Homestead Electric** | 114.23
St. Petersburg, FL | City of St. Petersburg** | 114.12


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that former CPUC president Michael Peevey had met improperly with SCE executive Stephen Flakas at the Hotel (Bristol) in Warsaw, Poland in early 2013 and developed a proposed term sheet which closely matched the structure of the term in the 2014 settlement agreement. This hard-lining term sheet was discovered in Peevey’s top desk drawer, as if a souvenir, when his residence was searched in relation to the investigation of the 2010 San Bruno gas explosion, which killed 8 people and destroyed 24 homes, and resulted in a $16 million fine.

Lutz said, “Without the fortuitous discovery of the RSG Note, it likely would not have been possible to achieve this win for the ratepayers.” Just before the 2014 settlement was approved by the CPUC, Citizens Oversight became the leading plaintiff in a federal lawsuit to undo the settlement. It was also one of only two parties that filed an application for rehearing at the CPUC just after it was approved.

The federal lawsuit was originally derived due to the scope of the argument that the 1934 Johnson Act, which limited taking regulatory matters to both the state and federal courts, a habit of the regulated railroads of that time to set up any case in legal proceedings virtually forever. But when appealed, the 9th circuit agreed to allow the case to proceed, since the Johnson Act was designed to limit the regulatory access available to the utilities, and ratepayer advocates. The fact that this case was allowed to proceed and was being headed up by the highly reputable law firm of Aguirre & Servenson LLP played a role in convincing the utilities to settle the case. If the settlement agreement is approved by the CPUC, then this federal case will be dismissed.

In mid-2017, the lawsuit filed by SCE against their subcontractor, Mitsubishi Heavy Industries (MHI), for some $57 million alleging fraud, was completed by the arbitration panel. The 1-page award document essentially ruled against SCE on every contention, resulting in the whole case costing more in legal fees (of nearly $10 million) compared to the contractually limited liability of MHI ($138 million).

Thus, the arbitration panel found that MHI was not at fault, and even though they did ask the wrong computer model, the court found that the correct model would not have prevented the failure. Thus, both SCE and MHI say they did everything prudent and reasonably, and still the new steam generators failed.

Lutz, reflected, “We can learn a very important lesson from this case. The Replacement Steam Generator (RSG) project was very funded, was managed by a world-class corporation, utilized a subcontractor who had the relevant experience to complete the project, and utilized top engineering talent. Although, mistakes were made, the design was not actively sabotaged. Nevertheless, the four massive steam generators, which were supposed to last at least 40 years, suffered from such extreme vibrations that they had to be shut down in little as 11 months. The radioactive leak that prompted the shutdown was growing at 0% per hour and without that systematic shutdown it could have been a much larger disaster.’”

“This nuclear plant did not shut down due to any external event like the earthquake and tsunami of Fukushima. It did not shut down due to operator error, same occurred at Chernobyl and Three Mile Island. This plant shut down due to design mistakes that were not detected by traditional engineering and management techniques, nor detected by Nuclear Regulatory Commission (NRC) review. We must learn that even the best engineering practice and prudence management sometimes may fail.”

“...but the consequences of nuclear plant failure is so high that design failure is not an option.

Thus, nuclear plants, no matter how well designed on paper, may yet fail. Humans are fallible. Our ability to model complex systems is limited. Since the risk is unavoidable, the lesson is clear. Construction of new nuclear plants must be halted, existing plants should be shut down and decommissioned in a systematic and expeditious manner.”

We hope the utilities, and most importantly, Southern California Edison, will stop their greed and clearly state the same. Their own experience negates this problem, and other utilities should take note and plan to exit the operation of these plants.”

Fortunately, renewable energy solutions without those risks can quickly fill the energy deficit if we are serious about deploying them. They are already far cheaper than nuclear power, particularly when you include the cost of nuclear waste, and all that follows, which we need not burden.

Other significant terms of the settlement:

- Edison and SDG&E for recovery of $775 million in past investments in San Onofre. Had those costs been collected in rates, customers would have paid $730 million between 2018 and 2002.

- Edison retains responsibility for $16.4 million in sanctions imposed by the CPUC in 2015 for private discussions with regulators that violated the Ex Parte rules.

- Customers keep $70 million in savings from payments by Nuclear Energy Insurance Limited.

- SCE still owns an inventory of how much nuclear fuel they had purchased based on the expectation that the plant would continue working for many years. In the settlement, SCE agrees to sell and recover what it can from that inventory. The nuclear fuel market is currently at rock bottom prices, so it is questionable what, if anything, the nuclear industry continues to do.

- SCE will be able to keep the profits of the MHI case. As stated, these recoveries were consumed by legal costs, resulting in new or negative net proceeds.

- The agreement includes a provision that utility shareholders will provide $12.5 million to fund research at the California State University system to address mitigation and reduction of CHP emissions and to facilitate the adoption of renewable energy sources in rural and impoverished communities.

- There are provisions to exclude debts from the capital structure related to financing the regulatory asset which were included in the prior settlement. Those provisions are unchanged.

- Decommissioning is not affected, and parties to the agreement are at liberty to challenge decommissioning costs in other proceedings. This proceeding has no effect on nuclear fuel tax at the site.

- Two other agreements are being executed simultaneously:

  - First, as agreed between SDG&E and SCE which covers the costs of the new settlement when compared with the 2014 settlement from SDG&E standpoint. In other words, because SDG&E had been in the same situation in the ex parte violation of the RSG Note, SCE will make SDG&E whole, even though their ratepayers will continue to have relief.

  - Second, from a settlement agreement related to the federal lawsuit which will put lawsuit to bed, it will still dismiss both defendants, SDG&E and CPUC, with prejudice.

Citizens Oversight has developed a “Frequently Asked Questions” page on the settlement which includes all the documents available and will be up as soon as any new documents are available. The address is http://cogsci.org/comm/Servlet/UtilitiesSettlementAG1 Media Contact: Ray Lutz – 619-830-5313 – raylutz@cogsci.org

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EXECUTION VERSION

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Investigation on the
Commission’s Own Motion into the Rates, Operations, Practices, Services and Facilities of Southern California Edison Company and San Diego Gas & Electric Company
Associated with the San Onofre Nuclear Generating Stations Units 2 and 3

Investigation (20-04-13)
(Filed October 25, 2012)

Application 1-03-016
Application 13-03-005
Application 13-03-013
Application 13-03-014

And Related Matters


DATED: January 30, 2018

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EXECUTION VERSION

The parties to this Agreement are Southern California Edison Company (“SCE”), San Diego Gas & Electric Company (“SDG&E”), The Alliance for Nuclear Responsibility (“ANR”), the California Large Energy Consumers Association (“CLECA”), California State University (“CSU”), Citizens Oversight dba Coalition to Decommission San Onofre (“Citizens Oversight”), the Coalition of California Utility Employees (“CUE”), the Direct Access Customer Coalition (“DACCC”), Ruth Henriks, The Office of Ratepayer Advocates (“ORA”), The Utility Reform Network (“TURN”), and Women’s Energy Matters (“WEM”). SCE and SDG&E are referred to herein as the “Utilities”; ANR, CLECA, CSU, CUE, DACCC, Ruth Henriks, ORA, TURN, and WEM are referred to herein as “Interested Parties” and the parties collectively are referred to herein as the “Parties.”

The Parties agree to settle all claims, allegations, and liabilities in the Order Instituting Investigation Regarding San Onofre Nuclear Generating Stations Units 2 and 3, 1-12-013, and all proceedings consolidated with it (including A-13-03-035, A-3-03-045, A-3-03-013), and A-3-03-014 (collectively, the “Orders”) on the following terms and conditions which shall become effective only if the California Public Utilities Commission (“Commission”) approves this Agreement, as more fully described below:

The Parties have entered into this Agreement as a compromise of disputed claims in order to minimize the time, expense, and uncertainty of further regulatory proceedings. The Parties agree to the following terms and conditions, and the prior and final resolution of all issues in the Orders. For the avoidance of doubt, this Agreement, if approved by the Commission, constitutes a complete and final resolution of all issues identified in the May 9, 2016, ruling of Commissioner Sandoval and Administrative Law Judge ("ALJ") Huesty, the December 13, 2016, ruling of Commissioner Sandoval and ALJ Huesty, and the October 10, 2017, and January 8, 2018, rulings of Commissioner Picker and ALJ Huesty.

This Agreement constitutes the sole agreement among, or between the settling Parties concerning the subject matter of this Agreement, except (1) SCE and SDG&E have entered into the Utility Shareholder Agreement (executed below), and (2) SCE, Citizens Oversight, Ruth Henriks, and certain other parties have entered into the Federal Court Agreement (as defined below).

The Parties shall jointly submit this Agreement to the Commission for approval.

I. DEFINITIONS

1.1. Capitalized terms not defined in this Agreement have the meanings defined in the 2014 Agreement.

Commission's standard for approving such agreements under Rule 12.1 of the Commission's Rules.

2.13. On November 2, 2018, SCE filed Adviser Letter 3499-E seeking approval of SCE's 2017 revenue requirement for the 2014 Settlement Agreement, SCE's SONQ Revenue Requirements for 2017 was $201,109,617. SCE in.

2.14. On November 7, 2016, SDG&E filed Advisor Letter 2989-E, in which it requested approval of SDG&E's 2017 revenue requirement for the 2014 Settlement Agreement. SDG&E's SONQ Revenue Requirement for 2017 was $149,589,208. Advisor Letter 2989-E also requested that the Commission approve the application of SDG&E's share of certain proceeds from DOE Spent Fuel Litigation to reduce SDG&E's SONQ Regulatory Assets. Per action of the Energy Division, Advisor Letter 2989-E was made effective as of December 8, 2016.

2.15. On December 13, 2016, Commissioner Sardarov and AJL Husak issued a ruling ordering the Utilities and the other parties in the CC in mediation for resolving the standards for approving settlements under Rule 12.1 of the Commission's Rules and regarding procedural actions for the Commission to consider in ruling on the petitions for modification of its November 25, 2016 decision.

2.16. In response to the December 13, 2016 ruling, the Parties met and conferred throughout a significant portion of 2017, including multiple sessions facilitated by a third-party mediator, but those mediation sessions held in 2017 did not produce any agreement regarding modifying the 2014 Agreement.

2.17. On October 18, 2017, Comcomier and AJL Husak issued a ruling proposing a process for the Commission to reconsider if the 2014 Agreement satisfies Rule 12.1 of the Commission's Rules, as well as a process for additional testimony, evidentiary hearings, and briefing regarding costs allocation between ratepayers and shareholders should the Commission conclude that the 2014 Agreement should not be retained.

2.18. On November 7, 2017, SDG&E filed Advisor Letter 3173-E, in which it requested that the Commission approve the application of the share of certain proceeds from DOE Spent Fuel Litigation to reduce SDG&E's SONQ Regulatory Assets. Per action of the Energy Division, Advisor Letter 3173-E was made effective as of December 16, 2017.

2.19. The Parties, with the assistance of mediators, thereafter engaged in further settlement discussions in 2018, including recorded meetings in early January 2018 pursuant to Article 12 of the Commission's Rules.

2.20. On January 8, 2018, Comcomier and AJL Husak issued a ruling setting a schedule for further proceedings pursuant to the October 18, 2017 ruling and describing the scope of remaining issues for written testimony and hearings before the Commission.

2.21. On January 10, 2018, the Utilities executed the Utility Shareholders Agreement.

in these Adviser Letters to offset their SONQ Litigation Costs, as well as the 3% of the negative balance in the NICL Outage Memorandum Subaccount pursuant to Section 4.11(e)(ii) of the 2014 Agreement. The Utilities will retain all amounts received from MHR in 2017 pursuant to the award issued on March 13, 2017, by the International Chamber of Commerce International Court of Arbitration (“ICC”) in ICC Arbitration Case No. 19768/09/FR, with the exception of the SDG&E trustor credit as shown in Table 1 of SDG&E Advisor Letter 3173-E. The Utilities have previously credited customers approximately $1 million in proceeds received from MHR.

(e) From and after the Cessation Date, the Utilities will recover Nuclear Fuel Investment in rates. The Utilities shall retain all proceeds from the sale of their share of Nuclear Fuel (the City of State and any related merchant) and no portion of such proceeds shall be credited to customers.

This Agreement does not affect the disposition to the Utilities of funds from the Nuclear Decommissioning Trusts for authorized purposes, including recovery of costs incurred after June 7, 2013, nor does this Agreement affect future contributions to the Nuclear Decommissioning Trusts (if any). This Agreement also does not affect the recoverability of funds that are not SONQ Costs, but which otherwise relate to SONQ, that the Commission has authorized the Utilities to recover through rates other than as authorized in the 2014 Settlement, i.e., costs for activities relating to siting studies and studies, marine migration, and claims relating to conditions of employment, including worker's compensation and employment law claims, relating to events occurring prior to June 7, 2013. Further, this Agreement does not preclude the Utilities from requesting, or the Commission from granting, authority to recover in rates costs of third-party claims for personal injury or property damage, including environmental claims, arising out of SONQ operations prior to June 7, 2013, that it hearing understood that the Intermittent reserve the right to oppose any such request.

3.3. Implementation of Rate Changes

(a) Within 45 days after the Approval Date, each Utility shall file with the Commission a Tier 2 advice letter describing the details of the rate changes resulting from this Agreement, as described in Section 3.6(c).

(b) Following the Approval Date, the Parties shall coordinate regarding the timing of the issuance of press releases by the Parties regarding the rate changes resulting from this Agreement. Such press releases shall describe, among other things, the amounts being returned to customers as a result of this Agreement and the average rate increase by class (e.g., residential, commercial, and industrial non-CARE). In addition, the Utilities shall describe the impact of this Agreement on rates by email to customers, for whom the Utilities have email addresses, social media, and by posting the official websites of the Utilities. Parties may make public statements regarding this Agreement, provided that they do not characterize the Agreement as constituting an admission or other indication of wrongdoing or indecency by the Utilities.

(c) The Utilities shall track the SONQ Revenue Requirement collected in rates from and after the Cessation Date. In the advice letters described in Section 3.6(b) of this Agreement, the Utilities shall provide an adjustment to rates starting on the Implementation Date, reflecting (i) the removal of the SONQ Revenue Requirement from rates prospectively from the Implementation Date, (ii) a refund to customers of the Overcollection Amount, amortized over the period starting on the Implementation Date and ending on the Refund End Date, (iii) the disposition of any balances in the Utilities' STAM As, NMLAs, NCMAs and NMLAs, and (iv) a debit to customers of any excess cost savings booked in the Utilities' CCRAA, as described in Section 3.6(b). A Utilities' Implementation Date shall not occur on the same day as any other concurrent rate change for that Utility. The Utilities may have a different Implementation Date. SCE will offset the refund via a credit to the NSGA, or its successor account,

3.4. Greenhouse Gas Research Contributions and Program

(a) The amount described in Section 4.6 of the 2014 Agreement shall be reduced to a total amount of $12.5 million ($2 million annually for five years for SCE, and $500,000 annually for five years for SDG&E) ("New Contribution Amount"). The New Contribution Amount shall be paid by the Utilities using shareholder funds. The five-year period shall commence with the approval of the Tier 2 adoption letter described below in Section 3.4(g).

(b) The New Contribution Amount shall be distributed on a basis of a comparative grant proposal process to campuses and research institutes of California State University located in Southern California, provided, however, that grant recipients may subcontract with other California State University campuses for specialized expertise. Eligible proposals will focus on development of new technologies, methodologies and design modifications to reduce or avoid greenhouse gas emissions ("GHG") emissions and/or to mitigate the effects of GHG emissions, as well as research on the integration of renewable resources in rural and/or disadvantaged communities. Project grant proposals shall include a 30% administrative costs, not to exceed 10%.

(c) The program will be administered as part of the Utilities' existing technology portfolio in better ensure a path to deployment, to improve coordination with and avoid duplication of other Utility R&D efforts, and to limit administrative expenditures. The program shall not be considered part of the Utilities' Commission-approved carbon reduction programs. Investment in Programs Investment Charage ("CCP") program established by the Commission in Decision 11-D-435 and Decision 12-D-437, or the CC's successor, nor shall the program established.
3.5. No Adjustments
(a) From and after the Cessation Date, no adjustments, offsets or effects of any kind shall be made to rates in respect of any costs incurred as a result of the non-operation of SONGS, or in respect of any amounts that customers could have received in the event that SONGS had continued to operate after June 7, 2013. This limitation includes foregone generation sales revenue; there will be no future adjustments or disallowances imposed as a result of foregone sales of SONGS.
(b) The provisions of the 2014 Agreement relating to foreclosed property taxes (see 2014 Agreement, § 4.4(i)), the savings realized in respect of financing the SONGS Regulatory Assets with debt (see 2014 Agreement, § 4.4(a)(ii)), and amounts received in respect of M&S (see 2014 Agreement, § 4.5(b)) shall be implemented for periods up to the Cessation Date. For periods after the Cessation Date, customers will not pay in rates any amounts in respect of property taxes, financing of the SONGS Regulatory Assets, or M&S, and for such periods no disbursements, adjustments, credits or offsets of any kind shall be made to rates in respect of the provisions of the 2014 Agreement enumerated in this Section 3.2(b).
(c) No disbursements, adjustments or offsets of any kind shall be made to rates in respect of any amounts that the Utilities claimed, or could have claimed, but did not receive from NELE, nor from the second settlement. For such amounts, the Utilities will not seek to disburse the funds until the Energy Division’s approval of such Turbine 2 Advisory Letters.
(d) The Utilities will file Tier 2 Advisory Letters proposing the rates to be avoided, as well as the expected results, applications, and demonstrations of the claimed project impacts. The Utilities shall not begin to disburse the funds until the Energy Division’s approval of each Turbine 2 Advisory Letter.
(e) The Utilities will file, and serve, “Information Only” Annual Reports to the Energy Division to approve the Commission’s program’s status. The first Annual Report shall be filed one year after Commission approval of the Tier 2 advisory letter described in Section 3.4(b).
(f) For the avoidance of doubt, campuses of the University of California shall not be eligible to participate in the competitive grant proposal process described in Section 3.4(b) of this Agreement or otherwise receive any funds pursuant to Section 3.4 of this Agreement or Section 4.6 of the 2014 Agreement.

3.6. Capital Structure
(a) Pursuant to Section 4.4(a) of the 2014 Agreement, SCE and SDG&E financed the SONGS Regulatory Assets to be amortized pursuant to the 2014 Agreement with debt, and such debt was recognized in determining the equity of each Utility’s ratemaking capital structure. Notwithstanding the Utilities will cease to amortize those SONGS Regulatory Assets from and after the Cessation Date, the debt borrowed to finance the SONGS Regulatory Assets that were being amortized as of the date of the 2014 Agreement will continue to be included from both Utilities’ ratemaking capital structure. In addition, from and after the Cessation Date, the Utilities may exclude from their ratemaking capital structure the after-tax charge to equity resulting from the implementation of this Agreement.

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(b) Comply with Section 4.6(b) of the 2014 Agreement, the Parties agree to support the continued exclusion, from the dates of the Utility’s financing the SONGS Regulatory Assets with debt, of the capital financing of those assets in determining the Utility’s overall AFDUE rate calculation at both the Commission and the Federal Energy Regulatory Commission, notwithstanding that both Utilities will cease to amortize the SONGS Regulatory Assets financed from and after the Cessation Date.

3.7. The PCA, or any other agency and/or successor mechanism adopted by the Commission, shall have authority to require any additional credits provided in this Agreement in accordance with the SONGS DA Rate-making Consent Proceeding, to ensure that traveled service and depreciable funds (e.g., direct access, community aggregation, and community choice aggregation) customers receive equitable and symmetrical benefits.

3.8. Closures of Regulatory Accounts
(a) The intervenors agree not to oppose requests by the Utilities to close their MNLMA, NECIMA, NMLMA, SONGSOMA, and STAMA within 45 days after the Approval Date.
(b) The intervenors agree not to oppose requests by the Utilities to close their CFBAs within 45 days after the Approval Date. For any amounts credited to taxpayers for savings tracked in the CFBAs between the Cessation Date and December 31, 2017, a debt shall be recorded by the Utilities. SDG&E will effectuate the debt via the NGMA or its successor assignor.

3.9. Utility Shareholder Agreement
(a) The Parties shall not take any action that would unilaterally alter the Utility Shareholder Agreement in any way.
(b) In the event that the Commission issues an order that has the effect of invalidating the Utility Shareholder Agreement, SDG&E may, in its discretion, withdraw from this Agreement, in which case SCE shall remain a Party to this Agreement but this Agreement shall be terminated as to SDG&E.

3.10. Except as expressly provided in this Agreement, the terms and conditions of the 2014 Agreement remain in full force and effect.

IV. GENERAL PROVISIONS
4.1. The Parties shall use their best efforts to obtain Commission Approval. If the Agreement is signed, the Parties shall:
(a) Jointly file motions requesting that the Commission:
(i) Approve this Agreement in its entirety without change under Rule 12 of the Commission’s Rules of Practice and Procedure;
(ii) Stay all proceedings in the OI pending its decision on the joint motion of the Parties to approve this Agreement; and
(iii) Expeditiously consider and approve this Agreement so as to provide the benefits of this Agreement as soon as possible.
(b) Reaffirm prepayment discovery requests in the OI pending the Commission’s consideration of the motion for settlement approval. The Parties shall not be required to respond to any pending discovery requests pending the Commission’s consideration of the motion for settlement approval. Notwithstanding the foregoing, ORA cannot waive its statutory discovery rights over any entity registered by the Commission as provided by the Public Utilities Code (e.g., P.U.C. Code § 399.5.3.4(a));
(c) Support and mutually defend this Agreement in its entirety from and after the Agreement Date;
(d) Avoid and discontinue form making any collateral attacks on this Agreement or taking positions in other proceedings that would undermine the effect of this Agreement;
(e) Oppose any change to this Agreement proposed by any non-settling party to the OI, unless all Parties jointly agree to support such change;
(f) Cooperate reasonable on all subaspects, including briefs and notices, necessary to achieve Commission Approval;
(g) Review any Commission decision regarding this Agreement to determine whether the Commission has conditioned its approval on a material change to this Agreement, the deletion of a material term of this Agreement, or the addition of a material term to this Agreement. The Parties agree that any change in, deletion of, or addition to, Section 1.10 would be material. Any Party unwilling to accept such material change, deletion, or addition shall so notify the other Parties within 15 calendar days of issuance of the order by the Commission or the court. The Parties generally shall discuss each change, deletion, or addition found unacceptable, negotiate in good faith to fashion a resolution acceptable to all Parties, and request Commission or court approval of the resolution so achieved. Failure to resolve such change, deletion, or addition to the satisfaction of all Parties within 15 calendar days of notification, or to obtain Commission or court approval of such resolution, shall enable any Party to withdraw from this Agreement by prompt notice to all other Parties; provided, however, that such withdrawal shall not affect the validity of this Agreement as to the other Parties.

4.2. The Parties intend that Commission Approval will constitute a complete and final settlement of the OI, including all issues raised that could have been raised in the AFR and PFEAs, and will have the effect set forth in Rule 12.5 of the Commission’s Rules of Practice and Procedure. Subject to Section 4.1, after the Agreement Date, the Parties will not assert in any other proceeding (including, but not limited to, pending SDG&E

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3.127-E and the reasonableness of renewal fuel contract cancellation costs in A.36-03-004) positions contrary to those reflected in this Agreement.

4.2. Nothing in this Agreement prevents RUA from continuing to advocate for the litigation position in A.36-03-044, except that this provision shall not apply to any opposition to SCE's position with respect to the DOF's proceeding.

4.4. The Parties intend that this Agreement, as well as Commission Approval, shall not be a precedent in any other proceeding.

4.5. The Parties have entered into the stipulations in this Agreement as a compromise and on the basis that the stipulations are not to be construed as admissions or concessions by any Party regarding any fact or matter of law at issue in the DOF. If Commission Approval does not occur, the Parties reserve all rights to take any position whatsoever regarding any fact or matter of law at issue in the DOF.

4.6. The Parties agree that no signature to this Agreement by any employee thereof shall assume any personal liability as a result of this Agreement.

4.7. If any Party fails to perform its obligations under this Agreement, any other Party may come before the Commission to pursue a remedy, including enforcement. Prior to doing so, the Parties shall settle the issue with the mediator who assisted with negotiations of the settlement, if the mediator consents.

4.8. Each Party acknowledges and stipulates that it has agreed to this Agreement freely, voluntarily, and without any fraud, duress, or undue influence by any other party. Each Party states that, through its authorized representatives, it has read and fully understands its rights, privileges, and duties under this Agreement, including its right to discuss this Agreement with its legal counsel, and has exercised those rights, privileges, and duties to the extent deemed necessary.

4.9. In executing this Agreement, each Party desires and mutually agrees that its provisions are reasonable, consistent with the law, and in the public interest.

4.10. This Agreement cannot be amended or modified without the express written and signed consent of all Parties, including pursuant to the process set forth in Section 4.14(c).

4.11. No provision of this Agreement shall be considered waived by any Party unless such waiver is given in writing. The failure of a Party to insist, in any one or more instances, on strict performance of any provision of this Agreement or to take advantage of any of its rights under the Agreement shall not be considered a waiver of such provision or a relinquishment of such rights in other instances, but the same shall continue and remain effective.

4.12. No Party has relied, or presently relies, on any statement, promise, or representation by any other Party, whether oral or written, except as expressly set forth in this Agreement. Each Party expressly assumes the risk of any mistake or misunderstanding of law or fact made by such Party or its authorized representative in entering into this Agreement.

V. EXECUTION

IN WITNESS WHEREOF, the Parties have duly executed this Agreement. The undersigned represent that they are authorized to sign on behalf of the Party represented.

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4.13. This Agreement shall not be construed against any Party on the basis that such Party was a drafter of this Agreement.

4.14. This Agreement may be executed in separate counterparts by the Parties with the same effect as if all Parties had signed one and the same document. All such counterparts shall be deemed to be an original and together shall constitute one and the same Agreement.

4.15. This Agreement shall become effective and binding on the Parties as of the Approval Date; provided, however, that Section 4.1 of this Agreement shall impose obligations on the Parties immediately upon the Approval Date.

4.16. This Agreement shall be governed by the laws of the State of California as to all matters, including but not limited to validity, construction, effect, performance, and remedies.

4.17. To the extent this Agreement requires that any Party provide notice to any other Party, such notice shall be in writing and directed to the signature line in this Agreement.

V. EXECUTION

IN WITNESS WHEREOF, the Parties have duly executed this Agreement. The undersigned represent that they are authorized to sign on behalf of the Party represented.

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THE ALLIANCE FOR NUCLEAR RESPONSIBILITY

By: Michelle Barker
Title: Executive Director
Date: Jan 30, 2018

THE CALIFORNIA LARGE ENERGY CONSUMERS ASSOCIATION

By: E. M. Brown
Title: Counsel
Date: Jan 30, 2018

CALIFORNIA STATE UNIVERSITY

By:                         
Title:                     
Date:                      

CITIZENS OVERSIGHT

By:                         
Title:                     
Date:                      

THE COALITION OF CALIFORNIA UTILITY EMPLOYEES

By:                         
Title:                     
Date:                      

THE DIRECT ACCESS CUSTOMER COALITION

By:                         
Title:                     
Date:                      

THE UTILITY REFORM NETWORK

RUTH HENRICKS
By:                         
Title:                     
Date:                      

THE OFFICE OF RATEPAYER ADVOCATES

By:                         
Title:                     
Date:                      

EXECUTION VERSION

WOMEN'S ENERGY MATTERS

By:                         
Title:                     
Date:                      

THE UTILITY REFORM NETWORK

By:                         
Title:                     
Date:                      

EXECUTION VERSION

RUTH HENRICKS
By:                         
Title:                     
Date:                      

THE OFFICE OF RATEPAYER ADVOCATES

By:                         
Title:                     
Date:                      

EXECUTION VERSION

G.2 – 375

G.2 – 377

G.2 – 376

G.2 – 378
March 2, 2018

California Polytechnic State University
San Luis Obispo
R.J. Kennedy Library
Division of kangaroo and Mags Dept.
San Luis Obispo, California 93407

Attention: Mr. Tim Strow, Intern Associate Dean
Re: Diablo Canyon Independent Safety Committee Agenda Packet

Dear Mr. Strow:

Enclosed please find a copy of the Agenda Packet for the next meeting of the Diablo Canyon Independent Safety Committee which will be held in Avila Beach on February 7-8, 2018. Would you please have this packet available at the Reference Department and make it available to the public, Thank you for your cooperation and assistance in this matter.

Very truly yours,

[Signature]

Robert W. Rifkin
DCISC Attorney, Legal Counsel

OFFICE OF LEGAL COUNSEL - ROBERT W. RIFKIN
11500 Foothill Boulevard, San Luis Obispo, CA 93405
TELEPHONE (805) 546-2621 FAX (805) 546-7091

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DCISC
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

COMMITTEE MEMBERS
WEBSITE: WWW.DCISC.ORG

ROBERT W. RIFKIN
ATTORNEY

FEBRUARY 2, 2018

VIA FEDERAL EXPRESS

Avila Beach, California 93424

Mr. James M. Welch - PG&E
Mr. Guy Hamon - PG&E
Mr. David Towne – Pacific Gas & Electric
Mr. David Prater - COC-ENERGY
Mr. David Zumberge - COC-ENERGY

SDC IS COMMITTED TO THE PROTECTION OF THE ENVIRONMENT AND THE COMMUNITY.

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San Luis Obispo, California 93407

Diablo Canyon
INDEPENDENT SAFETY COMMITTEE (DCISC)

Public Meeting:

Wednesday Afternoon, February 7th 1:30 P.M.
Introduction, public comments, and communications to the Committee: Committee business session, including receipt of PG&E’s response to the Committee’s 27th Annual Report on the Safety of Diablo Canyon Operations, discussion of Committee activities and plans during 2018, and reports on fact finding work by Members and Technical Consultants to Diablo Canyon Power Plant (DCPP).

Wednesday Evening, February 7th 6:00 P.M.
Public comments and communications to the Committee: Informational presentations by PG&E on plant safety and operations, including the “State of the Plant”, plant performance, operational highlights and station activities, organizational changes, results of the Institute of Nuclear Power Operations’ evaluation, and an update on the status of the Joint Proposal to retire DCPP by 2025, as approved by the California Public Utilities Commission, including an overview of the Employee Retention Plan to retain qualified staff including licensed operators.

Thursday Morning, February 8th 8:00 A.M.
Introduction, public comments and communications to the Committee: DCISC summary of assessments of the flooding hazard due to tsunami, further informational presentations by PG&E on plant safety and operations, including NRC enforcement actions, NRC Performance Indicators, recent events and notices of violation, the NRC’s “5506” inspection for “White” input into a Strategic Performance Area, and issues raised by NRC Resident Inspectors, the results of the 2017 Operating Plan and key elements of the 2018 Operating Plan and report on a fact-finding visit and discussion of administrative, legal, and regulatory matters including discussion of a provisional role for the DCISC after expiration of the operating licenses.

Please plan to attend!

For further information call 1-800-439-4688 or visit the Committee’s website at www.dcosc.org

A copy of the meeting Agenda packet may be reviewed at the Cal Poly Library’s Reference Department and the Agenda packet is available via the DCISC’s website. Each meeting of the public meeting of the DCISC is available live online during the meeting by visiting www.slo-span.org and following the archived link. (For the meeting’s archived link on the agenda, or Details on the website.)

WANT TO SUPPORT THE COMMITTEE’s WEBSITE, SIGN THE PETITION AT www.slo-span.org OR AFTER THE MEETING GOVERNMENT ACCESS TELEVISION CHANNEL.

Avila Lighthouse Suites
Point San Luis
Conference Center
P.O. Box 703
Avila Beach, California
PRESS RELEASE:

PUBLIC MEETING

OF THE
DIABLO CANYON
INDEPENDENT SAFETY COMMITTEE ("DCISC")

WITH: The Members of the Independent Safety Committee:
Dr. Robert J. Bubelick
Dr. Peter Lam
Dr. Per F. Petersen

WHAT: An opportunity for the public to observe and receive information concerning the activities of the Independent Safety Committee, including recent fact-finding visits and informational presentations concerning safety-related issues at Diablo Canyon Nuclear Power Plant:

- Committee Business Session - Wednesday afternoon, receipt of PG&E's Response to the DCISC's 7th Annual Report and review of the Open Items List and Fact Finding Reports.
- Presentation on the State of the Plant including station performance, new events, operational highlights, and organizational changes.
- Update on the status of the Joint Proposal to retire Diablo Canyon by 2025 as approved by the California Public Utilities Commission and an overview of the Employee Retention Plan to retain qualified staff.
- Summary of Assessments of the Flooding Hazard due to Tsunamis.
- Update on NRC Performance Indicators, License Event Reports, Notices of Violation, the NRC's "95001" Inspection for "White" Input into a Strategic Performance Area, and issues raised by NRC Resident Inspectors.
- Results of the 2017 Operating Plan and Key Elements of the 2018 Operating Plan.
- Committee discussion of a potential role for the DCISC following expiration of the Operating License.
- Presentation on handling & disposal of damaged spent fuel.
- Overview of training on "FLEX" equipment & training video.

WHERE: Avila Lighthouse Suites - Point San Luis Conference Facility
First & San Francisco Streets, Avila Beach, CA

WHEN: Wednesday and Thursday - February 7-8, 2018
1:30 p.m. to approx. 5:45 p.m. (Wednesday, February 7th)
6:00 p.m. to approx. 7:30 p.m. (Wednesday, February 7th)
8:00 a.m. to approx. 11:45 a.m. (Thursday, February 8th)
1:00 p.m. to approx. 3 p.m. (Thursday, February 8th)

FOR FURTHER INFORMATION:
Including those and other topics reviewed by the Independent Safety Committee or the specific days and times for particular presentations
Contact 1-800-439-4088

or review the meeting agenda online at www.dicsn.org

The Committee's policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Point San Luis Conference facility is an accessible facility and drivers for attendees who may be hearing impaired are available. The meeting will be webcast in real time at:

http://www.dicsn.org/"events/2018-02-07/public-meeting"

DIABLO CANYON
INDEPENDENT SAFETY COMMITTEE
- PUBLIC MEETING -

Wednesday, February 7th
1:30 P.M.
Introductions, public comments, and presentations by the Committee Members, Committee business, overview of PG&E's response to the DCSIC's 7th Annual Report and discussion by the Committee.

Wednesday, February 7th
6:00 P.M.
Public comments and presentations by the Committee Members, informal and information presentations by PG&E officials on Plant status and operations including the State of the Plant and the approved Joint Proposal to retire Diablo Canyon by 2025 with Question and Answer session.

Thursday, February 8th
8:00 A.M.
Introductions, public comment presentations by the Committee Members, formal presentation by PG&E officials on Plant status and operations including misleading & disposal of spent fuel, and one of FLEX outages and concludes with remarks by NSIC Director.

Thursday, February 8th
1:00 P.M.
Public comments and presentations by Committee Members, further informational presentations by PG&E officials on the Committee and Plant operations including misleading & disposal of spent fuel, and one of FLEX outages and concludes with remarks by NSIC Director.

WHERE: Avila Lighthouse Suites - Point San Luis Conference Center
First & San Francisco Streets
Avila Beach, California

Please plan to attend!

For further information call 1-800-439-4088 or visit the Committee's website at www.dicsn.org.

A copy of the meeting Agenda packet may be reviewed at the City Of Pismo Beach Library or the Agenda is available on the DCSIC's website. The meeting will be webcast in real time at http://webcast.tv/697076, without refreshes, and view the webcast through the agenda and through the webcast. Each session of a public meeting of the DCSIC is a public meeting that is open to the public and is covered by the Meeting and Open Records Acts, except for certain private business, as will be noted. The MEETING ARE Aired or replayed on GOVERNMENT ACCESS TELEVISION CHANNEL 3.

The Committee's policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Point San Luis Conference facility is an accessible facility and drivers for attendees who may be hearing impaired are available.

http://www.dicsn.org/"events/2018-02-07/public-meeting"

http://webcast.tv/697076, without refreshes, and view the webcast through the agenda and through the webcast.

The Committee's policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Point San Luis Conference facility is an accessible facility and drivers for attendees who may be hearing impaired are available.

http://www.dicsn.org/"events/2018-02-07/public-meeting"

http://webcast.tv/697076, without refreshes, and view the webcast through the agenda and through the webcast.
Hi Bob,

Hope you are doing well! I just wanted to check in to see if the Committee Members had a particular session in next week's public meetings they would like to hear from Senator Manning's office. Just want to make sure the time is blocked off on my calendar.

Thank you! Look forward to seeing you in Avila next week.

All the best,

Anne Aguilera | Assistant District Director
OFFICE OF SENATOR WILLIAM W. MANNING
California State Senate Majority Leader
1026 Palm Street Suite 201 | San Luis Obispo, CA 93401
Ph: 805.549.3794 | Fax: 805.549.3779

From: info@DCISC.org
Sent: Monday, January 21, 2018 5:37 PM
To: Aguilera, Anne
Cc: info@DCISC.org
Subject: RE: Notice of & Agenda for Diablo Canyon Ind, Safety Committee Public Meeting

Hi Bob,
Thank you for your response,

I know the Committee Members were unable to attend the public meeting in February and hearing from you on the Senator’s views on state-related issues concerning DCPP decommissioning.

I look forward to seeing you again in Avila Beach!

Best,
Bob

From: Aguilera, Anne (mailto:Anne.Aguilera@sen.ca.gov)
Sent: Wednesday, January 31, 2018 10:10 AM
To: [info@DCISC.org]
Cc: [info@DCISC.org]
Subject: RE: Notice of & Agenda for Diablo Canyon Ind, Safety Committee Public Meeting

Hi Bob,

I hope 2018 is starting out to be a good year for you,

Sincerely,

Bob Rathie
Assist. DCISC Legal Counsel
(805) 439-4688
DCISC.sen.org

G.2 – 387

G.2 – 388

G.2 – 389

G.2 – 390
Hi Bob,

I got your voicemail. Actually, when Dr. Budtitz and I spoke, I mentioned that I thought that I would be able to attend the quarterly meeting next week; indeed, I can’t make it. I will certainly review the meeting on my own where it’s available. And someday, I’m sure I’ll make it up to a meeting in person. Thanks for continuing to keep me in the loop about the Committee.

Best –

Meg

From: info@DCISC.org
Sent: Friday, January 19, 2018 3:30 PM
To: Megan Hey <Megan.Hey@d4j.ca.gov>
Cc: info@DCISC.org
Subject: Notice of & Agenda for Diablo Canyon Island Safety Committee Public Meeting

Dear Ms. Hey,

The next public meeting of the Diablo Canyon Independent Safety Committee (DCISC) will be held on Wednesday and Thursday, February 7-8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility in Avila Beach, California. A draft agenda for the meeting is attached.

Since the last public meeting of the DCISC in October 2017, the California Public Utilities Commission approved the retirement of PG&E’s Diablo Canyon Nuclear Power Plant (DCPP) in Decision 18.04.022 issued on January 11, 2018. The decision orders PG&E to retire Unit 1 no later than by 2024 and Unit 2 no later than 2025, and it also addresses a number of related issues in connection with the construction of generation operations by DCPP.

At the DCISC’s October 2017 meeting the matter of whether the DCISC might continue to review activities related to post-shutdown decommissioning of the power plant, including but not limited to the coating, transfer, and storage of highly radioactive spent fuel, was raised by several persons. Discussion of that matter has been placed on the agenda for February 8 under Agenda Item XX and, on behalf of DCISC Members, an invitation is cordially extended to you to attend the meeting and to make any comments or suggestions regarding a continuing role for the DCISC during the decommissioning following termination of operation at DCPP, or other issues related to decommissioning activities or within the DCISC’s purview.

Should you be unable to attend, the DCISC Members would welcome receiving any comments you might wish to provide. Comments may be emailed to the Committee at info@DCISC.org or mailed to the Office of the DCISC Legal Counsel, 837 Cam Street, Suite D, Monterey, CA 93940. All comments received will be provided to the Members for their consideration and will become part of the DCISC’s public record.

1

G.2 – 391

From: info@DCISC.org
Sent: Thursday, February 1, 2018 10:41 AM
To: Newport, Christopher; Reynoso, John
Cc: info@DCISC.org
Subject: RE: DCISC Public Meeting on February 7-8, 2018

Chris & John –

Attached is the final agenda for the DCISC’s public meeting to be held on February 7-8, 2018, once again at the Avila Lighthouse Suites. I’m sending you the annotated version of the agenda which includes the estimated times for the presentations and identifies the DCPP staff who will be presenting the informational topics to the Committee. The entire agenda packet, including the Minutes of the October 2017 meeting, will be posted on our website at www.dcisc.org, very soon.

Hopefully you might be able to find some time to attend some portion of the February public meeting next week – you are always most welcome.

I also wanted to check and see if you might provide me with a list of the NRC inspection activities for 2018. I know this would help inform our Members and Consultants at the public meeting and we’ve had a suggestion from a Member to post some on our website. Would this be acceptable to the NRC? I imagine it’s likely public information anyway. . .

Please give me a call if you should have any questions or require further information.

Best regards,

Bob Brito
DCISC Legal Counsel
1-800-439-4688
info@dcisc.org

2

G.2 – 392

From: info@dcisc.org
Sent: Thursday, February 1, 2018 1:24 AM
To: Newport, Christopher; Reynoso, John
Cc: info@dcisc.org
Subject: RE: DCISC Public Meeting on February 7-8, 2018

Bob,

My apologies for the delayed response.

Please see attached – the latest publicly available inspection schedule.

We will be releasing a new schedule some time next month along with our end-of-cycle assessment letters – there should only be minor changes for 2018.

Let me know if you need anything else.

-Chris Newport

Christopher Newport
Senior Resident Inspector
Diablo Canyon
US Nuclear Regulatory Commission
(805)595-2354

G.2 – 393

G.2 – 394
Mr. Edward D. Halpin, Senior Vice President, Generation and Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 56, Mail Code 1046
Avila Beach, CA 93424

August 28, 2017

SUBJECT: UPDATED INSPECTION PLAN FOR DIABLO CANYON POWER PLANT, UNITS 1 AND 2

Dear Mr. Halpin:

The attached inspection plan lists the inspections performed through June 30, 2019 for Diablo Canyon Power Plant, Units 1 and 2. The U.S. Nuclear Regulatory Commission (NRC) provides the inspection plan to allow for the notification of any scheduling conflicts and personnel availability issues. Routine inspections performed by resident inspectors are not included in the inspection plan. The inspections listed during the last twelve months of the inspection plan are tentative and may be revised. The NRC will contact you as soon as possible to discuss changes to the inspection plan should circumstances warrant any changes. This inspection plan does not include the plan for security-related inspections, which will be sent via separate, non-publicly available correspondence.

Additionally, as reflected in the enclosure, during this period the NRC staff will complete Temporary Instruction 2815/191, "Assessment of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communications StaffOnly Multi-Unit Core Assessment Plans." This inspection will be conducted at Diablo Canyon Power Plant, Units 1 and 2, to confirm the station's full implementation of Commission Orders EA-12-049 and EA-12-051.

In accordance with Title 10 of the Code of Federal Regulations (10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for

G.2 – 395

G.2 – 396
Info@DCSC.org

From: Info@DCSC.org
To: "Aguiar, Annie"
Cc: Info@DCSC.org
Subject: RE: Notice of & Agenda for Diablo Canyon Ind. Safety Committee Public Meeting
Attachments: DCSC Public Meeting Agenda - February 8, 2018.pdf

Annie – we’ve scheduled discussion of a potential role for the Committee post-shutdown as part of my report (Agenda Item 10 on the attached agenda), it’s the last item on the meeting agenda before they break for lunch. I anticipate that the discussion will start around 10:30 – 10:45 am on Thursday morning.

We’ll be entertaining comments from the public on that topic at that time but, of course, we can accommodate your comments on behalf of Senator Monning at any time if Thursday morning should prove inconvenient.

So far, I’ve heard back from SGI Supervisor Bruce Gibson in response to an invitation to attend and I suspect that Supervisor Gibson may be in attendance on Thursday morning.

Thank you for checking in – let me know if you have any other questions or if I can assist in any way.

Best,
Bob

From: Aguiar, Annie [mailto:Annie.Aguiar@sen.ca.gov]
Sent: Wednesday, January 31, 2018 3:04 PM
To: Info@DCSC.org
Subject: RE: Notice of & Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Hi Bob,

Hope you are doing well! I just wanted to check in to say if the Committee Members had a particular session in next week’s public meetings that they would like to hear from Senator Monning’s office. Just want to make sure the time is blocked off on my calendar.

Thank you! Look forward to seeing you in Avila next week.

All the best,
Annie Aguiar
Assistant District Director
OFFICE OF SENATOR WILLIAM W. MONNING
California State Senate Majority Leader
1244 Valley Street Suite 110 | San Luis Obispo, CA 93401
Ph: 805.549.3394 | Fax: 805.549.3778

UCSC Public Meeting Agenda - February 8, 2018

From: [mailto:Info@DCSC.org]
Sent: Monday, January 22, 2018 5:07 PM

Dear Annie,

I want to thank you again for attending the October public meeting of the Committee and addressing remarks to the members on Senator Monning’s behalf. I know our Members appreciated hearing from you. I am writing now to let you know that the next public meeting of the Diablo Canyon Independent Safety Committee (DCSC) will be held on Wednesday and Thursday, February 7-8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility in Avila Beach, California. A draft agenda for the meeting is attached.
Since the last public meeting of the DCISC in October 2017, the California Public Utilities Commission approved the retirement of PG&E’s Diablo Canyon Nuclear Power Plant (DCPP) in Decision 18-01-022 issued on January 11, 2018. The Decision orders PG&E to retire Unit 1 no later than by 2024 and Unit 2 no later than 2025, which also addresses a number of related issues in connection with the cessation of generation operations by DCPP.

At the DCISC’s October 2017 meeting the matter of whether the DCISC might continue to review activities related to post-shutdown decommissioning of the power plant, including but not limited to the cooling, transfer and storage of highly radioactive spent fuel, was raised by several persons. Discussion of that matter has been placed on the agenda for February 8 under Agenda Item XX and, on behalf of DCISC Members, an invitation is cordially extended to you to attend the meeting and to share any concerns, recommendations or suggestions regarding a continuing role for the DCISC during the decommissioning period following termination of generation operations at DCPP, or other issues related to decommissioning activities or within the DCISC’s purview.

Should you be unable to attend, the DCISC Members would welcome receiving any comments you might wish to provide. Comments may be emailed to the Committee at info@dcisc.org or mailed to the Office of the DCISC Legal Counsel, 837 Cass Street, Suite D, Morro Bay, CA 93440. All comments received will be provided to the Members for their consideration and will become part of the DCISC’s public record.

Each public meeting of the DCISC is live-streamed on the internet and the discussions during the February 7-8, 2017 meeting may be accessed through a link on the DCISC’s website http://www.dcisc.org or through www.cciw.org. DCISC public meetings are also archived on the internet, indexed to the meeting agenda, and may be accessed at the above websites. Information on the DCISC and its Members and on various topics related to DCPP is available on its website, as are the dates for its future public meetings.

Please let me know if you plan to attend the February 2018 public meeting and if you would like to address the DCISC on any topic and I will ensure that sufficient time is reserved for your remarks.

I hope 2018 is starting out to be a good year for you.

Sincerely,

Bob Rabie
Asst. DCISC Legal Counsel
(800) 459-4648
info@dcisc.org

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From: info@dcisc.org
Sent: Monday, January 29, 2018 3:34 PM
To: cagadmin@arruyogrande.org
Cc: info@dcisc.org
Subject: RE: DCISC Notice of Public Meeting

Thank you. We will remove her from our mailing list.

From: cagadmin@arruyogrande.org [mailto:cagadmin@arruyogrande.org]
Sent: Monday, January 29, 2018 3:31 PM
To: info@dcisc.org
Subject: DCISC Notice of Public Meeting

As of December 31, 2017, Kitty Norton has retired and is no longer with the City of Arroyo Grande. If you need immediate assistance, please contact 805-473-5400.
Summer – Yes, we have space and can likely accommodate your husband. We’ve already turned in the list to PG&E so we would need your information asap to add him to the group. Although he may already be in the OSCP security database, you’d better let me have his information to go with the request to add his name to the list.

Information required is: full name, home address, contact telephone number, social security number, date of birth, citizenship and gender. Might be a good idea to provide his LAN ID as well.

Thanks,

Bob

From: Summer Rogovoy [mailto:SummerRogovoy@avallaghlighthouse.com]
Sent: Friday, January 26, 2018 12:10 PM
To: info@DCISC.org
CC: info@DCISC.org
RE: Diablo Tour

Hi Bob,

My husband has just let me know that he would like to join the tour. He has a current LAN ID through PG&E (he is the Lead Safety Inspector of the Gas Pipeline Division for PG&E for the Central Coast). Does he still need to forward you his info or can he just be added to the list?

Thank you,

Summer Rogovoy
General Manager
480-427-1903 / 805-627-1909
659 Power Street / Avila Beach, California 93424
www.avallaghlighthouse.com
Thanks – the morning timing makes it more likely I can make it.

Bruce

From: info@DCISC.org [mailto:info@DCISC.org]
Sent: Friday, January 26, 2018 8:35 AM
To: info@DCISC.org
Cc: Cherie Motlow
Subject: RE: Notice of & Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Dear Supervisor Gibson –

Thank you for your response to the DCISC’s invitation. I hope you are able to attend the public meeting at Avila Lighthouse Suites on February 8 when the Committee is expected to take up the matter of whether it should have a post-shutdown role to review the decommissioning of the power plant. I estimate that the Committee will take up that matter no earlier than 10:30 AM, or shortly thereafter, on Thursday, February 8. It’s the last matter on the morning’s agenda so there should be some flexibility for you in making comments before they adjourn for lunch.

I know the Members and Consultants value and appreciate your input and interest in the Committee and its activities.

Thank you again, and please feel free to contact me with any questions or if I can be of assistance.

Best regards,

Bob Rathe

From: Bruce Gibson [mailto:bgibson@co.slo.ca.us]
Sent: Thursday, January 25, 2018 9:38 AM
To: info@DCISCOrg
Cc: Cherie Motlow, <cmotlow@co.slo.ca.us>
Subject: RE: Notice of & Agenda for Diablo Canyon Ind. Safety Committee Public Meeting

Mr. Rathe – thanks for your invitation and I’m sorry for the delayed response.

I will try to attend the item on 2/B, and think the role of the DCISC post-shutdown is important and important, if my schedule won’t allow that, I would look forward to attending at the next opportunity.

For scheduling purposes, would you have a rough estimate as to when item 2X might be heard? I have 2/C my legislative assistant, who manages my calendar.

G.2 – 411

Please let me know if you plan to attend the February 2018 public meeting and if you would like to address the DCISC on any topic and I will ensure that sufficient time is reserved for your remarks.

Sincerely,

Robert Rathe
Asst. DCISC Legal Counsel
(805) 439-6488
info@dcisc.org
Dear Mr. Sullivan:

Enclosed please find a copy of the two volumes which comprise the "Twenty-Seventh Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2016 - June 30, 2017," which was adopted at the eighty-eighth public meeting of the Diablo Canyon Independent Safety Committee ("DCISC") held in Avila Beach on October 18-19, 2017.

As required, the DCISC first submits a copy of its report to PG&E, and then includes PG&E's written response as part of the report. We then file the report with your office as well as with the CPUC, the Governor and the Attorney General. This Report is also made available to the public on the DCISC website, at the R.E. Kennedy Library on the campus of California Polytechnic University at San Luis Obispo and at local public libraries.

The Members of the Committee welcome and invite any thoughts and comments which you or your staff might have concerning the value and usefulness of this and the previous DCISC annual reports.

Thank you for your attention to this matter.

Very truly yours,

Robert R. Wellington
DCISC Legal Counsel

RR/Wr

Enclosure

cc: none

Mr. Hector Garcia - PG&E/DCISP

Office of Legal Counsel


Telephone: (831) 649-9064 - Fax: (831) 647-2706 - email: dcisc@cal.gov

G.2 – 415

DCISC

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

COMMITTEE MEMBERS

ROBERT R. WELLINGTON
PETER LAW
PETER F. PETTITON

WEBSITE: WWW.DCISC.ORG

January 26, 2018

OFFICE OF LEGAL COUNSEL - ROBERT R. WELLINGTON - 971 CASE STREET - SUITE D - MONTEREY - CA - 93940

Telephone: (831) 649-9064 - Fax: (831) 647-2706 - email: dcisc@cal.gov

G.2 – 417
January 26, 2018

Mr. James Welch
Vice President Nuclear Generation & Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 56
Avila Beach, California 93424

Re: DCISC Twenty-Seventh Annual Report on Safety of Diablo Canyon Operations
July 1, 2016 - June 30, 2017

Dear Mr. Welch:

At its October 19, 2017 meeting, the Nuclear Generation and Chief Nuclear Officer of the Pacific Gas and Electric Company, the California Attorney General, and the California Energy Commission. This Report is also made available in the public on the DCISC's website, at the R.E. Kennedy Library on the campus of California Polytechnic University at San Luis Obispo and at local public libraries.

If you have any questions or comments concerning the above, please feel free to contact me,

Very truly yours,

Robert R. Wellington
DCISC Legal Counsel

R/R
Enclosure

cc w/c all: DCISC Members

William V. Massie, Esq., PG&E Law Dept.
Jennifer R. Prest, Esq., PG&E Law Dept.
Mark Kramer, PG&E Director, State Agency Relations

cc: Mr. Hector Garcia, PG&E DCP

OFFICE OF LEGAL COUNSEL: ROBERT R. WELLINGTON - 355 CABRILLO STREET SUITE D - MONTEREY CA - 93940
TELEPHONE (831) 426-1044 - FACSIMILE (831) 426-1716 - dcisc@calparks.org

G.2 - 419

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January 26, 2018

R.E. Kennedy Library
Reference Department Desk
California Polytechnic State University
San Luis Obispo, California 93407

Attention: Librarian

Re: Diablo Canyon Independent Safety Committee Twenty-Seventh Annual Report

Dear Librarian:


Thank you for your cooperation and assistance in this matter.

Very truly yours,

Robert R. Wellington
DCISC Legal Counsel

R/R
Enclosure

cc: Dr. Robert L. Bluhm

Dr. Pat Petersen
Dr. Peter Lam
Mr. Robert O. McWherter, Jr.
Mr. R. Foreman Wardell P.E.
Mr. Martin A. Maack, Esq.

OFFICE OF LEGAL COUNSEL: ROBERT R. WELLINGTON - 355 CABRILLO STREET SUITE D - MONTEREY CA - 93940
TELEPHONE (831) 426-1044 - FACSIMILE (831) 426-1716 - dcisc@calparks.org

G.2 - 420

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Warms regards,

Peter

Sent from my iPhone

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From: Douglas <douglas@calparks.org>
Date: January 24, 2018 at 2:11:55 AM EST
To: peterlam1@gmail.com; peterlam1@gmail.com
Cc: cuneway@dcisc.org; cuneway@dcisc.org
Subject: Information for the Diablo Canyon Independent Safety Committee

Dear Dr. Lam,

I am writing to ask whether the committee intends to provide a substantive discussion of the communication regarding the seismic hazard to the DCNNP that I submitted as a handset at the time of its June 7-8, 2017 meeting. To recall, this handset included information based on PG&E and other data addressing the four factors that define the seismic hazard to the facility: 1) the existing pattern of seismic events, 2) the susceptibility of the site to seismic events, 3) the quality of the data, and 4) the actual recorded spectra from the most recent earthquake that occurred at the site.

As the committee is doubtless aware, the National Research Council recently updated the PG&E seismic hazard report for use in the development of an SFRA (seismic probabilistic risk assessment) for the Diablo Canyon power plant (NRC/NRP/Access No. M1212083430). Given this, I suggest that it should be a matter of concern to the committee (as well as to the citizens of the San Luis Obispo region), that so far as I am aware, the DCNNP report fails to provide a basis for a realistic assessment of the actual seismic hazard of the DCNNP.

As noted, I would be interested in hearing your response, if any, about the relevance of the information in my handset to the needed realistic assessment of the seismic hazard at the DCNNP site. To this end, it is my intention to be present at the upcoming committee meeting, but only if there is an agenda item for discussion of the handset information by the committee.

Douglas H. Hamilton, Ph.D., CEG
Consulting Geologist

G.2 - 421

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G.2 - 422
Bob,

Thanks for the agenda,

Let me check on the inspection schedule and get back to you.

-Chris Newport

On 25 January 2018 16:43, "Amy W. Wallington Law, LLC" <amy@wallingtonlaw.com> wrote:

Chris & John

Attached is the final agenda for the DCSIC’s public meeting to be held on February 7-8, 2018, once again at the Aula Lighthouse Suites. I’m sending you the associated version of the agenda which includes the estimated times for the presentations and identifies the DCSIC staff who will be presenting the informational topics to the Committee. The entire agenda packet, including the Minutes of the October 2017 meeting, will be posted on our website at www.dcsic.org very soon.

Hopefully you might be able to find some time to attend some portion of the February public meeting next week — you are always most welcome.

I also wanted to check and see if you might provide me with a list of the NRC inspection activities for 2018. I know this would help inform our members and consultants at the public meeting and we’ve had a suggestion from a member of the public to post same on our website. Would this be acceptable to the NRC? (Imagine it’s likely public information anyway…)!

Please give me a call if you should have any questions or require further information.

Best regards,

Bob Rachie
Ass, DCSIC Legal Counsel
1-800-499-4688
info@dcsic.org

ROBERT M. BURKE, WASHINGTON LAW OFFICES – 1500 EAGLE ST, SUITE 200 – MONTEREY – CA 93940 – (831) 374-0212 – Fax: (831) 374-5270

CONFIDENTIAL NOTICE: This communication and any accompanying documents are confidential and privileged. They are intended for the sole use of the addressee. If you are not the intended recipient, or you are not authorized to have access to the information contained herein (including any reliance thereon), please do not read or disclose the communication or any part thereof. Any such disclosure, copying or dissemination is strictly prohibited. Without any such instructions disclosure shall be deemed to waive the attorney-client or work product privileges as to any such information.

1 G.2 – 423

DCSafety@dcsic.org

From: Jess Pawlak <jessp55@gmail.com>
Sent: Wednesday, January 31, 2018 6:25 PM
To: DCSafety@dcsic.org
Subject: Re: Please keep me on e-mail list for next Diablo Canyon Tour

Hello Folks,

I will not be able to attend the one in February, however, please keep me on the list for the next one during the Spring or Summer of 2018.

Thanks,

Jess Pawlak
MS CISA CIPT

This transmission may contain information that is proprietary, privileged, confidential, and/or exempt from disclosure under applicable law. If you are not the intended recipient, you are hereby notified that any disclosure, copying, transmission, or use of the information contained herein (including any reliance thereon) is prohibited. If you received this transmission in error, please immediately destroy the material and notify the sender. Any further use of the communication is strictly prohibited. Without any such instructions disclosure shall be deemed to waive the attorney-client or work product privileges as to any such information.

On Fri, Jan 5, 2018 at 1:03 PM, DCSafety@dcsic.org <dcsafety@dcsic.org> wrote:

Thank you for contacting the Diablo Canyon Independent Safety Committee and for your interest in a tour of the Diablo Canyon Power Plant with members of the Committee.

The next tour is scheduled to be held on Wednesday, February 7, commencing at 8:00 AM. The minimum age for prior registration for the tour is 18.

Our office will be taking reservations (which are required in advance) for the tour commencing on Monday, January 22, 2018, at 3:00 PM on a first-come, first-served basis. Reservations may be made by telephoning 1-800-499-4688. Please plan to make your call as early as possible as demand is usually very heavy. Reservations will be taken for no more than four immediate family members per call. You should be prepared to provide information for each person including date of birth, social security number, gender and citizenship.

The tour departs from the PG&E Energy Education Center at 6850 County Road in San Luis Obispo and takes about 3 ½ hours.

Please let me know if you should have any additional questions.

Robert Rachie
DCSIC Asst. Legal Counsel
1-800-499-4688
info@dcsic.org

From: Jess Pawlak <jessp55@gmail.com>
Sent: Wednesday, January 9, 2018 12:51 PM
To: dcsafety@dcsic.org
Subject: Please keep me on e-mail list for next Diablo Canyon Tour

Hello Folks,

I would like to take a tour with family members and friends who are interested in Diablo Canyon’s Nuclear Power Generation. Please let me know when another tour will be given and what age group is allowed on the tour.

Thank You!

Jess Pawlak
MS CISA CIPT

This transmission may contain information that is proprietary, privileged, confidential, and/or exempt from disclosure under applicable law. If you are not the intended recipient, you are hereby notified that any disclosure, copying, transmission, or use of the information contained herein (including any reliance thereon) is prohibited. If you received this transmission in error, please immediately destroy the material and notify the sender. Any further use of the communication is strictly prohibited. Without any such instructions disclosure shall be deemed to waive the attorney-client or work product privileges as to any such information.
I want to thank you again for attending the October public meeting of the Committee and addressing remarks to the Members on Senator Moore's behalf. I know our Members appreciated hearing from you. I am writing now to let you know that the next public meeting of the Diablo Canyon Independent Safety Committee (DCISC) will be held on Wednesday and Thursday, February 7-8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility in Avila Beach, California. A draft agenda for the meeting is attached.

Since the last public meeting of the DCISC in October 2017, the California Public Utilities Commission approved the retirement of PG&E’s Diablo Canyon Nuclear Power Plant (DCPP) in Decision 18-01-002 issued on January 11, 2018. The Decision orders PG&E to retire Unit 1 no later than by 2024 and Unit 2 no later than 2025, and it also addresses a number of related issues in connection with the cessation of generation operations by DCPP.

At the DCISC’s October 2017 meeting, the matter of whether the DCISC might continue to review activities related to post-shutdown decommissioning of the power plant, including but not limited to the cooling, transfer and storage of highly radioactive spent fuel, was raised by several persons. Discussion of that matter has been placed on the agenda for February 8 under Agenda Item II, an item for analysis by DCISC Members. An invitation is cordially extended to you to attend the meeting and share your concerns, recommendations or suggestions regarding a continuing role for the DCISC during the decommissioning period following termination of generation operations at DCPP, or other issues related to decommissioning activities or within the DCISC’s purview.

Should you be unable to attend, the DCISC Members would welcome receiving any comments you might wish to provide. Comments may be emailed to the Committee at info@dcisc.org or mailed to the Office of the DCISC Legal Counsel, 837 Cass Street, Suite D, Monterey, CA 93940. All comments received will be provided to the Members for their consideration and will become part of the DCISC’s public record.

Each public meeting of the DCISC is broadcasted on the internet and the discussions during the February 7-8, 2018 meeting may be accessed through a link on the DCISC’s website, https://www.dcisc.org or through www.aspen.com. DCISC public meetings are also archived on the internet, indexed to the meeting agendas and may be accessed at the above websites. Information on the DCISC and its Members and its various member-related topics related to DCPP is available on its website, m, m and the dates for its future public meetings.

Please let me know if you plan to attend the February 2018 Public Meeting and if you would like to address the DCISC on any topic and I will ensure that sufficient time is reserved for your remarks.

I hope 2018 is starting out to be a good year for you.

Sincerely,
Bob Rathie
Ass, DCISC Legal Counsel
(831) 429-6888
info@dcisc.org
WITH MEMBERS OF THE
DIABLO CANYON INDEPENDENT
SAFETY COMMITTEE

At 8:00 A.M., on the morning of Thursday, February 7, 2019, the Diablo Canyon Independent Safety Committee will conduct an inspection tour of certain accessible areas at the Diablo Canyon Nuclear Power Plant. The tour will take approximately three and half hours and will be open to a limited number of members of the public. The tour will not enter the protected areas of the plant.

Because the plant is an operating nuclear facility, the number of participants must be limited and space will be reserved on a first-come, first-served basis. Registration, which will have been done in high demand, will be accepted for no more than four immediate family members per call, each of whom must be at least eighteen years of age.

Personal identification including, but not limited to, cash or credit cards with printed name, social security number, gender and citizenship are required when making a reservation. You will be required to present an NRC-approved form of identification, which must include a photo, to take the tour. The Committee retains the right to change the public tour to accommodate private tour requests. The information is being shared with the public to allow for limited access to the areas of the plant.

Reservations may only be made by contacting the Committee's call center:

- 650-306-0869
- Monday, January 21, 2019
- Between the hours of 8:00 A.M. and 5:00 P.M.

Please place your call no later than Friday, February 1, 2019. Please do not call the operator as all calls are done on a duty basis. Reservations cannot be accepted over the phone. No reservations will be accepted for reservations left with anyone other than Committee staff.

In the event that security or operational concerns dictate a public tour of Diablo Canyon on Monday, February 4, 2019, in the alternative the OCSF committee will be able to schedule an open tour of the PG&E Energy Education Center at 7000 Ontario Road, Suite 103, Chico, CA. Information concerning the agenda for the OCSF public meeting on January 4, 2018, at the PG&E Energy Education Center, is available at www.pge.com or by contacting the office of the Committee's Public Counsel at the Committee's toll-free telephone number.

DIABLO CANYON POWER PLANT PUBLIC TOUR
WITH MEMBERS OF THE
DIABLO CANYON INDEPENDENT
SAFETY COMMITTEE

At 8:00 A.M. on the morning of Tuesday, February 7, 2019, the Diablo Canyon Independent Safety Committee will conduct an inspection tour of certain accessible areas at the Diablo Canyon Nuclear Power Plant. This tour will take approximately three and a half hours and will be open to a limited number of members of the public. The tour will not enter the protected areas of the plant.

Because the plant is an operating nuclear facility, the number of participants must be limited and space will be reserved on a first-come, first-served basis. Registration, which has been done in high demand, will be accepted for no more than four immediate family members per call, each of whom must be at least eighteen years of age.

Personal identification including, but not limited to, cash or credit cards with printed name, social security number, gender and citizenship are required when making a reservation. You will be required to present an NRC-approved form of identification, which must include a photo, to take the tour. The Committee retains the right to change the public tour to accommodate private tour requests. The tour will take approximately three and a half hours and will be open to a limited number of members of the public. The tour will not enter the protected areas of the plant.

Reservations may only be made by contacting the Committee's call center:

- 650-306-0869
- Monday, January 21, 2019
- Between the hours of 8:00 A.M. and 5:00 P.M.

Please make your call no later than Tuesday, February 5, 2019. Please do not call the operator as all calls are done on a duty basis. Reservations cannot be accepted over the phone. No reservations will be accepted for reservations left with anyone other than Committee staff.

In the event that security or operational concerns dictate a public tour of Diablo Canyon on Monday, February 4, 2019, in the alternative the OCSF committee will be able to schedule an open tour of the PG&E Energy Education Center at 7000 Ontario Road, Suite 103, Chico, CA. Information concerning the agenda for the OCSF public meeting on January 4, 2018, at the PG&E Energy Education Center, is available at www.pge.com or by contacting the office of the Committee's Public Counsel at the Committee's toll-free telephone number.
Dear [Name],

When you were working with AGP Video at the October 18-19, 2017 DCISC public meeting, you indicated you might like to take the tour of the power plant conducted by the Committee and I promised to provide information on how to do so. Hence this email.

The Committee will be conducting a tour with members of the public of the power plant on the morning of Wednesday, February 7, commencing at 8:00 AM. Our office will be taking reservations (which are required in advance) for the tour commencing this coming Monday, January 22, 2018, at 9:00 AM on a first-come, first-served basis. Reservations may be made by telephoning 1-800-439-6688. Please plan to make your call as early as possible as demand is usually very heavy. You should be prepared to provide information for each person including date of birth, social security number, gender and citizenship. The tour departs from the PG&E Energy Education Center at 6588 Ontario Road in San Luis Obispo and takes about 3 ½ hours.

I hope you can attend the February public tour.

Best regards,

Robert Rathie
DCISC Asst. Legal Counsel
1-800-439-6688
info@dcisc.org
Dear Mr. Schutz,

DCSC Technical Consultant Herman Wardell provide me with your contact information and he indicated that you might be interested in attending the next public meeting of the Diablo Canyon Independent Safety Committee which will be held on Wednesday and Thursday, February 7-8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility in Avila Beach, California.

The Committee will be conducting a tour with members of the public of the power plant on the morning of Wednesday, February 7, commencing at 8:00 AM. Our office will be taking reservations (which are required in advance) for the tour commencing this coming Monday, January 22, 2018, at 8:00 AM on a first-come, first-served basis. Reservations may be made by telephoning 1-800-439-4688. Please plan to make your call as early as possible as demand is usually very heavy. You should be prepared to provide information for each person including date of birth, social security number, gender and citizenship. The tour departs from the PG&E Energy Education Center at 8988 Ontario Road in San Luis Obispo and takes about 3 ½ hours.

In case you cannot attend in person, each public meeting of the DCSC is livestreamed on the Internet and the discussions during the February 7-8, 2017 meeting may be accessed through a link on the DCSC’s website http://www.dcsc.org or through www.stayapton.org. DCSC public meetings are also archived on the Internet, indexed to the meeting agenda, and may be accessed at the above websites. Information on the DCSC and its Members and on various topics related to DCPP is available on its website, as are the dates for its future public meetings.

Please let me know if you should have any additional questions. I hope you can attend the February public meeting.

Robert Rathie
DCSC Asst. Legal Counsel
1-800-439-4688
info@dcsc.org

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G.2 – 439

G.2 – 440

of that matter has been placed on the agenda for February 8 under Agenda Item XX and, on behalf of DCSC Members, an invitation is cordially extended to you to attend the meeting and to share any concerns, recommendations or suggestions regarding a continuing role for the DCSC during the decommissioning period following termination of generation operations at DCPP, or other issues related to decommissioning activities or with the DCSC’s purview.

Should you be unable to attend, the DCSC Members would welcome receiving any comments you might wish to provide. Comments may be emailed to the Committee at info@dcsc.org or mailed to the Office of the DCSC Legal Counsel, 837 Cass Street, Suite D, Monterey, CA 93940. All comments received will be provided to the Members for their consideration and will become part of the DCSC’s public record.

Each public meeting of the DCSC is livestreamed on the Internet and the discussions during the February 7-8, 2017 meeting may be accessed through a link on the DCSC’s website http://www.dcsc.org or through www.stayapton.org. DCSC public meetings are also archived on the Internet, indexed to the meeting agenda, and may be accessed at the above websites. Information on the DCSC and its Members and on various topics related to DCPP is available on its website, as are the dates for its future public meetings.

Please let me know if you plan to attend the February 2018 public meeting and if you would like to address the DCSC on any topic and I will ensure that sufficient time is reserved for your remarks.

Sincerely,

Robert Rathie
Asst. DCSC Legal Counsel
(805) 439-4688
info@dcsc.org

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G.2 – 441

G.2 – 442
Dear Ralph,

The Diablo Canyon Independent Safety Committee (DCISC) was established by the California Public Utilities Commission as part of a Settlement Agreement entered into in June 1988 between the DRA, the Attorney General and PG&E. Its three members are appointed by the Governor of the State of California, the Attorney General and the Chairperson of the California Energy Commission, respectively. The Committee’s charge is to review Diablo Canyon operations for the purpose of assessing the safety of operations and suggesting any recommendations for safe operations in its annual reports.

I am writing to let you know the next public meeting of the DCISC will be held on Wednesday and Thursday, February 7-8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility in Avila Beach, California. A draft agenda for the meeting is attached.

Since the last public meeting of the DCISC in October 2017, as you know, the Commission approved the retirement of PG&E’s Diablo Canyon Nuclear Power Plant (DCPP) in Decision 18-01-012 issued on January 11, 2018. The Decision orders PG&E to retire Unit 1 no later than by 2024 and Unit 2 no later than 2025, and it also addresses a number of related issues in connection with the cessation of generation operations by DCPP.

At the DCISC’s October 2017 meeting the matter of whether the DCISC might continue to review activities related to post-shutdown decommissioning of the power plant, including but not limited to the cooling, transfer and storage of highly radioactive spent fuel, was raised by several persons. Discussion of that matter has been placed on the agenda for February 8 under Agenda Item XX and, on behalf of DCISC Members, an invitation is cordially extended to you to attend the meeting and to share any concerns, recommendations or suggestions regarding a continuing role for the DCISC during the decommissioning period following termination of generation operations at DCPP, or other issues related to decommissioning activities or within the DCISC’s purview.

Should you be unable to attend, the DCISC Members would welcome receiving any comments you might wish to provide. Comments may be emailed to the Committee at info@dcisc.org or mailed to the Office of the DCISC Legal Counsel, 837 Casa Street, Suite D, Monterey, CA 93940. All comments received will be provided to the Members for their consideration and will become part of the DCISC’s public record.

Each public meeting of the DCISC is livestreamed on the internet and the discussions during the February 7-8, 2017 meeting may be accessed through a link on the DCISC’s website http://www.dcsic.org or through www.youtube.com. DCISC public meetings are also archived on the internet, indexed to the meeting agenda, and may be accessed at the above websites. Information on the DCISC and its Members and on various topics related to DCPP is available on its website, as are the dates for its future public meetings.

Please let me know if you plan to attend the February 2018 public meeting and if you would like to address the DCISC on any topic and I will ensure that sufficient time is reserved for your remarks.

Sincerely,

Robert Ralbo
AICD, DCISC Legal Counsel
(800) 439-6888
info@dcisc.org

G.2 – 443

Dear Shelly -

I was excited visiting with you a while ago at Gloria Soares’ birthday bash at the Vintage Press. For a while there I wasn’t sure if the guest of honor was going to actually make an appearance, and I thought it was all of George’s considerable persuasive skills and logic to get Gloria to join the party.

The Diablo Canyon Independent Safety Committee is one of our firm’s long-time clients and as you know with the plant not slated to close by 2025 (would be earlier) there’s considerable uncertainty for the future. I thought you might have an interest in attending our next meeting which is scheduled for the hospitable environs of Avila Beach.

A bit of background, at DCISC was established by the California Public Utilities Commission as part of a Settlement Agreement entered into in June 1988 between the DRA, the Attorney General and PG&E. Its three members are appointed by the Governor of the State of California, the Attorney General and the Chairperson of the California Energy Commission, respectively. The Committee’s charge is to review Diablo Canyon operations for the purpose of assessing the safety of operations and suggesting any recommendations for safe operations in its annual reports.

The next public meeting of the DCISC will be held on Wednesday and Thursday, February 7-8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility in Avila Beach, California. A draft agenda for the meeting is attached.

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At the DCISC’s October 2017 meeting the matter of whether the DCISC might continue to review activities related to post-shutdown decommissioning of the power plant, including but not limited to the cooling, transfer and storage of highly radioactive spent fuel, was raised by several persons. Discussion of that matter has been placed on the agenda for February 8 under Agenda Item XX and, on behalf of DCISC Members, an invitation is cordially extended to you to attend the meeting and to share any concerns, recommendations or suggestions regarding a continuing role for the DCISC during the decommissioning period following termination of generation operations at DCPP, or other issues related to decommissioning activities or within the DCISC’s purview.

Please let me know if you plan to attend the February 2018 public meeting if you would like to address the DCISC on any topic and I will ensure that sufficient time is reserved for your remarks.

Sincerely,

Bob Ralbo
AICD, DCISC Legal Counsel
(800) 439-6888
info@dcisc.org

G.2 – 444

G.2 – 445
Dear David,

I want to let you know that the next public meeting of the Diablo Canyon Independent Safety Committee (DCISC) will be held on Wednesday and Thursday, February 7-8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility in Avila Beach, California. A draft agenda for the meeting is attached.

Since the last public meeting of the DCISC in October 2017, as you know, the California Public Utilities Commission approved the retirement of PG&E’s Diablo Canyon Nuclear Power Plant (DCCPP) in Decision 18-01-022 issued on January 11, 2018. The Decision orders PG&E to retire Unit 1 no later than by 2024 and Unit 2 no later than 2025, and it also addresses a number of related issues in connection with the cessation of generation operations by DCCPP.

At the DCISC’s October 2017 meeting the matter of whether the DCISC might continue to review activities related to post-shutdown decommissioning of the power plant, including but not limited to the cooling, transfer and storage of highly radioactive spent fuel, was raised several times. Discussion of that matter has been placed on the agenda for February 8 under Agenda Item XX and, on behalf of DCISC Members, an invitation is cordially extended to you to attend the meeting and to share any comments, recommendations or suggestions regarding a continuing role for the DCISC during the decommissioning period regarding termination of generation operations at DCCPP, or other issues related to decommissioning activities or within the DCISC’s purview.

Should you be unable to attend, the DCISC Members would welcome receiving any comments you might wish to provide. Comments may be emailed to the Committee at info@dcisc.org or mailed to the Office of the DCISC Legal Counsel, 857 Cans Street, Suite D, Monterey, CA 93940. All comments received will be provided to the Members for their consideration and will become part of the DCISC’s public record.

Each public meeting of the DCISC is broadcast live on the internet and the discussions during the February 7-8, 2017 meeting may be accessed through a link on the DCISC’s website at http://www.dicsc.org or through www.dinsp.org. DCISC public meetings are also archived on the internet, indexed to the meeting agenda, and may be accessed at the above websites. Information on the DCISC and its Members and on various topics related to DCCPP is available on its website, at the dates for its future public meetings.

Please let me know if you plan to attend the February 2018 public meeting and if you would like to address the DCISC on any topic and I will ensure that sufficient time is reserved for your remarks.

Also want to thank you for all the hard work you put in for the nomination process. Much appreciated I know by our Members,

I hope 2018 is starting out to be a good year for you,

Sincerely,

Bob Rathie
Amt. DCISC Legal Counsel
(805) 436-6688
info@dcisc.org

G.2 – 447

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Dear Craig,

I want to thank you again for attending the October public meeting of the Committee and addressing remarks to the Members on Congressman Cahnful’s behalf. I know our Members appreciated hearing from you. I am writing now to let you know that the next public meeting of the Diablo Canyon Independent Safety Committee (DCISC) will be held on Wednesday and Thursday, February 7-8, 2018, at the Avila Lighthouse Suites Point San Luis Conference Facility in Avila Beach, California.

Since the last public meeting of the DCISC in October 2017, the California Public Utilities Commission approved the retirement of PG&E’s Diablo Canyon Nuclear Power Plant (DCCPP) in Decision 18-01-022 issued on January 11, 2018. The Decision orders PG&E to retire Unit 1 no later than by 2024 and Unit 2 no later than 2025, and it also addresses a number of related issues in connection with the cessation of generation operations by DCCPP.

At the DCISC’s October 2017 meeting the matter of whether the DCISC might continue to review activities related to post-shutdown decommissioning of the power plant, including but not limited to the cooling, transfer and storage of highly radioactive spent fuel, was raised several times. Discussion of that matter has been placed on the agenda for February 8 under Agenda Item XX and, on behalf of DCISC Members, an invitation is cordially extended to you to attend the meeting and to share any comments, recommendations or suggestions regarding a continuing role for the DCISC during the decommissioning period following termination of generation operations at DCCPP, or other issues related to decommissioning activities or within the DCISC’s purview.

Should you be unable to attend, the DCISC Members would welcome receiving any comments you might wish to provide. Comments may be emailed to the Committee at info@dcisc.org or mailed to the Office of the DCISC Legal Counsel, 857 Cans Street, Suite D, Monterey, CA 93940. All comments received will be provided to the Members for their consideration and will become part of the DCISC’s public record.

Each public meeting of the DCISC is broadcast live on the internet and the discussions during the February 7-8, 2017 meeting may be accessed through a link on the DCISC’s website at http://www.dicsc.org or through www.dinsp.org. DCISC public meetings are also archived on the internet, indexed to the meeting agenda, and may be accessed at the above websites. Information on the DCISC and its Members and on various topics related to DCCPP is available on its website, at the dates for its future public meetings.

Please let me know if you plan to attend the February 2018 public meeting and if you would like to address the DCISC on any topic and I will ensure that sufficient time is reserved for your remarks.

Also want to thank you for all the hard work you put in for the nomination process. Much appreciated I know by our Members,

I hope 2018 is starting out to be a good year for you,

Sincerely,

Bob Rathie
Amt. DCISC Legal Counsel
(805) 436-6688
info@dcisc.org

G.2 – 449
Hello Denise and thanks for your assistance on the phone this morning.

Regarding Mr. Richard Beaud and his presence on the next tour...he is out of his office today, so I was unable to reach him for the details you required, but he will be available tomorrow and I will contact him in the morning.

Is this the email address to which I can return those details, or, because it involves a social security number (and concerns about internet security) should I simply call you with this information on Monday morning at the 800 phone number?

Thanks for all your help with this.

DAVID WEISMAN

On Jan 11, 2018, at 12:08 PM, Info@DCISC.org <info@dcisc.org> wrote:

David – receipt acknowledged and thank you for sharing the ANR press release with us.

Looking forward to seeing you in February for the tour and at the public meeting.

Best regards,

Bob Ruslie

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Info@DCISC.org

From: Info@DCISC.org
Sent: Thursday, January 11, 2018 12:08 PM
To: "David Weisman"
Cc: petersen@me.com; Bob Ruslie; petersen@me.com; info@dcisc.org
Subject: RE: Alliance for Nuclear Responsibility press release on CPUC Diablo Decision

David – receipt acknowledged and thank you for sharing the ANR press release with us.

Looking forward to seeing you in February for the tour and at the public meeting.

Best regards,

Bob Ruslie

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From: David Weisman [mailto:davidpweisman@gmail.com]
Sent: Thursday, January 11, 2018 11:45 AM
To: info@DCISC.org
Cc: petersen@me.com; Bob Ruslie; petersen@me.com
Subject: Alliance for Nuclear Responsibility press release on CPUC Diablo Decision

See attached statement of the Alliance re: today’s CPUC decision affirming plan to retire Diablo Canyon,

The DCISC is referenced in our press release.

DAVID WEISMAN
Outreach Coordinator

Alliance for Nuclear Responsibility

P.O. Box 1234
San Luis Obispo, CA 93406

(805) 704-1910 cell
davidpweisman@gmail.com
www.4nrc.org
January 11, 2018

CPUC ISSUES DECISION AFFIRMING JOINT PROPOSAL TO CLOSE DIABLO CANYON NUCLEAR PLANT

The CPUC today voted to approve the Joint Proposal to retire the Diablo Canyon Nuclear Power Plant. The Alliance for Nuclear Responsibility (A4NR) was one of the original parties to the proposal, first announced in June 2016.

"With today's historic vote, the Commission approves PG&E's plan to cease operation of Diablo Canyon no later than 2025," commented A4NR Executive Director Rochelle Becker, adding, "Achieving this milestone was aligned with the mission of A4NR."

Not all the provisions of the Joint Proposal were approved in the final decision. With regard to the issue of worker retention, Ms. Becker noted that it would have benefited the Commission to consider the sober advice of the CPUC's own Diablo Canyon Independent Safety Committee (http://4.nm.gov/p=3903). "Sadly, the CPUC does not seem to have instilled the lessons learned from the abrupt closure of the San Onofre reactors five years ago, particularly with regard to local area impacts."

As ratepayer advocates, A4NR was pleased to spearhead a Settlement Agreement within the Joint Proposal that reduced by more than two-thirds the amount of money PG&E had requested for their shortened effort to relicense the reactors for 20 additional years. A4NR intervened at the CPUC in 2010 to oppose PG&E's request. "We believed it was premature and imprudent at the time," stated Becker, "and are glad that ratepayers will finally see some relief from this ill-fated venture."

As well, A4NR and PG&E also reached an agreement under which PG&E will review all pending capital projects at Diablo to consider whether any should be cancelled in light of the plant's imminent retirement. If any projects are cancelled, PG&E has agreed to waive rate recovery for a substantial portion of the costs incurred to date.

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Appendix A – List ofAppearances

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Decision 18-01-022 January 11, 2018

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA


Application 16-08-006

(See Appendix A for Appearances)

DECISION APPROVING RETIREMENT OF DIABLO CANYON NUCLEAR POWER PLANT

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DETAILED APPROVAL RETIREMENT OF DIABLO CANYON NUCLEAR POWER PLANT

Summary

Pacific Gas and Electric Company (PG&E) proposes to retire the Diablo Canyon Power Plant in 2024 and 2025, when its federal Nuclear Regulatory Commission operating licenses expire. PG&E requests Commission approval to recover in rates over $1.76 billion in costs associated with the retirement of Diablo Canyon. Those costs include $1.3 billion for energy efficiency procurement to partially replace the output of Diablo Canyon, $363.4 million for Diablo Canyon employee retention and retraining, $85 million for a Community Impacts Mitigation Program, $18.6 million in costs previously incurred for its Nuclear Regulatory Commission license renewal process, and an unspecified amount for cancelled capital projects. (PG&E Opening Brief at i-ii.)

This order approves PG&E’s proposal to retire Diablo Canyon and approves $241.2 million in rate recovery for costs associated with the retirement of Diablo Canyon. Specifically, PG&E is authorized to recover in rates $222.6 million for employee retention and retraining, and $18.6 million for its license renewal activities, as well as a portion of the cost of cancelled capital projects. Rate recovery for the Community Impacts Mitigation Program requires legislative authorization. Replacement procurement issues will be addressed in the Integrated Resource Planning proceeding. This proceeding is closed.

1. Background

Pacific Gas and Electric Company’s (PG&E) Diablo Canyon nuclear power plant is located in coastal San Luis Obispo County, and consists of two units that have been operating since 1985 (Unit 1) and 1986 (Unit 2), with a combined generation capacity of 2,240 megawatts (MW). The units are currently licensed

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Morro Bay, San Luis Obispo, Arroyo Grande, Pismo Beach and Atascadero (filed jointly), California Solar Energy Industries Association, Sierra Club, Shell Energy North America (US), L.P., City of Lancaster, Friends of Wild Cherry Canyon, Central Coast Wave Energy Hub, The Utility Reform Network (TURN), World Business Academy, the Commission’s Office of Ratepayer Advocates (ORA), Sorrons Clean Power Authority, Marin Clean Energy, SolarCity Corporation, City and County of San Francisco, A4NR, Women’s Energy Matters (WEM), and the Green Power Institute.

Responses to PG&E’s application were filed by OhmConnect, Inc; San Luis Obispo Mothers for Peace, Inc; Mothers for Peace, Independent Energy Producers Association (IEP), South San Joaquin Irrigation District, Direct Access Customer Coalition, Alliance for Retail Energy Markets, Large-scale Solar Association, Energy Hub, CPower, Enernoc, Inc., Converge, Inc, California Energy Storage Alliance, San Luis Coastal Unified School District (School District), IBEW 1245, CCEU, Environmental Defense Fund, FCE, NRDC, Environment California, California Energy Efficiency Industry Council, Center for Energy Efficiency and Renewable Technologies (CEERT) and the County of San Luis Obispo (County). 2

The general timeline of the proceeding was:

August 11, 2016 – Application filed.
September 15, 2016 – Protests and Responses filed.
September 26, 2016 – PG&E Reply to Protests and Responses filed.
October 6, 2016 – Pre-hearing Conference held.

1 Some responses were filed jointly by multiple parties.

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October 20, 2016 – Public Participation Hearings held in San Luis Obispo.
November 16, 2016 – Scoping Memo and Ruling issued.
January 27, 2017 – Intervenor testimony served.
March 17, 2017 – Rebuttal testimony served.
April 19 – 27, 2017 – Evidence hearings held.
May 26, 2017 – Opening briefs filed.
September 14, 2017 – Public Participation Hearings held in San Luis Obispo.

On December 28, 2016, PG&E filed a joint motion requesting approval of a partial settlement between PG&E, the County of San Luis Obispo, the Cities of Arroyo Grande, Atascadero, Morro Bay, Paso Robles, Pismo Beach, and San Luis Obispo (collectively Local Cities), the School District, FCE, NRDC, Environment California, IBEW 1245, CCEU, and A4NR. The proposed settlement modified the Community Impacts Mitigation Program originally proposed by PG&E in its application.

On February 27, 2017, PG&E notified the parties that it was withdrawing its request for two of the three tranches of replacement procurement (and associated cost recovery) that it had proposed in its application, and that this change would be reflected in its rebuttal testimony.

On May 23, 2017, PG&E filed a joint motion requesting approval of a partial settlement between PG&E, A4NR, TURN, ORA, Mothers for Peace, FCE, NRDC, Environment California, IBEW 1245 and CCEU. This second proposed settlement modified PG&E’s original request for rate recovery of its NRC license renewal costs and its cancelled project costs.

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2. Issues Before the Commission

The Scoping Memo identified the following issues:

- Retirement of Diablo Canyon Power Plant
- PG&E has proposed to retire Diablo Canyon Unit 1 in 2024, and Unit 2 in 2025. Parties have proposed both earlier and later retirement dates. Parties may present testimony in support of PG&E's proposed dates, or earlier or later retirement dates, including indefinite dates.

Proposed Replacement Procurement
- PG&E has made a proposal for procurement of resources to partially replace Diablo Canyon’s output. Parties may present testimony supporting alternative procurement proposals, including proposals that all necessary replacement procurement should be addressed in this proceeding, that no replacement procurement should be addressed in this proceeding, or that some replacement procurement should be addressed in this proceeding.

Proposed Employee Program
- PG&E has proposed an employee retention, retraining and severance program associated with approximately 1,500 employees at Diablo Canyon. Parties have raised questions about the cost and funding of this program. Parties may present testimony on the need for this program and its size, cost, structure, timing and its source of funding.

Proposed Community Impacts Mitigation Program
- PG&E has proposed a community impacts mitigation program to mitigate some of the adverse economic impacts to the residents of San Luis Obispo County as a result of the planned retirement of Diablo Canyon. Parties may present testimony on the community impacts of the proposed retirement of Diablo Canyon, including economic and emergency response impacts, and on proposals to mitigate those impacts.

Recovery of License Renewal Costs
- PG&E has proposed that it be granted rate recovery for costs relating to license renewal activities, including the filing of a license renewal application with the federal NRC. Parties may present testimony on whether it is reasonable for PG&E to recover some or all of these costs in rates.

Proposed Rate-making and Cost Allocation Issues
- PG&E has requested rate recovery for the costs of its proposals, including costs of replacement procurement, its employee program and community impacts mitigation program, and its license renewal activities, as well as other costs relating to the operation of Diablo Canyon facilities. Parties may support or criticize PG&E’s proposed rate design and cost allocation, or may present alternative rate design and cost allocation proposals.

Additional Issues Not Addressed Above
- Parties may present testimony on issues that are within the general scope of the proceeding, as established by the record to date, that are not specifically addressed in the above sections.

The Scoping Memo determined that it was premature to address land use, facilities and decommissioning issues, and that specific recommendations on those issues would not be considered at this time, but parties were allowed to present testimony recommending how to best preserve these issues for future consideration.

3. Discussion and Analysis

3.1. Retirement of Diablo Canyon Power Plant
- PG&E proposes to retire Diablo Canyon upon the expiration of its NRC licenses, which expire on November 2, 2024 for Unit 1 and August 26, 2025 for Unit 2. (Ex. PG&E-1 at 2-1.) PG&E’s forecasts and analysis indicates that in the near future there will be a significantly reduced need for electric generation from Diablo Canyon. (PG&E Opening Brief at 11-13.) Because of projected increases in energy efficiency, distributed generation, renewable generation, and customers moving to community choice aggregation (CCA) and direct access, PG&E’s conclusion is that there is simply less of a need for Diablo Canyon. (Id.) In fact, PG&E believes that the continued operation of Diablo Canyon beyond 2025 would exacerbate over-generation, requiring curtailment of renewable generation. (Id. at 16-17; Ex. PG&E-1 at 2-20.) PG&E’s analysis indicates that there is no need to replace Diablo Canyon in order to maintain system reliability. (Transcript Vol. 6 at 697-698.)

PG&E has been unequivocal that the retirement of Diablo Canyon will not have an adverse impact on local reliability. According to PG&E, because Diablo Canyon’s output is exported on the bulk transmission system, Diablo Canyon is considered a system resource only, and is not needed for local reliability.

DCPP [Diablo Canyon Power Plant] is located in the Los Padres area of PG&E’s service territory, which includes the cities of: San Luis Obispo, Divide, Santa Maria, Mesa, Templeton, Paso Robles, and Atascadero. [...]. Most of DCPP’s generation is exported to the north and east of the Los Padres division through 500 kilovolt (kV) bulk transmission lines, which includes a transmission connection between the Diablo Canyon and Midway substations. [fn. omitted] Los Padres customer demand is served through a network of 115 kV and 76 kV circuits and does not include DCPP as part of the local installed generation capacity as DCPP does not serve load within the division. As such, DCPP is not needed for local reliability. Unlike San Onofre Nuclear Generating Station, DCPP is considered as a system resource only and is not needed to provide support for local reliability. (Ex. PG&E-1 at 2-20 to 2-21; see also PG&E Opening Brief at 17.)

A number of parties support PG&E’s determination that Diablo Canyon is not needed; in addition to the parties supporting the Joint Proposal, other parties also agree that it is appropriate to retire Diablo Canyon:

IEP concurs with PG&E’s decision not to renew the licenses of the two units of the Diablo Canyon Power Plant. Replacement resources that are both less expensive and better able to fit the needs of PG&E’s customers and the electric grid are available. (IEP Opening Brief at 7.)

TURN’s economic analysis demonstrates that ratepayers would benefit from retiring Diablo Canyon and satisfying customer needs with incremental renewable resources. This analysis, along with the recognition that continued operations at Diablo Canyon involve the potential for a catastrophic accident or unexpected premature shutdown, affirms the reasonability of PG&E’s decision to permanently retire the plant by 2025. (TURN Opening Brief at 2.)

The City of San Francisco supports shutting down Diablo Canyon, and states:

PG&E has persuasively demonstrated that Diablo Canyon is a no longer a good fit for PG&E’s hundreds of customers. PG&E has shown that Diablo Canyon should be closed because of the high cost of operating Diablo Canyon, potential regulatory requirements regarding the once-through cooling technique used by Diablo Canyon, and system over-generation problems related to Diablo Canyon.
Canyon’s constant operation, [fn omitted] PG&E showed also that continued operation of Diablo Canyon is a bad fit in the context of California’s goal of reducing GHG [greenhouse gas] emissions in part by increasing use of renewable energy resources. This is because Diablo Canyon is a baseload, relatively inelastic resource that would exacerbate overgeneration and would result in curtailment of renewable resources. PG&E also admits that Diablo Canyon is no longer necessary for reliability. [fn omitted]

PG&E also projects that its load will shrink considerably by the time Diablo Canyon closes. Between 2017 and 2025, PG&E forecasts that approximately 20,000 GWH [gigawatt hours] of load will migrate to CCAVs. [fn omitted] This is comparable to the amount of bundled customer load (18,300 GWh) Diablo Canyon currently serves. In PG&E’s own words “whether CCA loads depart somewhat sooner or later than expected does not change the overall conclusion that DCPP is not needed for PG&E’s customers after the expiration of the Nuclear Regulatory Commission licenses in 2024 and 2025.”

[fn omitted] (City and County of San Francisco Opening Brief at 3.)

Other parties, while not actively supporting PG&E’s proposal, do not oppose it, including: ORA (ORA Opening Brief at 4); Alliance for Retail Energy Markets, the California Clean DG Coalition, CLECA, the Direct Access Customer Coalition, the Energy Users Forum, Marin Clean Energy, Peninsula Clean Energy, Silicon Valley Clean Energy Authority, and Sonoma Clean Power Authority (Joint Opponents Opening Brief at 2).

1 Elsewhere, however, ORA states: "ORA supports PG&E’s proposed retirement of the DCPP units at the end of their respective operating license periods in 2024 and 2025." (Ex. ORA-2 at 1)

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reliability. [fn omitted] It can be retired without impacting grid reliability.”

[fn omitted] (Joint Opponents Opening Brief at 3.)

CCNPs reliability argument also appears to assume that Diablo Canyon could operate as a flexible resource that could ramp up and down to meet changing daily demand, rather than how it has been operated, as a constant-level baseload resource. (CCNP Opening Brief at 41) PG&E points out that this is a speculative and unrealistic assumption, and would make Diablo Canyon even less cost effective:

Operating in load-following mode would take Diablo Canyon outside of the currently authorized NRC license conditions and would require extensive technical feasibility studies, redesign of procedures, processes and systems, maintenance practices and nuclear fuel redesign. [...] It is unclear if Diablo Canyon could be retrofitted to safely and reliably operate in a different operating mode, whether the NRC would approve it, and whether it would be cost effective to do so given the reduction in capacity factor that would result if Diablo Canyon were to be frequently ramped down to minimum operating levels during the daytime hours when solar power is prevalent. (PG&E Reply Brief at 7.)

Finally, CCNP argues that retiring Diablo Canyon will make it “impossible” for the state to meet its GHG reduction goals, and accordingly it should be relicensed and kept available. (CCNP Opening Brief at 41-42.) CCNP claims that the retirement of Diablo Canyon would result in California importing large amounts of fossil fuel generated electricity from PacificCorp, (id.)

While the specific arguments made by CCNP are not well supported by the record, the GHG impact of Diablo Canyon’s retirement (and any replacement

2 In this mode Diablo Canyon would ramp up and down to meet daily variations in load.

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procurement) does need to be considered. This issue is discussed in more detail below in the section addressing replacement procurement, which finds that the question of the GHG impact of Diablo Canyon’s retirement should be addressed in the Commission’s Integrated Resource Planning (IRP) proceeding.

Two parties - WEM and Mothers for Peace - argue that Diablo Canyon should be shut down earlier than PG&E’s proposed 2024-2025 timeline. WEM argues that Diablo Canyon will become “commercially unreasonable” to operate well before 2024/2025, that replacement energy is already available before then, and given the risks associated with nuclear power, Diablo Canyon should be shut down no later than 2020. (WEM Opening Brief at 1-2.) Mothers for Peace similarly recommends a shutdown date of 2019/2020. (Mothers for Peace Opening Brief at 3.)

WEM and Mothers for Peace base their arguments in part upon the potential dangers of nuclear power. While this Commission has broad authority over PG&E and Diablo Canyon (including non-nuclear safety), the Commission’s authority over nuclear safety is less clear; accordingly, the Commission’s decision on this issue is not based on nuclear safety.

But the economics of Diablo Canyon can provide a basis for this Commission’s decision, and WEM and Mothers for Peace also argue that Diablo Canyon will be uneconomic to operate well before 2025, WEM points out that as PG&E’s bundled load decreases, more of Diablo Canyon’s output will need to be sold at a loss on the wholesale market, and that: “This foreseeable development will make continued operation of Diablo Canyon increasingly uneconomic and dysfunctional, and there will likely begin to happen before 2020, not 2025." (WEM Opening Brief at 12.)
Similarly, Mothers for Peace argues that Diablo Canyon costs are already high:

"[T]he costs of operating and maintaining Diablo Canyon are disproportionately high for the contribution the power plant makes to PG&E's electrical generation capacity and, therefore, further investment in the continued operation of Diablo Canyon is not a prudent economical capital expense for the utility." (id. at 8)

Mothers for Peace also raises the additional concern that PG&E will need to spend increasing amounts of money on maintenance and repair of Diablo Canyon due to its age, particularly because of the degradation of a number of major plant components. (Mothers for Peace Opening Brief at 6-9.)

WEM and Mothers for Peace raise valid concerns about the current cost of operating Diablo Canyon, and the potential for significant costs that could be incurred between now and 2024/25, but those concerns cannot be considered in isolation. While shutting down Diablo Canyon in 2019/2020 would likely provide some cost savings, it would also provide less time for replacement procurement to be considered in the IRP proceeding and for the development and deployment of additional greenhouse gas-free resources. These factors are difficult to balance, as we cannot forecast with certainty the precise growth of CCAs, the deployment of greenhouse gas-free resources, or the near-future costs of operating Diablo Canyon. For example, WEM argues that a foreseeable range of utility bundled sales:

"[R]esults in a similar—or potentially much less—bundled load for PG&E in 2020 as PG&E projects for 2025. Therefore it is likely that constraints on the need for Diablo Canyon will arise by 2020, and..."

An early shutdown would also accelerate the impacts on plant employees and the local community.

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allocation mechanisms, (CEERT Opening Brief at 7, emphasis in original.)

IEP similarly argue that PG&E should immediately be directed to do an “all-source” solicitation in order to take advantage of federal tax credits for renewable generation projects that are expected to expire or decline in the near future. (IEP Opening Brief at 1-2, 11-12.)

Other parties recommend that the Commission NOT authorize any replacement procurement in this proceeding, but instead advocate that the Commission should do a need analysis (and any resulting authorization) in the IRP proceeding. Those parties include Shell:

The appropriate forum for consideration of all Diablo Canyon replacement procurement, including PG&E's proposed first “tranche” of procurement, is the IRP proceeding. Ex. Shell-L at pp. 4-7 (Dyck). SB 350 provides that the investor-owned utilities’ (“IOUs”) procurement planning decisions must be made in the context of a comprehensive planning process. [fn omitted] PG&E's proposal in this proceeding, to replace a portion of Diablo Canyon energy output with energy efficiency, interferes with the Commission's ability to establish a comprehensive procurement strategy for PG&E in the IRP proceeding. (Shell Opening Brief at 2 3.)

ORA makes a similar argument as well:

In its testimony, ORA recommended that no replacement procurement be addressed in this proceeding. ORA continues to make that recommendation since PG&E has not withdraw its 'Tranche #1 proposal, and other parties may seek Commission approval of the Tranche #2 and #3 proposals even though PG&E has withdrawn them.

As ORA noted in its testimony, R.16-02-007, the Commission’s Integrated Resource Planning and Long-Term Procurement Planning rulemaking (“Integrated Resource Planning proceeding”) would be addressed in the IRP proceeding and not the ROA proceeding.

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procurement of just EE, as proposed in Tranche 1, may worsen overgeneration issues. (Joint Opponents Opening Brief at 4-5, fn. omitted.)

ORA similarly opposes PG&E's request for $1.3 billion in customer funding for its Tranche #1 EE procurement proposal and associated shareholder incentive payments. According to ORA:

PG&E fails to demonstrate that its requested Tranche #1 procurement, which is an increase of more than 50% of the currently-identified energy efficiency potential, would be cost effective. (ORA Opening Brief at 10.)

As ORA points out, PG&E is already required under California’s leading order for energy resources to first meet its resource needs through “all available energy efficiency resources that are cost effective, reliable, and feasible.” (Id., quoting Pub. Util. Code § 454.5(b)(9)(C)(I).) According to ORA, PG&E has acknowledged that in Decision (D.) 15-10-028, the Commission set a goal for PG&E to procure all cost-effective and feasible EE for the years 2016-2024. For 2018-2024, the period corresponding to the Tranche #1 procurement proposal, that goal is a total of 3,741 gross GWh savings. (Id., citing Exs. PG&E-1, at 4-3, Table 4-1, lines 3-9.)

ORA concludes:

Yet, PG&E's Diablo Canyon application proposes to procure an additional 2,000 gross GWh installed in its service territory in the same period 2018-2024. [fn. omitted] This represents an increase of 53.5% over currently approved goals for the years 2018-2024. Such a substantial increase in the EE potential is only possible by lowering the Commission's threshold criteria for cost-effectiveness. Lowering the cost-effectiveness standards would burden customers with the cost of Energy Efficiency measures that provide insufficient value to qualify under current standards. (ORA Opening Brief at 11.)

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is the appropriate Commission proceeding to address all replacement procurement associated with the closure of the Diablo Canyon units. [...] PG&E will be required to perform portfolio optimization as part of its IRP in 2017. PG&E has likely included Energy Efficiency as part of its proposed preferred resources portfolio. The correct, optimized levels of these resources will be determined in the Commission’s IRP system plan.

PG&E’s proposal for replacement procurement outside of the IRP portfolio optimization process creates the potential for over-procurement in PG&E’s service territory, thereby leading to higher costs for customers and resulting in a sub-optimal resource plan. (ORA Opening Brief at 4-5, fn. omitted.)

In addition to arguments that replacement procurement should be addressed in the IRP proceeding rather than here, a number of parties argued that PG&E's remaining Tranche 1 proposal itself was flawed:

TURB supports PG&E's intention to dramatically scale up its procurement of cost-effective EE (energy efficiency). However, as shown in TURB's testimony and explained below, PG&E has not met its burden of demonstrating that its Tranche 1 proposal offers the right mechanism through which to do that. [fn omitted] In sum, Tranche 1 suffers from three fundamental design flaws: it may not be feasible, it does not ensure that the EE savings will be additional to the savings that would otherwise occur, and it does not ensure that the EE savings will still be available when Diablo Canyon comes offline. Moreover, the notion of a major EE procurement outside of PG&E's existing EE portfolio and its new EE Business Plan is ill-conceived, and PG&E has not demonstrated that the benefits of this separate procurement will exceed the costs. (TURB Opening Brief at 20.)

While acknowledging that Tranche 1 may exacerbate conditions of overgeneration and renewable curtailment, PG&E and the other Joint Parties fail to address: (PG&E witness Strauss agreed that

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EPUC makes a similar argument:

While labor unions, local governments, environmental organizations and shareholders all receive first, defined benefits, there are no benefits and no protections for ratepayers. Instead they should greater uncertainty and risks, and the revenue consequences as those uncertainties are resolved. These include:

• whether any replacement of DCCP’s output is needed;
• whether, if ever, that replacement should be procured;
• whether the quantity of energy efficiency (EE) to be procured in Tranche 1 is feasible and whether it will be cost-effective, and
• whether the authorization of the Tranche 1 procurement will conflict with and potentially impair the targets of the Rolling, Portfolio Business Plans filed by PG&E and the other utilities. [fn omitted] The risk that all cost effective EE will have been procured through the Business Plan and each of its annual updates, and that any EE authorized in this docket will be more expensive and take rates inefficiently. (EPUC

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avoid any increase in greenhouse gas emissions resulting from the closure of Diablo Canyon. Given the time between now and 2024 and 2025, the rapid changes in the California electricity market, and the growth of renewable generation and CCAs, however, it is not clear based on the limited record in this proceeding what level of GHG-free procurement (if any) may be needed to offset the retirement of Diablo Canyon.

The IRP proceeding, however, is better equipped to make that determination. The IRP is supposed to incorporate the analysis leading to an optimized portfolio of resources, reflecting constraints such as GHG emissions, reliability, cost, and RPS and energy efficiency requirements, while ensuring safe and reliable electricity service at just and reasonable rates. (R., 16-02-007 at 13.) In short, the IRP has the ability to look at a bigger picture than this proceeding, and can better analyze the potential impacts of the retirement of Diablo Canyon and its interaction with other dynamics in the electricity markets in a manner consistent with state policies. PG&E’s previous Tranche 2 and 3 proposals would better be considered in the IRP proceeding.

Overall, practical and policy reasons indicate that it is better for potential replacement procurement issues to be addressed in the Commission’s IRP process, rather than addressing it in a more piecemeal fashion in this proceeding. Accordingly, the need for and authorization of any replacement procurement should be addressed in the IRP proceeding.6

3.3. Proposed Employee Program
PG&E proposes to implement an employee retention, severance and retraining program for its Diablo Canyon employees, and requests three related approvals from the Commission:

[1]. Recover $352.1 million in costs associated with retaining approximately 1,600 employees at Diablo Canyon to ensure the plant’s continued safe and efficient operation through the end of each unit’s license in 2024 and 2025, respectively, over a 7-year period through an annual expense-only revenue requirement of $80.9 million beginning January 1, 2018 through December 31, 2024 through the Nuclear Decommissioning Non-Reypassable Charge (NDNRC).

[2]. Implement the Employee Severance Program and authorize PG&E to continue to forecast and recover the cost of the Employee Severance Program in each subsequent Nuclear Decommissioning Cost Triennial Proceeding (NDTCP).

[3]. Recover $11.3 million in costs associated with retaining eligible employees at Diablo Canyon and to recover these costs over a 5-year period through an annual expense-only revenue requirement of $2.3 million from January 1, 2021 through December 31, 2025 through the NDNRC. (PG&E Opening Brief at I.)

Starting with the last one, the retraining of Diablo Canyon employees is intended to support the placement of Diablo Canyon employees who are interested in transitioning to other employment roles within PG&E as a result of the retirement of Diablo Canyon. (Ex. PG&E 1 at 7-8.) While the precise components and details of this program have not been determined, PG&E identifies possible elements of the program, including support for an internal

PG&E job search, limited wage protection, professional and technical training and relocation assistance. (id.)

PG&E forecasts the cost of the retraining program to be approximately $11.3 million, to be recovered through the NDNRC. (id. at 7-11.) PG&E also requests a new two-way expense-only subaccount (the Employee Retraining Program Subaccount) within the existing Diablo Canyon Retirement Balancing Account.

The proposed retraining program is directly related to the retirement of Diablo Canyon, and the cost of the program is recoverable in rates through the NDNRC. (Pub. Util. Code sections 8322(g) and 8330.) PG&E’s request for the retraining program, the new two-way expense-only subaccount, and associated rate recovery through the NDNRC is approved.

PG&E has in place an Employee Severance Program, which provides payments of specified amounts to employees whose jobs will be eliminated upon the closure of Diablo Canyon. (Ex. PG&E 1 at 7-9.) The Employee Severance Program is directly related to the decommissioning of Diablo Canyon, and $140 million in estimated costs for the program are already incorporated into PG&E’s decommissioning estimate. (Ex. PG&E 1 at 7-11.)

PG&E does not request rate recovery for the severance program in this proceeding, as the forecast and recovery of costs are being addressed in PG&E’s NDCP. (id.) A severance program for Diablo Canyon employees is appropriate in light of the plant’s pending retirement, and the cost and ratemaking for that program should continue to be addressed in PG&E’s nuclear decommissioning proceeding.

In response, PG&E argues that the retention program is related to the retirement of the plant, as absent that there would not be a need for the retention plan:

The retention program is part of the operating costs of the plant, incurred to ensure there are qualified employees to continue to operate the plant. As Ms. King testified, it has been a regular practice in the past to increase wages of plant employees to retain them. [fn. omitted] Such operating costs have been, and should continue to be, recovered through the energy rates charged to bundled customers, who benefit from the operation of the plant. (EPUC Reply Brief at 6.)

At the same time, however, PG&E acknowledges that it intends to continue to operate Diablo Canyon for almost a decade before it plans to actually retire the plant. (Ex. PG&E 1 at 7-9.) Looking at PG&E’s proposal, it appears to confirm that EPUC’s position is correct: PG&E is proposing to keep operating Diablo Canyon until 2024/2025, and is proposing the retention program for the purpose of keeping the plant operating, not for the purpose of shutting it down. (PG&E Reply Brief at 49.) This is further reinforced by the fact that the retention program ends on August 31, 2023, but the plant will not completely retire until

6 PG&E’s cost estimates used a headcount of 1,661. (Exhibit PG&E 1 at 7-6.)
2025. (Ex. PG&E-1 at 7-4.) Accordingly, rate recovery for the employee retention plan should come through the existing ratemaking treatment for the operation of Diablo Canyon, not through the NDNBC.

In addition, there are problems with the design and the resulting cost of PG&E’s proposal. PG&E, with the support of the Joint Parties, proposes to pay retention bonuses to every employee of the plant who continues to work through specified time periods. PG&E proposes two “tiers” of retention payments. Tier 1 would run from September 1, 2016 through August 31, 2020, would provide a retention payment to each employee of 25% of the employee’s base salary at the end of each of the four years, and would cost $191.6 million. Tier 2 would run from September 1, 2020 through August 31, 2023, would provide a retention payment to each employee of 25% of the employee’s base salary at the end of each of the three years, and would cost $160.5 million. (Ex. PG&E-1 at 7-4 and 7-6.) PG&E’s estimated $352.1 million cost for the retention plan assumes that approximately 1,500 employees would be retained until August 31, 2023. (Id. at 7-6.)

ORA and CGNP oppose PG&E’s employee retention program as proposed. ORA argues that ratepayers should not pay for the $191.6 million cost of Tier 1, but generally supports rate recovery for the $160.5 million cost of Tier 2. (ORA Opening Brief at 25.) CGNP argues that the entire retention program is unnecessary (CGNP Opening Brief at 14-17), but does note that retention payments may be necessary for a very limited set of hard-to-fill positions. (Id. at 15.)

PG&E’s proposal appears to have a significant “free rider” problem that PG&E does not address, and as such the proposal is overly generous with ratepayer funding. The approximately 1,500 employees eligible to receive the

employees consist of 63% of the 1458 regular Diablo employees, and it is highly unlikely that they would be eager to leave when they could continue to work towards retirement. Older workers face well-known difficulties in finding new employment, thus given the choice of transferring within PG&E vs. a severance package if their job was eliminated, there would be little incentive for employees to leave voluntarily. (CGNP Opening Brief at 15.)

In another area where there is a paucity of analysis, PG&E does not address how many employees would continue to work at Diablo Canyon after its retirement, on tasks such as decommissioning, nuclear fuel storage, maintenance and security. In fact, PG&E states that it does not currently know how many employees it expects will remain at Diablo Canyon after its retirement, (Ex. PG&E-6 at 74.) Because these employees would have continuing employment after the plant retires, they would presumably have less of an incentive to leave because of the retirement. But under PG&E’s proposal, all of these employees would still receive ratepayer-funded retention payments.

PG&E likewise does not address the potential employment prospects for nuclear power plant employees. PG&E cites to CCEC witness Dalzell for the argument that many Diablo Canyon employees are “high-skill, high-wage workers and would be attractive candidates for other jobs.” (PG&E Opening Brief at 46.) PG&E explains the basis for that argument:

The CCEC witness, Tom Dalzell, testified that based on his experience with decommissioning PG&E’s fossil fuel and geothermal generation facilities in the late 1990s, he was certain that absent an employee retention package, employees would find jobs outside of DCCP once a closure date was announced. (PG&E Opening Brief at 46.)

This is not a valid comparison; there are many more fossil fuel plants than there are nuclear plants, and the situation today is different from the diversion

of plants in the 1990s. A better comparison would be to look at the relative current and forecasted supply and demand of nuclear power plant jobs and experienced nuclear power plant employees. These factors have a significant impact on how likely Diablo Canyon employees will be to look for and obtain outside employment. PG&E did not present such an analysis in this proceeding. While there is certainly ratepayer benefit from Diablo Canyon being operated in a safe and reliable manner until its retirement, PG&E has failed to show that the amount of ratepayer dollars requested is necessary or reasonable. At the same time, the funding level recommended by ORA, while more reasonable from a ratepayer perspective, also lacks analytical support, ORA’s proposal does not adequately address the possible need for a retention payment in the earlier (Tier 1) years, nor does it consider the nature of Diablo Canyon’s workforce. As a result, while PG&E’s proposed retention payments appear to be too high, ORA’s may be too low.

Taking into consideration the benchmarking data, the presence of significant and pre-funded severance pay, the unique nature of the nuclear industry, and the extended payment period, a 15% per year retention payment level is reasonable. Accordingly, we authorize PG&E’s proposed employee retention program, but at an annual payment level of 15%, rather than 25%. This results in a maximum cost of $135 million for Tier 1, and a maximum cost of

Notes:
12 There may also be employees who would continue to work at Diablo Canyon only because of the retention payment, but are otherwise unhappy or uninterested in their job, so their retention would provide little or no benefit to ratepayers.

13 Not all ORA or CGNP. One commenter at a public participation hearing stated: “Given the current status of the nuclear industry, there is no need to pay Diablo Canyon employees an additional $302 million in order to retain them for the eight years in question. The industry is in serious decline.” (Transcript v. 9 at 1466.)

14 Significant amounts of Diablo Canyon employee data were put into the record in response to a Commission data request. (Ex. PG&E-6.)
96.3 million for Tier 2, for a total cost of $211.3 million. PG&E is authorized rate recovery for up to $211.3 million for its employee retention program.

Finally, it appears that PG&E (with the participation of at least some of its unions) has already executed retention agreements with its employees, presumably incorporating the payment levels proposed by PG&E in this proceeding. CCUE cites to these agreements, and the fact that 86% of IBEW 1245’s represented employees at Diablo Canyon have signed them, as showing that PG&E’s retention program is working. (CCUE Opening Brief at 13-14). CGNP, however, points out that: “[T]he 86% only means that workers will accept free money until such times as they may quit.” (CGNP Reply Brief at 10.)

The retention payments negotiated and agreed to by PG&E and its unions require funding from raters and, accordingly require Commission approval for their funding. At the time it entered into those agreements, PG&E did not have authority to make the payments that the agreements (appear to) promise. This puts the Commission in the position of potentially saying “no” to PG&E’s proposal, while the employees may already be thinking that the answer is “yes.” PG&E should not be making promises (even implied ones) to its employees that it does not know it can keep.

3.4. Proposed Community Impacts Mitigation Program

In its Application, PG&E proposed a Community Impacts Mitigation Program (CIMP), which was described as follows:

12 of 476 represented employees.

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District, including $10 million dedicated to an educational foundation designated by the School District. (Joint Motion re Settlement on Community Impacts at 56.)

In addition to the $75 million ESFM, the proposal includes another $10 million “Economic Development Fund” (EDF). Of that $10 million, $4.24 million would go to the County, and $5.76 million would go to the six Local Cities. The County would then allocate $192,000 to the City of Grover Beach, which is not a party to this proceeding. (Id. at Appendix 2, Attachment A.)

It is uncontested that the retirement of Diablo Canyon would result in reduced local tax revenues and a loss of well-paying jobs, with a corresponding potential for significant adverse economic impacts on the local area. The question before this Commission is not whether there will be economic impacts, or even the potential size and scope of those impacts, but rather whether PG&E raters should pay to mitigate those impacts.13

The parties presented a range of policy and legal arguments on this issue. The policy arguments focus on issues of fairness: who benefited from Diablo Canyon, who bore the costs and risks of Diablo Canyon’s operation, and who should bear the costs and risks of the plant’s retirement. (See, e.g., County Opening Brief at 1-3, 16-17; TURN Opening Brief at 43-44.) While it is reasonable for this Commission to consider whether the proposed payment to the community is fair, the Commission must also consider whether that payment is legal.

12 The economic impacts of the retirement of Diablo Canyon are to be studied pursuant to Pub. Util. Code § 7125, enacted in 2016.

13 Existing support for local emergency services provided through PG&E rates is not at issue in this proceeding, and remains in effect.

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Diablo Canyon is one of the largest employers, taxpayers, and charitable contributors in the San Luis Obispo County area. Diablo Canyon currently contributes approximately $22 million in property taxes to the local community. With the retirement of Diablo Canyon, this could decline to zero by 2025. The Parties will support funding of continuing revenue streams to address community needs and concerns. PG&E will propose to compensate San Luis Obispo County for the loss of property taxes associated with the declining rate base in Diablo Canyon through a transition period ending in 2025. The payment in lieu of taxes will be recovered through nuclear decommissioning funding. PG&E estimates that the total cost of the Community Impacts Mitigation Program is approximately $49.5 million. As specified in Section 5.4.1, as a condition of the program, PG&E will recover the costs of the Community Impacts Mitigation Program through FPPC-approved rates for nuclear decommissioning. (PG&E Application, Attachment A (Joint Proposal) at 10-11.)

Later in the proceeding, PG&E entered into a proposed settlement with the County, the Local Cities and the School District, along with the original Joint Parties.14 This proposed settlement primarily addressed the Community Impacts Mitigation Program, with PG&E agreeing to increase the payment to the communities to a total of $85 million, compared to the prior $49.5 million. (Joint Motion re Settlement on Community Impacts at 2.)

Of the $85 million, $75 million is called an “Essential Services Mitigation Fund” (ESMF), and would be distributed to the County. That $75 million would be allocated by the County to local cities and districts based upon their 2015-2016 unitary tax allocations; approximately $36.6 million would go to the School

...
PG&E also gets another benefit: the support (or at least non-opposition) of
the settling parties for its other litigation positions. The settling parties agreed to:

[1] Support the Employee Program as proposed by PG&E in its
Application initiating this proceeding, and the County, the Cities,
and the District agree not to oppose or to take no position on the
remaining relief requested in PG&E’s Application, as modified by
the Agreement. (Joint Motion, December 26, 2016 at 2)

In short, this appears to be a very good deal for PG&E – it gains some
community goodwill, and gets support (or eliminates potential opposition) for its
litigation positions, and all at no financial cost.

The fairness to the community is less clear. While the proposed
settlement’s payment of $85 million is a clear benefit to the recipient community,
not all of that payment is allocated fairly. While the majority of the CIMP
appears to be allocated fairly (based upon historic unitary tax allocations), a
significant portion is earmarked for the County, Local Cities, and the School
District, which are parties to the proceeding and negotiated the proposed
payment with PG&E. This is particularly true of the $10 million IDF.

As a result, the amount and allocation of payments appear to have more to
do with PG&E’s litigation needs than the economic needs of the community.
While in general the community strongly supports the proposed settlement, the
allocation of payments to the affected communities does not appear to be fair,
and we cannot tell from the record whether the amount of the proposed payment
is fair. A clearer picture of the economic impacts on the community should be
available upon completion of the assessment required under Pub. Util. Code
§ 7125.

Finally, it is essential to consider whether the proposed settlement is fair to
PG&E’s ratepayers, who are being asked to pay the $85 million cost of the

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Accordingly, we have to analyze whether it is appropriate to substitute
ratepayers for taxpayers, which raises legal as well as policy issues.

The parties contesting this issue cite to Commission Resolution E-3535,
adopted in 1998, which addressed a similar issue, also for Diablo Canyon. The
parties are correct that Resolution E-3535 is on point here; but in order to
understand and apply the logic of Resolution E-3535, it is essential to consider
D.97-05-088, which led to the Commission’s adoption of Resolution E-3535. In
the proceeding leading to D.97-05-088, in the wake of electric restructuring:
The County of San Luis Obispo and the San Luis Coastal Unified
School District (County) seek protection against the risk that Diablo
Canyon-related property taxes will decrease precipitously and
jeopardize the ability of the County to provide basic public
and educational services. If the threat actually materializes, the County
wants to be made whole. By its recommendation, the County seeks
adoption by the Commission of a mechanism that insures that the
County has the opportunity to recover the property tax revenues
they had a reasonable expectation of receiving but for electric
restructuring. (D.97-05-088 at 91.)

In that proceeding, the Commission held that: “The County’s proposal
that ratepayers pay for property taxes that PG&E does not incur is not permitted
under either general rate-making principles or public utility law.” (Id. at 101.)
As a result, the Commission held that the County should direct its request for relief
to the Legislature, not the Commission. (Id.) In large part because the facts
presented in this proceeding are unusually aligned with those in D.97-05-088, the
Commission reaches the same result today.

Because the analysis set forth by the Commission in D.97-05-088 is directly
on point, we quote it here at length:

The County of San Luis Obispo and the San Luis Coastal Unified
School District (County) seek protection against the risk that Diablo
Canyon-related property taxes will decrease precipitously and
jeopardize the ability of the County to provide basic public
and educational services. If the threat actually materializes, the County
wants to be made whole. By its recommendation, the County seeks
adoption by the Commission of a mechanism that insures that the
County has the opportunity to recover the property tax revenues
they had a reasonable expectation of receiving but for electric
restructuring.

The County recommendation is that this Commission should:

• Find that $185 million (NIP in 1999 dollars) represents a
reasonable estimate of the potential difference between property tax
revenues that the County would have received from PG&E in the
absence of accelerated recovery of Diablo Canyon depreciation and
what the County could actually receive given restructuring,

• Order that the $185 million in potentially foregone property taxes
be collected by PG&E as CTC at a rate of $30.5 million per year
during the CTC recovery period and held in a separate, segregated
interest-bearing account until 2026.

• Order PG&E, starting in 1999 and continuing thereafter on an
annual basis, to withdraw funds from the segregated CTC account
and to remit to the County the difference between the estimated annual
tax payments based upon straight-line depreciation of Diablo Canyon
through the year 2026 and any amount of property taxes actually
determined [sic] to be due and payable by PG&E to the
County in each year, to the extent such actual taxes are less than the
estimated straight-line depreciation based property taxes.

The County asserts that adoption of its recommendation will
provide protection against the possibility that the County will
experience drastic reductions in property tax revenues as a direct
result of electric restructuring. If the risk of property tax reductions does not materialize or produces lower tax revenue losses than predicted, any excess amounts reserved for payment to the County will be returned to ratepayers.

The County contends that the evidence produced by it shows:

• that the County enjoys unique status by reason of long-standing, mutual commitments with PG&E relating to the location and operation of Diablo Canyon within the County;

• that electric restructuring, and PG&E’s related pricing proposal for Diablo Canyon in particular, create the real possibility that the County will suffer far greater negative consequences from restructuring than any other similarly situated stakeholder, primarily in the form of dramatic reductions in the level of otherwise expected property tax revenues to be received from PG&E;

• that the consequence for the County of any property tax revenue reductions resulting from PG&E’s Diablo Canyon pricing proposal includes severe reductions in essential public services available to the residents and schoolchildren of San Luis Obispo County;

• that the mutual commitments between the County and PG&E and, in particular, the County’s reliance on PG&E’s promises to provide identifiable economic benefits in exchange for siting and operating a nuclear generation facility within San Luis Obispo County, create an enforceable entitlement to a stable and predictable level of property tax revenues for the County throughout the projected operating life of Diablo Canyon; and

• that the difference between property tax revenues that the County would have received from PG&E in the absence of accelerated recovery of Diablo Canyon depreciation and what the County actually receives given implementation of electric restructuring is properly recoverable (by PG&E and payable to the County) [...].

This evidence, in the opinion of the County, leads to only one conclusion of law: It is consistent with law, policy, and the public interest for the Commission to adopt a mechanism that will provide a safety net for the County by ensuring that the County’s property tax receipts are unaffected by any accelerated depreciation of Diablo Canyon authorized by the Commission in conjunction with its initiative to restructure the state’s electric industry.

PG&E and ORA oppose the County. [...] In addition to the problems in predicting the actual impacts of restructuring on the County, PG&E asserts that the County’s proposal to recover lost property tax revenues is legally suspect. AB 1990 contains no explicit provision to allow utilities to recover costs or lost governmental revenues that they are not liable for but which are incurred by third parties, such as counties, under restructuring. In addition, as a general principle of ratemaking, utilities are not permitted to include in their cost of service payments which in fact they have not incurred or accrued, or forecast to incur, and which they have not become legally obligated to incur or accrue.

ORA states that the County has not cited any statute or rule that would support its position. ORA notes that there has never been any guarantee that Diablo Canyon property tax revenues would not decrease, even in the absence of electric restructuring and PG&E’s accelerated depreciation proposal. For example, if Diablo Canyon continued to perform at current levels in the future such that PG&E recovered more in revenues than intended under the original ratemaking settlement, the Commission could require a reduction in prices as was done in 1995, or the early termination of the ratemaking treatment. This would impact San Luis Obispo tax revenues, even in the absence of electric restructuring. In addition, nothing in the existing Diablo Canyon ratemaking treatment precludes the facility from shutting down, not just for catastrophic failure, but for economic reasons as well. Under such circumstances, regardless of electric restructuring, there would likely be no tax revenues for San Luis Obispo. [...] Most telling is ORA’s argument that San Luis Obispo would have to impose on ratepayers what is essentially a tax that is entirely unrelated to utility service. The County’s proposal that ratepayers pay for property taxes that PG&E does not incur is not permitted under either general ratemaking principles or public utility law. Section 451 of the PU Code requires: “All charges demanded or received by any public utility..., for any product or commodity furnished or to be furnished or any service rendered or to be rendered shall be just and reasonable, every unjust or unreasonable charge demanded or received for such product or commodity or service is unlawful.”

A utility cannot charge ratepayers costs that are unrelated to the provision of any product or commodity or service, and the Commission cannot lawfully order such charges. [fn. omitted]

However, ORA supports San Luis Obispo’s efforts to seek relief in a more appropriate forum. It is within the state’s powers, not the Commission’s, to levy taxes and to disturb tax revenues. [...] The arguments of PG&E and ORA are persuasive. There is no legal basis for this Commission to authorize PG&E to include in its rates and cost of service estimated property taxes which it is not lawfully obligated or forecased to pay. Taxes which are included in rates are those in effect at the time the rates are approved, unless the existing law provides for a change at a future date. (Re Pac. Tel. & Tel. (1954) 53 CPUC 276, 295.) Absent legislative change, or Board of Equalization change, PG&E’s taxes are what they are under existing law and the County’s proposal will not change that fact. The County must direct its request for relief to the Legislature and the Board, not this Commission. (D.97-05-088 at 91-100.)

As in 1997, this Commission is reluctant to require ratepayers to pay for the cost of local government services that are typically paid for by taxpayers, no matter how beneficial these services may be. Absent legislative authorization, utility rates should be used to provide utility services, not government services. While Resolution E-3535 subsequently did authorize ratepayer payment to the County and the School District, it is important to take into consideration what happened in between D.97-05-008 and Resolution E-3535. As described in Resolution E-3535:

After the Commission’s Decision was issued, the California Legislature passed into law Chapter 282, section 8660-001-0462, paragraph 3, of Statutes of 1997. This new law states that if PG&E and the County and School District enter into a settlement that resolves claims by the latter parties relating to the effects of AB 1990 (Budge), enacted 1996, Chapter 854, then PG&E may recover an additional amount, not to exceed $10 million, through base rate in 1998. (Resolution E-3535 at 3.)

In short, there was express legislative authorization for rate recovery for a payment to the community, which was implemented by Resolution E-3535. Accordingly, ratepayer funding of the CIMP is not authorized. If legislation specifically directs this Commission to provide ratepayer funding for the CIMP (or a similar payment to the community), the Commission would do so, as it did in 1998. PG&E may also choose to use shareholder funds to support the CIMP.

3.5. Recovery of License Renewal Costs

In its Application, PG&E requested rate recovery for $82.688 million in costs incurred for its efforts to renew the NRC operating licenses for Diablo Canyon. (Ex. PG&E-1 at 8-1.) This request was opposed by TURN, ORA, AANR and Mothers for Peace, who argued that PG&E should not get rate recovery for any of the costs associated with relicensing Diablo Canyon. (See, e.g., TURN Protest at 4-6; AANR Protest at 5-13.)

In late 2009, PG&E filed an application with the NRC to renew Diablo Canyon’s operating licenses. In early 2010, PG&E filed an application with this Commission requesting rate recovery for its estimate of $385 million in costs for Diablo Canyon NRC license renewal and related activities. (Ex. PG&E-1 at 9-4.)
In that proceeding (Application (A.) 10-01-022), PG&E, the Commission’s Division of Ratepayer Advocates (DRA)\textsuperscript{25} and TURN reached a tentative settlement. (D.12-02-004 at 2.)

In March, 2011, prior to a hearing on the settlement, an earthquake and tsunami caused serious damage to a nuclear plant located at Fukushima, Japan, and the NRC effectively halted the relicensing of Diablo Canyon pending further seismic studies. (Id. at 2-4; Ex. PG&E-1 at 9-5 to 9-6.) The Commission then closed A.10-01-022 without addressing the proposed settlement. (D.12-02-004 at 5-7.) The proposed settlement between PG&E, DRA and TURN would have allowed PG&E rate recovery for $80 million in licensing renewal costs.

(Ex. PG&E-5-2 at 5-19.)

While the license renewal process at the NRC was suspended, PG&E reduced its spending on license renewal activities, but continued with some activities in order to keep its application up-to-date (Ex. PG&E-1 at 9-6) and to retain its ability to re-start and complete the license renewal process in the future. (Ex. PG&E 5-2 at 5-22.) PG&E’s license renewal spending ramped back up significantly in 2014 (although PG&E’s testimony does not clearly identify when it re-started active work on the license renewal). (Ex. PG&E-7 at 228.)

PG&E did not return to the Commission to request approval for rate recovery of the license renewal costs it incurred until it filed the present application in August 2016.

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\textsuperscript{25} New ORA.

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Canyon received operating licenses. [In. omitted] The Settlement Parties then agreed that PG&E should not recover the direct costs incurred subsequent to that deferral request. After reviewing the costs of the project as summarized in Exhibit PG&E-2, as corrected in Attachment 2 to this Motion, the Settlement Parties submit that $186.6 million is a reasonable approximation of the direct costs incurred between the project inception and April 16, 2011 that should be authorized for recovery. Finally, the Settlement Parties agreed that no AFUDC should be recovered for the License Renewal Project as a reasonable sharing of risk between customers and shareholders. (Id. at 12:13.)

The parties opposing PG&E’s original request support the settlement. The $186.6 million figure is supported by the record, well within the range of possible litigation outcomes in this proceeding, and provides significant ratepayer saving compared to PG&E’s original request of more than $52 million. It was reasonable for PG&E to have spent that amount of money in 2009 to 2011 to seek to renew the operating licenses for Diablo Canyon. The removal of AFUDC from the amount sought, given that the relicensing was not completed, also supports the conclusion that the amount is reasonable. The proposed settlement meets the requirements of Rule 12.16(c).

While nuclear power plants are controversial, and renewal of Diablo Canyon’s licenses would have drawn opposition, the record supports a finding that PG&E’s decision to seek renewal of Diablo Canyon’s operating license (and its approach for doing so) from 2009 to April 2011 was reasonable. PG&E requested Commission approval for rate recovery of the costs of renewal at approximately the time they began to actively pursue license renewal, which provided an opportunity for parties (and the Commission) to address the reasonableness of their decision. In that proceeding, DRA and TURN agreed to a proposed settlement allowing PG&E rate recovery for its relicensing costs, which

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\textsuperscript{25} Whether PG&E was reasonably likely to continue relicensing activities after April 2011 is not clear, and the proposed settlement at that date was a cutoff is reasonable and is supported by the record.

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3.6. Proposed Ratemaking and Cost Allocation Issues

PG&E's proposed ratemaking treatment for Diablo Canyon as it approaches retirement does not alter the existing ratemaking treatment, which has generation rates based on a depreciation schedule that assumes Diablo Canyon will be retired (and depreciated to zero) at the end of 2024 for Unit 1 and the end of 2025 for Unit 2. (PG&E Opening Brief at 70-71) In re PG&E does propose to add an annual true-up to reflect actual depreciation and capital spending at Diablo Canyon. (Id., citing Ex. PG&E-1, at 10-4.)

PG&E also proposes:

For capital additions after 2016, PG&E proposes to simplify the recovery over the remaining years of Diablo Canyon's operations by calculating a remaining life depreciation rate based on the vintage of the addition. Thus, a capital addition project that goes into service in 2017 would have an assumed 8-year life/depreciation schedule and a capital addition project added in 2019 would have an assumed 7-year life/depreciation schedule.

Beginning in 2017, PG&E will true-up the depreciation rates for plant and capital additions set in the 2017 GRC with the actual costs incurred/recorded for these two categories. To implement this proposal, PG&E proposes to establish a new 3-way subaccount within the proposed Diablo Canyon Retirement Balancing Account that would be called the "Diablo Canyon Capital Depreciation Subaccounts." This subaccount would track and adjust the capital revenue requirements associated with Diablo Canyon's net book value and capital additions. Starting in 2018, PG&E proposes to file in May of each year a Tier 3 advice letter true-up the prior year's forecast to recorded costs and establishing the amount of the depreciation rate adjustment that will be incorporated into the AET.

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23 The net plant cost for Diablo Canyon (which PG&E forecasts to be $1,305 billion) and its recovery in rates are addressed in PG&E's general rate case (GRC).

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4. Comments on Proposed Decision

The proposed decision of ALJ Allen was mailed to the parties in accordance with Section 311 of the Public Utilities Code, and comments were allowed under Rule 14.3 of the Commission’s Rules of Procedure and Practice. Comments were filed on November 29, 2017. Reply comments were filed on December 6, 2017.

During the course of the proceeding, PG&E consistently argued that it intended to operate Diablo Canyon until 2024/2025, particularly in response to parties' suggestion that PG&E develop a contingency plan for an earlier shutdown. (See, e.g., WEM Opening Brief at 4, quoting PG&E witness Strauss.) Now, in the wake of the proposed decision (and its reduction in PG&E's requested rate recovery), PG&E is warning that it may in fact shut down Diablo Canyon earlier. (PG&E Comments at 4.) The proposed decision has been modified to reflect an increased probability of Diablo Canyon shutting down earlier than 2024/2025.

While many parties support the proposed decision’s deferral of replacement procurement issues, including GHG impacts, to the IRP proceeding (see, e.g., Comments of CLECA, California Clean DG Coalition, ARaM, Joint Intervenors and the City and County of San Francisco), a number of parties argue that the Commission should not defer to the IRP proceeding consideration of the GHG impacts of the retirement of Diablo Canyon (see, e.g., Comments of CEERT, FVE, PG&E and NRG).

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24 In addition, those capital project costs charged would include AFUDC.
CEERT, for example, argues that by doing so, the proposed decision ignores SB 359 and that the law's GHG emission reduction requirements. (CEERT Comments at 5.) According to CEERT, the proposed decision rejects "a commitment to or procurement of GHG-free energy to replace Diablo Canyon," and accordingly is inconsistent with the Governor's objectives for clean energy, clean air, and pollution reduction. (Id.)

This is a mischaracterization of the proposed decision. Deferring consideration to the IRP proceeding of the GHG impacts of Diablo Canyon replacement procurement does not reject a commitment to procurement of greenhouse gas-free energy. Consideration of GHG impacts in the IRP proceeding is consistent with SB 359 and the GHG reduction policies of the State of California. The scope of the IRP proceeding expressly includes the following:

Based on the OIR, parties' comments on the OIR, and the discussion at the PHC, the scope of this proceeding will be focused around two of the new sections of the Public Utilities Code, codified by SB 359. These sections are as follows:

454.51. The commission shall do all of the following:
(a) Identify a diverse and balanced portfolio of resources needed to ensure a reliable electricity supply that provides optimal integration of renewable energy in a cost-effective manner. The portfolio shall rely upon zero carbon-emitting resources to the maximum extent reasonable and be designed to achieve any state-wide greenhouse gas emissions limit established pursuant to the California Global Warming Solutions Act of 2006 (Division 25.5 (commencing with Section 65900) of the Health and Safety Code) or any successor legislation. [...] 454.52. (a) [...] Commencing in 2017, and to be updated regularly thereafter, the commission shall adopt a process for each load-serving entity, as defined in Section 390, to file an integrated resource plan, and a schedule for periodic updates to the plan, to ensure that load-serving entities do the following:
(A) Meet the greenhouse gas emissions reduction targets established by the State Air Resources Board, in coordination with the commission and the Energy Commission, for the electricity sector and each load-serving entity that reflect the electricity sector's percentage in achieving the economy-wide greenhouse gas emissions reductions of 40 percent from 1990 levels by 2030. (R.16-02-007 (Proposing Memo and Ruling at 3-5.)

IRP is implementing SB350 and California's GHG policies. Careful consideration of the relationship between Diablo Canyon, SB 350, and California's GHG policies in the IRP proceeding is more consistent with SB 350 and those policies than attempting to do so in this more narrowly focused proceeding. To clarify this issue, the decision has been modified to direct PG&E to be prepared to demonstrate in the IRP proceeding the greenhouse gas emissions of its electric portfolio in scenarios assuming Diablo Canyon retirement dates prior to 2024/2025.

CUE and PG&E, in arguing for higher employee retention payments, cast the choice of payment level as an either/or choice – the $352.1 million originally proposed, or the $160.5 million approved by the proposed decision. (CUE Comments at 2-8, PG&E Comments at 3.) CUE then argues that because more evidence was presented supporting the $352.1 million figure than the $160.5 million figure, the proposed decision errs by adopting the lower figure. This is a false dichotomy. Rather than a binary choice, the Commission must consider a spectrum. Absent a showing that it is reasonable to charge a cost to ratepayers, the proper amount is zero. With an adequate showing by a party, the need to move off of zero, up to whatever level is supported by the record. The proposed decision found that in this case the parties had provided adequate support to move off of zero (although there was also record support for zero), but failed to support a level of $352.1 million. ORA's testimony in support of $160.5 million helped push the needle up to that level. At the same time, it is not clear that $160.5 million is the correct level, particularly since it does not provide funding for the earlier (Tier 1) years.

CUE and PG&E further fault the proposed decision for not deferring to the retention payment "benchmarking" data cited by PG&E. (CUE Comments at 2, 4-6, 14; PG&E Comments at 6.) But as ORA points out:

[T]here is no data presented in the record regarding an applicable time-period for retention payments. Nothing was presented by PG&E's consultant in testimony, workpapers, or discovery responses regarding the reasonableness of a seven year retention payment plan relative to the time frame for those programs included within its industry data. (ORA Reply Comments at 3.)

In addition, the retention payment benchmarking data that was used appears to be broad, across a range of industries, rather than specific to the unique characteristics of the nuclear power industry. There is also nothing in the record to indicate that the retention payment benchmarking data reflects an equivalent level of severance pay as is present here. PG&E forecasts severance payment costs of $168 million. (Exhibit PG&E-1 at 7-7.) If that amount were to be distributed equally to 1,461 employees, each employee would receive a severance payment of $115,000. If anything, the benchmarking data appear to confirm that a 25% per year retention payment level is too generous.

There is, however, a benefit to providing certainty as to the contours of the retention program. Continued uncertainty could exacerbate employee concerns,
Accordingly, it appears that the CIMP is based on tax revenues, and calculating the amount of the CIMP does involve a computation of tax revenues. The Cities have failed to distinguish the present case from D-97-05-088.

A number of parties attempted to cobble together arguments, based on Public Utilities Code Sections 701 and 712.5, to show that the Commission has at least implied authority to approve rate recovery for the CIMP payments to the community. (See, e.g., School District Comments at 3-6; ANR Reply Comments at 14.) While Public Utilities Code Section 701 is very broad, and does grant the Commission significant authority, it does not directly address the situation here, and does not specifically authorize substituting ratepayers for taxpayers.

By comparison, Pub. Util. Code § 712.5 (SB 968) is much narrower, and is specifically focused on Diablo Canyon, but (as TURN points out) also does not expressly authorize the Commission to approve ratepayer funding for the CIMP.

Contrary to the claims made by ANR and SCLCUSS, Public Utilities Code § 712.5 (SB 968) does not expressly authorize the Commission to approve ratepayer funding for this purpose. The provision merely directs the Commission to "cause an assessment to be completed" regarding the "net economic effects" of a Diablo Canyon shutdown. The bill does not provide sweeping (and unbounded) authorization for unlimited ratepayer-funded payments to the affected communities to compensate for any impacts identified in the assessment. (TURN Reply Brief at 2, footnotes omitted.)

TURN is correct; even read in a broad way, Section 712.5 does not provide a basis for rate recovery of the CIMP. Minor clarifying changes have been made to the proposed decision on this issue. 26

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26 The retirement of Diablo Canyon and the CIMP proposal, along with D-97-05-088, present a unique situation. This decision is based on and limited to the specific facts presented, and is not a broad or general statement of the scope of the Commission's authority.

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arms-length" negotiations among "numerous parties." (Local Cities Comments at 2.)

These arguments are undercut by the significant fact that the ratepayer were not at the table for these "arms-length" and "hard bargained" negotiations that decided they should pay for the costs of replacement procurement, employee retention, and the CIMP. This is akin to joining a group for dinner, who inform you that they have already ordered, and have decided that you will pay the bill. While the parties to the Joint Proposal may often have conflicting interests, that does not appear to have been the case here, and the Joint Proposal would have received more deference if it had included the interests of those who were being asked to pick up the tab. No changes have been made to the proposed decision on this issue.

Some parties argue that the proposed decision is too short, and that it does not adequately discuss the proposals that it rejects, particularly the deferral of replacement procurement issues to the IRP proceeding. (See, CERRT Comments at 1-2; IIP Comments at 2.) But as the Joint Intervenors point out:

There is detailed and extensive record support for the JPD's conclusion that the IRP should address replacement procurement, including testimony from PG&E's own witnesses and the other Joint Parties. The JPD briefly references solid record evidence supporting deferral of replacement procurement to the IRP, citing ORA and MCE testimony. More than those two parties offered experts whose record testimony supports deferral to the IRP include: CCEP Witness Kinlochan; CECIA witness Barkovich; Joint Intervenor Witnesses Kinlochan and Barkovich; MCE Witness Dustel; ORA Witness Myers; Shell Witness Uppers; Solar City Witness Franz; and TURN Witness Marcus and Woodruff. These experts spoke to many reasons why the IRP is the right forum for a determination of need and

---

replacement procurement. (Joint Intervenors Comments at 4, footnotes omitted.)

The Joint Intervenors are correct that there is extensive record support for the proposed decision, particularly on this issue. The decision is based on the record and cites to the record, it is not necessary for it to address in detail every argument made in this proceeding. 27 Other than the changes noted above, the proposed decision has not been expanded.

5. Assignment of Proceeding
Michael Picker is the assigned Commissioner and Peter V. Allen is the assigned Administrative Law Judge in this proceeding.

Findings of Fact
1. Continuing operation of Diablo Canyon Unit 1 beyond 2024 and Unit 2 beyond 2025 would require renewal of NRC licenses, and would not be cost effective.
2. The retirement of Diablo Canyon will not cause adverse impacts on local or system reliability.
3. The impact of the retirement of Diablo Canyon on GHG emissions is not clear.
4. The IRP proceeding is broader in scope than this proceeding, and is considering issues including optimized portfolios of generation resources to achieve the statewide GHG emissions target.

---

27 The record in this proceeding includes 21 opening briefs, 17 reply briefs and over 100 exhibits.
PG&E employees at Diablo Canyon who want to transfer to other jobs at PG&E due to the retirement of Diablo Canyon may require retraining and related assistance.

PG&E's proposed employee retention plan is costly and inefficient.

A less costly employee retention plan would be more reasonable, and may help to ensure the continued safe operation of Diablo Canyon until its retirement.

The CIMP is largely intended to substitute for anticipated lost tax revenue.

PG&E's original request for rate recovery for relicensing costs totaled $52.68 billion for expenses from 2009 through 2016, including AFUDC.

The proposed settlement on relicensing costs would provide PG&E $18.6 million in rate recovery for expenses from 2009 through 2011, and excludes AFUDC.

The proposed settlement on cancelled capital projects reduces ratepayer exposure to the cost of those projects.

It is premature to address land use, facilities and decommissioning issues.

PG&E has committed to take no action with any of the Diablo Canyon lands and facilities before completion of a future public stakeholder process.

Conclusions of Law

1. PG&E's proposal to retire Diablo Canyon Unit 1 by 2024 and Unit 2 by 2025 is reasonable, and should be approved.

2. The need for procurement to replace Diablo Canyon should be addressed in the IRP proceeding.

3. Any procurement to replace Diablo Canyon should be addressed in the IRP proceeding to avoid increased GHG emissions in the most optimal manner.

4. Implementation of a retraining program for PG&E employees at Diablo Canyon is reasonable, and should be approved.

ORDER

IT IS ORDERED that:

1. Pacific Gas and Electric Company's proposal to retire Diablo Canyon Unit 1 by 2024 and Unit 2 by 2025 is approved.

2. Pacific Gas and Electric Company's "Tranche 1" proposed to procure 3,000 gigawatt hours of energy efficiency is not approved.

3. Pacific Gas and Electric Company's withdrawn "Tranche 2" and "Tranche 3" replacement procurement proposals are not approved.

This order is effective today.

Dated January 11, 2018, at San Francisco, California.

MICHAEL PICKER
President
CARLA J. PETERMAN
LIANE M. RANDOLPH
MARISA GUZMAN ACEVES
CLIFFORD RECHTSCHAFFEN
Commissioners
G.2 – 523

G.2 – 524

G.2 – 525

G.2 – 526
November 27, 2017

Ms. Simone A. Malboeuf

309 Montecito Avenue
Los Osos, CA 93402

Diablo Canyon Independent Safety Committee’s recent action in response to your concern regarding Diablo Canyon Power Plant’s compliance with Nuclear Regulatory Commission Fire Protection regulations.

Dear Ms. Malboeuf,

During the DCISC’s recent public meeting on October 18, 2017, you once again called the DCISC’s attention to a document published in June 2017 by the Union of Concerned Scientists ("UCS") and you referred to an email exchange between you and Dr. David Lochbaum of the UCS in which references are made that DCPP (along with several other US nuclear power plants) is not in compliance with the NRC’s regulations in the area of fire safety. You provided both documents to the Committee with your letter of October 26, 2017. You have also requested this matter to the Committee’s attention and requested additional information during previous DCISC public meetings.

On November 21-24, 2017, DCISC Member Dr. Robert J. Bundesen and Technical Consultant Mr. R. Fernand Waddell conducted a Peer-Review meeting at the plant, and made some inquiries about this matter. They learned some information that will be included in a Peer-Review report (as is usual custom). This is a letter to let you know that when the information has been assembled and the report reviewed by the Peer-Review team it will be presented to the other Committee Members and Technical Consultant during the next public meeting of the DCISC scheduled to be held in Avila Beach on February 7-8, 2018. At that time, the DCISC, as usual, is likely (after debate and public input) to adopt that Peer-Review report, either as amended or not as the situation drives, and upon adoption the report will become part of the DCISC’s public record. Accordingly, on behalf of all the Members of the DCISC, please consider that letter as an invitation to attend the next public meeting so that you may listen and perhaps comment or contribute to the Committee’s deliberations.

Thank you for your interest in the DCISC and its activities and for taking the time to raise your concerns with the Committee Members.

Sincerely,

[Signature]

Avila Legal Counsel
Thank you for contacting the Diablo Canyon Independent Safety Committee and for your interest in a tour of the Diablo Canyon Power Plant with members of the Committee.

The next tour is scheduled to be held on Wednesday, February 7, commencing at 8:00 AM. The minimum age for your registration for the tour is 18.

Our office will be taking reservations (which are required in advance) for the tour commencing on Monday, January 22, 2018, at 7:00 AM on a first-come, first-served basis. Reservations may be made by telephoning 415-459-4000. Please plan to make your call as early as possible as demand is usually very heavy. Reservations will be taken for no more than four immediate family members per call. You should be prepared to provide information for each person including date of birth, social security number, gender and citizenship.

The tour departs from the PG&E Energy Education Center at 8588 Ontario Road in San Luis Obispo and takes about 3 1/2 hours.

Please let me know if you should have any additional questions.

Robert Ratchie
DCIS C Asst, Legal Counsel
1-800-459-4008
info@dcisc.org

From: Jess Pawlak [mailto:jesspawlak@gmail.com]
Sent: Wednesday, January 3, 2018 12:51 PM
To: dciscinfo@dcisc.org
Subject: Please keep me on e-mail list for next Diablo Canyon Tour

Hello Folks,

I would like to take a tour with family members and friends who are interested in Diablo Canyon's Nuclear Power Generation. Please let me know when another tour will be given and what age groups are allowed on the tour.

Thank You!

Jess Pawlak
MS PMP CHA CIPT
Cell: (925) 893-4675

G.2 – 539

G.2 – 540

DCISafety@DCISC.org

From: Sherry Lewis (mailto:sherry.lewis66@att.net)
Sent: Friday, December 15, 2017 3:43 PM
To: DCISafety@DCISC.org
Subject: Re: Feb 2018 meeting in SLO

Thanks Bob. I'll try to be there. I want to visit my daughter in Rochester NY around then.
Sherry

Sent from my iPhone

On Dec 15, 2017, at 6:33 AM, DCISafety@DCISC.org <dciscinfo@dcisc.org> wrote:

Sherry -- those dates are Wednesday, February 7 (tour in the morning and meeting in the afternoon/evening) and Thursday, February 8 (meeting in the morning/afternoon).

Looking forward to seeing you there.

Have a great holiday season,

Best,

Bob Ratchie

From: Sherry Lewis [mailto:sherry.lewis66@att.net]
Sent: Thursday, December 14, 2017 2:58 PM
To: dciscinfo@dcisc.org
Subject: Feb 2018 meeting in SLO

Hello.

I can't remember when the next DCISC meeting in San Luis Obispo is. Could you please tell me the tentative dates?

Thank you,
Sherry Lewis
I can also confirm that the Committee is preparing and planning to follow up on the concerns expressed in your recent letter and I hope to have more information for you in the near future.

Please know that I wish you a very enjoyable weekend -- the fog is now over Monterey Bay this evening so the recent heat wave seems to be over now.

Best regards,

Bob

---

Bob - thanks for acknowledging the receipt of letter and clips. As an aside and one that I have been hesitant to bring up at meetings but both of you consultants slip into using "we" when discussing PG&EE like they work for the utility and not the DCSC. I have not heard the committee members do this, but in every consultant report this happens at least once, perhaps no one else notices, but it is a habit.

In peace
Rochelle

On Thu, Oct 26, 2017 at 6:38 PM, Info@DCISC.org wrote:

Rochelle - thank you for your letter and the video clips with reference to your two questions on Consultant Wondell's report on the July 25-26 fact-finding concerning replacement/repair of the fire doors at the plant. This will acknowledge receipt and confirm that I provided your letter and the video clips to the DCSC Members and Consultants for their review and consideration of a response clarifying the DCSC's position.

Thank you also for taking the time to express your concerns, it is much appreciated.

---

G.2 – 543

G.2 – 544

G.2 – 545

G.2 – 546
Hi Rob,

Attached is a letter explaining the confusion and both video clips referred to in the letter. I hope this is helpful to the committee to understand why we feel the DCSCC response is inadequate and/or incorrect.

In peace
Rochelle

On Wed, Oct 25, 2017 at 12:18 PM, DCS@nev@DCSCC.org <dcscs@nev.gov.org> wrote:

Rochelle -- I will provide your email to the Members and Technical Consultants for follow up.

From my notes of the meeting on October 17, after Consultant Henderson's presentation on the July 25-26 fact-finding which included the fire doors, I have you asking about the fire door degradation and if the pattern of repair rather than replacing a defective door had changed, that is, was the plant previously replacing doors rather than repairing them in the past? Again, from my notes, I have Consultant Henderson responding to your question as to why it is more expensive now than in the past with the statement that the cost has increased due to the addition of corporate overhead charges.

If you have sections of the fire discussion that augment or better explain your question and the issues, they would be helpful and more welcome, and I can provide them to the Committee. We do not yet have the audio file used for transcribing the discussion.

G.2 – 547

In Peace

Rochelle Becker, Executive Director
Alliance for Nuclear Responsibility
PO 1128
San Luis Obispo, CA 93406
www.anr.org

G.2 – 548

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G.2 – 549

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G.2 – 550
DCISC
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

COMMITTEE MEMBERS
ROBERT J. ADKINS
PETER LAM
PAUL P. PALMERIN

November 1, 2017

Mr. James Welch
Vice President, Nuclear Generation & Chief Nuclear Officer
Pacific Gas & Electric Company
 Diablo Canyon Power Plant
Avila Beach, California 93424

Re: DCISC Twenty-Seventh Annual Report on Safety of Diablo Canyon Operations
July 1, 2016 – June 30, 2017

Dear Mr. Welch:

At its October 18, 2017 meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. The two volumes which make up the Annual Report are attached. The DCISC made one recommendation during this report period. An electronic copy of the complete report, together with both bound volumes, is also being sent to CNX Support Manager Mr. Hector Garcia, the Committee’s principal liaison with Diablo Canyon, pursuant to the Restated Charter for the Committee approved by California Public Utilities Commission Decision D17060428. The report is hereby submitted to PG&E for its review and written response within Forty-five days.

Upon receipt of the PG&E response, that response shall become a part of the DCISC report and we then submit the complete report to the Public Utilities Commission, the Governor, the Attorney General and the California Energy Commission, as provided by the Restated Charter.

If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

ROBERT R. WELCH
DCISC Legal Counsel

OFFICE OF LEGAL COUNSEL • ROBERT R. WELCH • 555 OASIS STREET • SUITE 3 • MONTEREY • CA • 93940
TELEPHONE 831.425.3950 • FAX 831.425.3700 • msw@dcisc.org

G.2 – 551 G.2 – 552

G.2 – 553 G.2 – 554
Rochelle — thank you for the "heads up."

The Committee is on the service list for information so we received the decision early yesterday morning and I immediately distributed it to our Members & Consultants.

Saw you were quoted in this morning’s Tribune regarding the funding for the relicensing efforts —

Best regards,

Bob Rushie

From: Rochelle Becker [mailto:rochellebecker@gmail.com]
Sent: Wednesday, November 8, 2017 11:44 AM
To: dcsafety@dcs.org; DCS@info@dcs.org
Subject: Proposed decision released

Hi Bob,

The Proposed Decision has been released and is attached in case you have not received,

In peace

Rochelle

In Peace

Rochelle Becker, Executive Director
Alliance for Nuclear Responsibility
PO 1328
San Luis Obispo, CA 93406
www.anr.org

G.2 – 555

PROPOSED DECISION

November 8, 2017
Agenda ID #16094
RateSetting

TO PARTIES OF RECORD IN APPLICATION 16-08-006:

This is the proposed decision of Administrative Law Judge Peter V. Allen. Until and unless the Commission hears the item and votes to approve it, the proposed decision has no legal effect. This item may be heard, at the earliest, at the Commissioner’s December 14, 2017 Business Meeting. To confirm when the item will be heard, please see the Business Meeting agenda, which is posted on the Commission’s website 10 days before each Business Meeting.

Parties of record may file comments on the proposed decision as provided in Rule 14.3 of the Commission’s Rules of Practice and Procedure.

The Commission may hold a RateSetting Deliberative Meeting to consider this item in closed session in advance of the Business Meeting at which the item will be heard. In such event, notice of the RateSetting Deliberative Meeting will appear in the Daily Calendar, which is posted on the Commission’s website. If a RateSetting Deliberative Meeting is scheduled, ex parte communications are prohibited pursuant to Rule 8.6 (h) (f).

/s/ ANNEE SIMON
Annie E. Simon
Acting Chief Administrative Law Judge
AESj2
Attachment

G.2 – 556

PROPOSED DECISION

November 8, 2017
Agenda ID #16094
RateSetting

Decision PROPOSED DECISION OF ALL ALLEN (Mailed 11/8/2017)
BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA


(See Appendix A for Appearances)

DECISION APPROVING RETIREMENT OF DIABLO CANYON NUCLEAR POWER PLANT

G.2 – 557

G.2 – 558
PROPOSED DECISION

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A.16-08-006 A11/PVA/p2

PROPOSED DECISION

DECISION APPROVING RETIREMENT OF DIABLO CANYON NUCLEAR POWER PLANT

Summary

Pacific Gas and Electric Company (PG&E) proposes to retire the Diablo Canyon Power Plant in 2024 and 2025, when its federal Nuclear Regulatory Commission operating licenses expire. PG&E requests Commission approval to recover in rates over $1.76 billion in costs associated with the retirement of Diablo Canyon. Those costs include $1.3 billion for energy efficiency procurement to partially replace the output of Diablo Canyon, $360.4 million for Diablo Canyon employee retention and retraining, $85 million for a Community Impacts Mitigation Program, $18.6 million in costs previously incurred for its Nuclear Regulatory Commission license renewal process, and an unspecified amount for cancelled capital projects. (PG&E Opening Brief at i-i.)

This order approves PG&E’s proposal to retire Diablo Canyon and approves $190.4 million in rate recovery for costs associated with the retirement of Diablo Canyon. Specifically, PG&E is authorized to recover in rates $171.8 million for employee retention and retraining, and $18.6 million for its license renewal activities, plus a portion of the cost of cancelled capital projects. Rate recovery for the Community Impacts Mitigation Program requires legislative authorization. Replacement procurement issues will be addressed in the Integrated Resource Planning proceeding. This proceeding is closed.

1. Background

Pacific Gas and Electric Company’s (PG&E) Diablo Canyon nuclear power plant is located in coastal San Luis Obispo County, and consists of two units that have been operating since 1985 (Unit 1) and 1986 (Unit 2), with a combined generation capacity of 2,240 megawatts (MW). The units are currently licensed

A.16-08-006 A11/PVA/p2

PROPOSED DECISION

by the Nuclear Regulatory Commission (NRC) to operate until 2024 (Unit 1) and 2025 (Unit 2).

On August 11, 2016, PG&E filed its application proposing to retire Diablo Canyon upon the expiration of its NRC licenses. In addition to retiring Diablo Canyon, PG&E’s application requested approval of: 1) procurement of three branches of greenhouse gas-free resources to partially replace the output of Diablo Canyon; 2) retention, retraining, and severance programs for Diablo Canyon employees; 3) a program that would provide funding to the local community to mitigate the economic impact of the plant’s retirement; and 4) rate recovery of various costs, including amounts spent for environmental reviews and PG&E’s new-suspended NRC license renewal application. (PG&E Application at 8-32.)

PG&E’s application was supported by the Natural Resources Defense Council (NRDC), Friends of the Earth (FOE), Environment California, International Brotherhood of Electrical Workers Local 1245 (IBEW 1245), Coalition of California Utility Employees (CCUE), and the Alliance for Nuclear Responsibility (ANR), and the proposal in the application was referred as a “Joint Proposal.”

Protests to PG&E’s application were filed by the California Large Energy Consumers Association (CLECA), Californians for Green Nuclear Power (CGNP), the Energy Producers and Users Coalition (EPUC), Energy Users Forum, Environmental Progress, LEAN Energy US, the Cities of Paso Robles, 1

1 The parties supporting the application are referred to as the “Joint Parties.” While generally supporting the Joint Proposal, the ANR did not support PG&E’s request for rate recovery of its NRC license renewal costs.

A.16-08-006 A11/PVA/p2

PROPOSED DECISION

Morro Bay, San Luis Obispo, Arroyo Grande, Pismo Beach and Atascadero (filed jointly), California Solar Energy Industries Association, Sierra Club, Shell Energy North America (US), L.P. (Shell), City of Lancaster, Friends of Wild Cherry Canyon, Central Coast Wave Energy Hub, The Utility Reform Network (TURN), World Business Academy, the Commission’s Office of Ratepayer Advocates (ORA),Solana Clean Power Authority, Marin Clean Energy, SolarCity Corporation, City and County of San Francisco, A4NR, Women’s Energy Matters (WEM), and the Green Power Institute.

Responses to PG&E’s application were filed by OhmConnect, Inc; San Luis Obispo Mothers for Peace, Inc (Mothers for Peace), Independent Energy Producers Association (IEP), South San Joaquin Irrigation District, Direct Access Customer Coalition, Alliance for Retail Energy Markets, Large-scale Solar Association, EnergyHub, CPower, EnerNOC, Inc., Converge, Inc., California Energy Storage Alliance, San Luis Coastal Unified School District (School District), IBEW 1245, CCUE, Environmental Defense Fund (EDF), FOE, NRDC, Environment California, California Energy Efficiency Industry Council, Center for Energy Efficiency and Renewable Technologies (CEERT) and the County of San Luis Obispo (County). 2

3 Some responses were filed jointly by multiple parties.

The general timeline of the proceeding was:
August 11, 2016 – Application filed.
September 15, 2016 – Protests and Responses filed.
September 26, 2016 – PG&E’s Reply to Protests and Responses filed.
October 6, 2016 – Pre-hearing Conference held.
PROPOSED DECISION

October 20, 2016 - Public Participation Hearings held in San Luis Obispo.
November 18, 2016 - Scoping Memo and Ruling issued.
January 27, 2017 - Intervenor testimony served.
March 17, 2017 - Rebuttal testimony served.
April 19 - 27, 2017 - Evidentiary hearings held.
May 26, 2017 - Opening briefs filed.
June 16, 2017 - Reply briefs filed.
September 14, 2017 - Public Participation Hearings held in San Luis Obispo.

On December 29, 2016, PG&E filed a joint motion requesting approval of a partial settlement between PG&E, the County of San Luis Obispo, the Cities of Arroyo Grande, Atascadero, Morro Bay, Paso Robles, Pismo Beach, and San Luis Obispo (collectively Local Cities), the School District, FOE, NRDC, Environment California, IBEW 1245, CUCE, and AANR. The proposed settlement modified the Community Impacts Mitigation Program originally proposed by PG&E in its application.

On February 27, 2017, PG&E notified the parties that it was withdrawing its request for two of the three branches of replacement procurement (and associated cost recovery) that it had proposed in its application, and that this change would be reflected in its rebuttal testimony.

On May 23, 2017, PG&E filed a joint motion requesting approval of a partial settlement between PG&E, AANR, TURN, ORA, Mothers for Peace, FOE, NRDC, Environment California, IBEW 1245 and CUCE. This second proposed settlement modified PG&E's original request for rate recovery of its NRC license renewal costs and its cancelled project costs.

### G.2 – 563

### PROPOSED DECISION

Diablo Canyon, including economic and emergency response impacts, and on proposals to mitigate those impacts.

**Recovery of License Renewal Costs**

PG&E has proposed that it be granted rate recovery for costs relating to license renewal activities, including the filing of a license renewal application with the federal NRC. Parties may present testimony on whether it is reasonable for PG&E to recover some or all of those costs in rates.

**Proposed Ratemaking and Cost Allocation Issues**

PG&E has requested rate recovery for the costs of its proposals, including costs of replacement procurement, its employee program and community impacts mitigation program, and its license renewal activities, as well as other costs relating to the operation of Diablo Canyon facilities. Parties may support or criticize PG&E's proposed rate design and cost allocation, or may present alternative rate design and cost allocation proposals.

**Additional Issues Not Addressed Above**

Parties may present testimony on issues that are within the general scope of the proceeding, as established by the record to date, that are not specifically addressed in the above sections.

The Scoping Memo determined that it was premature to address land use, facilities and decommissioning issues, and that specific recommendations on those issues would not be considered at this time, but parties were allowed to present testimony recommending how to best preserve these issues for future consideration.

### G.2 – 564

### PROPOSED DECISION

3. Discussion and Analysis

3.1. Retirement of Diablo Canyon Power Plant

PG&E proposes to retire Diablo Canyon upon the expiration of its NRC licenses, which expire on November 2, 2024 for Unit 1 and August 26, 2025 for Unit 2. (Ex. PG&E-1 at 2-1) PG&E's forecasts and analysis indicates that in the near future there will be a significantly reduced need for electric generation from Diablo Canyon. (PG&E Opening Brief at 11-18) Because of projected increases in energy efficiency, distributed generation, renewable generation, and customers moving to community choice aggregation (CCA) and direct access, PG&E's conclusion is that there is simply less of a need for Diablo Canyon. (Id.)

In fact, PG&E believes that the continued operation of Diablo Canyon beyond 2025 would exacerbate over-generation, requiring curtailment of renewable generation. (Id. at 16-17; Ex. PG&E-1 at 2-20.) PG&E's analysis indicates that there is no need to replace Diablo Canyon in order to maintain system reliability. (Transcript Vol. 6 at 937-938.)

PG&E has also been unequivocal that the retirement of Diablo Canyon will not have an adverse impact on local reliability. According to PG&E, because Diablo Canyon's output is exported on the bulk transmission system, Diablo Canyon is considered a system resource only, and is not needed for local reliability.

DCPP [Diablo Canyon Power Plant] is located in the Los Padres area of PG&E's service territory, which includes the cities of San Luis Obispo, Division, Santa Maria, Mesa, Templeton, Paso Robles, and Atascadero. [...] [The] DCPP's generation is exported to the north and east of the Los Padres division through 500 kilovolts (kV) bulk transmission lines, which include a transmission connection between the Diablo Canyon and Midway substations. [In] addition, the Los Padres transmission line serves through a network of 115 kV and 76 kV circuits and does not include DCPP as part of the local...
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installed generation capacity as DCPP does not serve load within the division. As such, DCPP is not needed for local reliability. Unlike San Onofre Nuclear Generating Station, DCPP is considered as a system resource only and is not needed to provide support for local reliability. (Ex. PG&E’s I-1 at 2:20 to 2:21; see also PG&E Opening Brief at 17.)

A number of parties support PG&E’s determination that Diablo Canyon is not needed, in addition to the parties supporting the Joint Proposal; other parties also agree that it is appropriate to retire Diablo Canyon:

IEP concurs with PG&E’s decision not to renew the licenses of the two units of the Diablo Canyon Power Plant. Replacement resources that are both less expensive and better able to fit the needs of PG&E’s customers and the electric grid are available. (IEP Opening Brief at 7.)

TURN’s economic analysis demonstrates that ratepayers would benefit from retiring Diablo Canyon and satisfying customer need with incremental renewable resources. This analysis, along with the recognition that continued operations at Diablo Canyon involve the potential for a catastrophic accident or unexpected premature shutdown, affirms the reasonableness of PG&E’s decision to permanently retire the plant. (TURN Opening Brief at 2.)

The City of San Francisco supports shutting down Diablo Canyon, and states:

PG&E has persuasively demonstrated that Diablo Canyon is a no longer a good fit for PG&E’s bundled customers. PG&E has shown that Diablo Canyon should be closed because of the high cost of operating Diablo Canyon, potential regulatory requirements regarding the once through cooling technique used by Diablo Canyon, and system over-generation problems related to Diablo Canyon.

1 These parties are: NRDC, POE, Environment California, IBEW 1345, CCUE, and CAIR.

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Only one active party, CGNP, argues that Diablo Canyon should continue to operate beyond 2025.4 CGNP makes three substantive arguments for keeping Diablo Canyon operating: Diablo Canyon is more cost effective than the alternative sources of supply, retiring Diablo Canyon would diminish system reliability, and retiring Diablo Canyon would have an adverse impact on GHG emissions. (CGNP Opening Brief at 5.)

On the issue of the cost effectiveness of Diablo Canyon, TURN identified significant flaws and omissions in CGNP’s cost calculations and estimates. (See, TURN Reply Brief at 1-7; Transcript, Vol. 8 at 1,300-1,318.) The record of this proceeding underscores, rather than supports, CGNP’s argument that continued operation of Diablo Canyon would be cost effective. Accordingly, CGNP’s testimony on this issue is given little weight.

CGNP’s argument that retiring Diablo Canyon would be detrimental to grid reliability seems to be based on the fact that Diablo Canyon has been a reliable resource, and that other generation resources have been less reliable. (CGNP Opening Brief at 40.) The reliability of the plant and the reliability of the system are separate things, and there has been clear testimony that the retirement of Diablo Canyon would not adversely affect the reliability of the system. (Transcript, Vol. 6 at 897-958.) As Joint Opponents unequivocally state:

“Diablo Canyon, an inflexible resource, is not needed either for system or local reliability.”

4 One other party, Environmental Progress, made a similar argument in its protest of the application, but did not present testimony or file briefs.

5 For example, if a person owned 12 cars, but never used more than three cars at one time, selling cars 11 and 12—even if they were more reliable than cars 9 and 10—would not significantly change the ability to have three operable cars.

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Canyon’s constant operation. [In omitted] PG&E showed also that continued operation of Diablo Canyon is a bad fit in the context of California’s goal of reducing GHG [greenhouse gas] emissions in part by increasing use of renewable energy resources. This is because Diablo Canyon is a base load, relatively inflexible resource that would exacerbate overgeneration and would result in continued curtailment of renewable resources. PG&E also admits that Diablo Canyon is no longer necessary for reliability. [In omitted]

PG&E also projects that its load will shrink considerably by the time Diablo Canyon closes. Between 2017 and 2025, PG&E forecasts that approximately 20,000 GWh [megawatt hours] of load will migrate to CEAs. [In omitted] This is in comparison to the amount of bundled customer load (18,500 GWh) Diablo Canyon currently serves. In PG&E’s own words “whether CCA loads depart somewhat sooner or later than expected does not change the overall conclusion that DCPP is not needed for PG&E’s customers after the expiration of the Nuclear Regulatory Commission licenses in 2024 and 2025.” [In omitted] (City and County of San Francisco Opening Brief at 3.)

Other parties, while not actively supporting PG&E’s proposal, do not oppose it, including: ORA (ORA Opening Brief at 4); Alliance for Retail Energy Markets, the California Clean DG Coalition, CLECA, the Direct Access Customer Coalition, the Energy Users Forum, Marin Clean Energy, Peninsula Clean Energy, Silicon Valley Clean Energy Authority, and Sonoma Clean Power Authority (Joint Opponents Opening Brief at 2).

1 Elsewhere, however, ORA states: “ORA supports PG&E’s proposed retirement of the DCPP units at the end of their respective operating license periods in 2024 and 2025.” (Ex. ORA-2 at 4.)

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reliability. [In omitted] It can be retired without impacting grid reliability.” [In omitted] (Joint Opponents Opening Brief at 3.)

CGNP’s reliability argument also appears to assume that Diablo Canyon could operate as a flexible resource that could ramp up and down to meet changing daily demand, rather than how it has been operated, as a constant-level baseload resource. (CGNP Opening Brief at 40.) PG&E points out that this is a speculative and unrealistic assumption, and would make Diablo Canyon even less cost effective:

“Operating in load-following mode would take Diablo Canyon outside of the currently authorized NRC license conditions and would require extensive technical feasibility studies, redesign of procedures, processes and systems, maintenance practices and nuclear fuel redesign. [...] It is unclear if Diablo Canyon could be retrofitted to safely and reliably operate in a different operating mode, whether the NRC would approve it, and whether it would be cost-effective to do so given the risks in capacity factor that would result if Diablo Canyon were to be frequently ramped down to minimum operating levels during the daytime hours when solar power is prevalent. (PG&E Reply Brief at 7.)

Finally, CGNP argues that retiring Diablo Canyon will make it “impossible” for the state to meet its GHG reduction goals, and accordingly it should be relicensed and kept available. (CGNP Opening Brief at 41-42.) CGNP claims that the retirement of Diablo Canyon would result in California importing large amounts of fossil fuel generated electricity from PacificCorp. (Id.)

While the specific arguments made by CGNP are not well supported by the record, the GHG impact of Diablo Canyon’s retirement (and any replacement
proposed retirement schedule for Diablo Canyon is approved. If in the interim period the facts change in a manner that indicates Diablo Canyon should be retired earlier, the Commission may reconsider this determination.

3.2. Proposed Replacement Procurement

In its initial Application, PG&E proposed to partially replace Diablo Canyon with greenhouse gas-free resources in three tranches, consisting of: 1) 2,000 gross GWh of energy efficiency; 2) 2,000 GWh of GHG-free energy, including energy efficiency and Renewables Portfolio Standard (RPS) eligible energy resources; and 3) a voluntary 55 percent RPS commitment. (PG&E Application at 9.) PG&E described these three tranches as "[A] first step towards replacing Diablo Canyon with a portfolio of GHG-free resources." (Id.)

While proposing this significant procurement of resources, PG&E noted that:

Additional resources beyond those specified in the Joint Proposal may be needed on a system-wide basis to replace the output of Diablo Canyon. The Joint Parties envision that this issue will primarily be addressed through the Commission’s Integrated Resource Planning process. (i.e., R.16-02-007). (Id.)

Multiple parties praised PG&E’s replacement procurement proposal, including Shell, Sierra Club, SolarCity, TURN, and Marin Clean Energy. While parties did not object to the idea of replacing Diablo Canyon with GHG-free resources, they challenged the feasibility, effectiveness, cost-effectiveness, cost, and cost allocation of PG&E’s specific proposal. (See, e.g., Shell Protest at 3-4, Sierra Club Protest at 6-12, SolarCity Protest at 2-7, TURN Protest at 7-11, Marin Clean Energy Protest at 7-10.)
Some parties recommended that the Commission approve partial replacement procurement for Diablo Canyon in this proceeding, but in a form different than that proposed by PG&E.

The GPI supports the authorization in this proceeding of an early tranche of procurement of greenhouse-gas-free resources that can be brought online prior to the retirement of DCPP, but only if the procurement is primarily an all-source procurement. (GPI Opening Brief at 19, emphasis in original)

Thus, CEERT continues to strongly support the authorization of the Tranche #1 and Tranche #2 competitive solicitations in this Application, without defer to the IRP Process, as critical “early action” greenhouse-gas-free energy procurement to meet PG&E’s bundled customer need upon the retirement of Diablo Canyon and as a contingency plan in the event of early retirement or shutdown, with cost recovery approved according to existing ratemaking and cost allocation mechanisms. (CEERT Opening Brief at 7, emphasis in original)

IP similarly argued that PG&E should immediately be directed to do an “all-source” solicitation in order to take advantage of federal tax credits for renewable generation projects that are expected to expire or decline in the near future. (IP Opening Brief at 1-2, 11-12)

Other parties recommend that the Commission NOT authorize any replacement procurement in this proceeding, but instead advocate that the Commission should do a need analysis (and any resulting authorization) in the IRP proceeding. These parties include Shell:

The appropriate forum for consideration of all Diablo Canyon replacement procurement, including PG&E’s proposed first “tranche” of procurement, is the IRP proceeding. Ex. Shell-1 at pp. 4-7 (Dyer), SB 380 provides that the investor-owned utilities’ (“IOUs”) procurement planning decisions must be made in the context of a comprehensive planning process. (in. omitted) PG&E’s

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TURN supports PG&E’s intention to dramatically scale up its procurement of cost-effective EE (energy efficiency). However, as shown in TURN’s testimony and explained below, PG&E has not met its burden of demonstrating that its Tranche 1 proposal offers the right mechanism through which to do that. (in. omitted) In sum, Tranche 1 suffers from three fundamental design flaws: it may not be feasible, it does not ensure that the EE savings will be additional to the savings that would otherwise occur, and it does not ensure that the EE savings will still be available when Diablo Canyon comes online. Moreover, the notion of a major EE procurement outside of PG&E’s existing EE portfolio and its new EE Business Plan is ill-conceived, and PG&E has not demonstrated that the benefits of this separation can exceed the costs. (TURN Opening Brief at 20)

While acknowledging that Tranche 1 may exacerbate conditions of overgeneration and renewable curtailment, PG&E and the other Joint Parties fail to address it: PG&E witness Straus added that procurement of just EE, as proposed in Tranche 1, may worsen over-generation issues. (Joint Opposing Opening Brief at 4-5, fn. omitted.)

ORA similarly opposes PG&E’s request for $1.3 billion in customer funding for its Tranche #1 EE procurement proposal and associated shareholder incentive payments. According to ORA:

PG&E fails to demonstrate that its requested Tranche #1 procurement, which is an increase of more than 50% of the currently identified energy efficiency potential, would be cost effective. (ORA Opening Brief at 11)

As ORA points out, PG&E is already required under California’s loading order for energy resources to first meet its resource needs through “all available energy efficiency...resources that are cost effective, reliable, and feasible.” (Id., quoting Pub. Util. Code § 454.5(b)(9)(C)(J)). According to ORA, PG&E has acknowledged that in D.15-10-028, the Commission set a goal for PG&E to

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procure all cost-effective and feasible EE for the years 2016-2024. For 2016-2024, the period corresponding to the Tranche #1 procurement proposal, that goal is a total of 3,741 gross GWh savings. (Id., citing Ex. PG&E-1, at 4-3, Table 4-1, lines 3-4)

ORA concludes:

Yet, PG&E’s Diablo Canyon application proposes to procure an additional 2,000 gross GWh installed in its service territory in the same period 2018-2024. (In. omitted) This represents an increase of 55.5% over currently approved goals for the years 2018-2024. Such a substantial increase in the EE potential is only possible by lowering the Commission’s threshold criteria for cost-effectiveness. Lowering the cost-effectiveness standards would burden customers with the cost of Energy Efficiency measures that provide insufficient value to qualify under current standards. (ORA Opening Brief at 11)

EPUC makes a similar argument:

While labor unions, local governments, environmental organizations and shareholders all receive firm, defined benefits, there are no benefits and no protections for ratepayers. Instead they shoulder greater uncertainty in rates and, the revenue consequences as these uncertainties are resolved. These include:

- whether any replacement of DCPP’s output is needed;
- when, if ever, that replacement should be procured;
- whether the quantity of energy efficiency (EE) to be procured in Tranche 1 is feasible and whether it will be cost-effective, and
- whether the authorization of the Tranche 1 procurement will conflict with and potentially impair the targets of the Rolling Portfolio Business Plans filed by PG&E and the other utilities. (In. omitted) The ratepayers assume the risk that all cost effective EE will have been procured through the Business Plan and each of its annual updates, and that any EE authorized in this docket will be more expensive and raise rates inefficiently. (EPUC Opening Brief at 12)
PROPOSED DECISION

ORA and EPUC make a good point—it is not clear that PG&E could actually procure over 50% more energy efficiency than a goal that is already supposed to include all cost-effective energy efficiency (unless PG&E procures energy efficiency that is not cost-effective). There is no reason to approve a $1.3 billion rate increase for a proposal that will most likely either fail to achieve its goal or will achieve a goal not worth reaching. Accordingly, PG&E’s Tranche 1 proposal is not adopted.

While we are rejecting the specific replacement procurement proposed here by PG&E, the larger question remains about what, if anything, should be done here to ensure that the retirement of Diablo Canyon will not result in an increase in GHG emissions. The answer to that is that we simply cannot tell based on the record in this proceeding. Given the time between now and 2024 and 2025, the rapid changes in the California electricity market, and the growth of renewable generation and CCAs, it is not clear based on the limited record in this proceeding what level of GHG-free procurement (if any) may be needed to offset the retirement of Diablo Canyon.

The IRP proceeding, however, is better equipped to make that determination. The IRP is supposed to incorporate the analysis leading to an optimized portfolio of resources, reflecting constraints such as GHG emissions, reliability, cost, and RPS and energy efficiency requirements, while ensuring safe and reliable electricity service at just and reasonable rates. (R. 16-02-007 at 13.)

In short, the IRP has the ability to look at a bigger picture than this proceeding, and can better analyze the potential impacts of the retirement of Diablo Canyon and its interaction with other dynamics in the electricity markets in a manner consistent with state policies. PG&E’s previous Tranche 2 and 3 proposals would better be considered in the IRP proceeding.

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Starting with the last one, the retraining of Diablo Canyon employees is intended to support the placement of Diablo Canyon employees who are interested in transitioning to other employment roles within PG&E as a result of the retirement of Diablo Canyon, (Ex. PG&E 1 at 7-8). While the precise components and details of this program have not been determined, PG&E identifies possible elements of the program, including support for an internal PG&E job search, limited wage protection, professional and technical training and relocation assistance. (Id.)

PG&E forecasts the cost of the retraining program to be approximately $11.3 million, to be recovered through the NDNBC. (Id. at 7-11.) PG&E also requests a new two-way expense-only subaccount (the Employee Retraining Program Subaccount) within the existing Diablo Canyon Retirement Balancing Account.

The proposed retraining program is directly related to the retirement of Diablo Canyon, and the cost of the program is recoverable in rates through the NDNBC. (Pub. Util. Code sections 8322.5g and 833c) PG&E’s request for the retraining program, the new two-way expense-only subaccount, and associated rate recovery through the NDNBC is approved.

PG&E has in place an Employee Severance Program, which provides payments of specified amounts to employees whose jobs will be eliminated upon the closure of Diablo Canyon. (Ex. PG&E-1 at 7-7.) The Employee Severance Program is directly related to the decommissioning of Diablo Canyon, and $148 million in estimated costs for the program are already incorporated into

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PROPOSED DECISION

Overall, practical and policy reasons indicate that it is better for potential replacement procurement issues to be addressed in the Commission’s IRP process, rather than addressing it in a more piecemeal fashion in this proceeding. Accordingly, the need for and authorization of any replacement procurement should be addressed in the IRP proceeding. 16

3.3. Proposed Employee Program

PG&E proposes to implement an employee retention, severance and retraining program for its Diablo Canyon employees, and requests three related approvals from the Commission:

1. Recover $552.1 million in costs associated with retaining approximately 1,500 employees at Diablo Canyon to ensure the plant’s continued safe and efficient operation through the end of each unit’s license in 2024 and 2025, respectively, over a 7-year period through an annual expense-only revenue requirement of $50.9 million beginning January 1, 2015 through December 31, 2024 through the Nuclear Decommissioning Non-Bypassable Charge (DNBRC).

2. Implement the Employee Severance Program and authorize PG&E to continue to forecast and recover the cost of the Employee Severance Program in each subsequent Nuclear Decommissioning Cost Triennial Proceeding (NDCTP).

3. Recover $11.3 million in costs associated with retaining eligible employees at Diablo Canyon and to recover these costs over a 5-year period through an annual expense-only revenue requirement of $2.2 million from January 1, 2021 through December 31, 2025 through the NDNBC. (PG&E Opening Brief at 1.)

16 Or in another proceeding as determined in the IRP proceeding.

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PG&E’s decommissioning estimate. (Ex. PG&E-1 at 7-11.) PG&E does not request rate recovery for the severance program in this proceeding, as the forecast and recovery of costs are being addressed in PG&E’s NDCTP. (Id.) A severance program for Diablo Canyon employees is appropriate in light of the plant’s pending retirement, and the cost and retraining for that program should continue to be addressed in PG&E’s nuclear decommissioning proceeding.

PG&E’s proposed employee retention program, however, is not so clearly related to the decommissioning of the plant. EPUC argues that the costs of the retention program are not related to the decommissioning of the plant, but rather to its continued operation.

The retention program is part of the operating costs of the plant, incurred to ensure there are qualified employees to continue to operate the plant. As Ms. King testified, it has been a regular practice in the past to increase wages of plant employees to retain them. (Ex. omitted) Such operating costs have been, and should continue to be, recovered through the energy rates charged to benefited customers, who benefit from the operation of the plant. (EPUC Reply Brief at 6.)

In response, PG&E argues that the retention program is related to the retirement of the plant, as almost that there would not be a need for the retention plan.

The only reason the Employee Program is necessary is due to the announcement that PG&E would retire and decommission the plant. Accordingly, there is a direct causal link between the closure of the plant and the Employee Program, making it appropriate to recover the costs of the Employee Program through decommissioning rates. (PG&E Reply Brief at 6.)

16 PG&E’s more recent estimate of the cost of the program is $558 million.
PROPOSED DECISION

At the same time, however, PG&E acknowledges that it intends to continue to operate Diablo Canyon for almost a decade before it plans to actually retire the plant. (Ex. PG&E-1 at 7-2.) Looking at PG&E’s proposal, it appears to confirm that EPUC’s position is correct: PG&E is proposing to keep operating Diablo Canyon until 2024/2025, and is proposing the retention program for the purpose of keeping the plant operating, not for the purpose of shutting it down. (PG&E Reply Brief at 49.) This is further reinforced by the fact that the retention program ends on August 31, 2023, but the plant will not completely retire until 2025. (Ex. PG&E-1 at 7-4.) Accordingly, rate recovery for the employee retention plan should come through the existing ratemaking treatment for the operation of Diablo Canyon, not through the NDNBC.

In addition, there are problems with the design and the resulting cost of PG&E’s proposal. PG&E, with the support of the Joint Parties, proposes to pay retention bonuses to every employee of the plant who continues to work through specified time periods. PG&E proposes two “ tiers” of retention payments. Tier 1 would run from September 1, 2016 through August 31, 2020, would provide a retention payment to each employee of 25% of the employee’s base salary at the end of each of the four years, and would cost $191.6 million. Tier 2 would run from September 1, 2020 through August 31, 2023, would provide a retention payment to each employee of 25% of the employee’s base salary at the end of each of the three years, and would cost $160.9 million. (Ex. PG&E-1 at 7-4 and 7-6.) PG&E’s estimated $352.0 million cost for the retention plan assumes that approximately 15,000 employees would be retained until August 31, 2023. (Id. at 7-6.)

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show that the amount of ratepayer dollars requested is necessary or reasonable. Based on the record of the proceeding, the funding level recommended by ORA is more reasonable, and we authorize rate recovery of $160.5 million for PG&E’s employee retention program.

One aspect of PG&E’s proposed employee retention program is that PG&E requested Commission approval of a very specific and detailed proposal, including a payment schedule. (Ex. PG&E-1 at 7:54) Under PG&E’s approach, the specifics of the retention program would effectively be locked in place by a Commission decision, meaning that neither employees, nor unions, nor PG&E could renegotiate a new deal absent Commission approval. In essence, PG&E has delegated management of the program to the Commission. ORA proposes to provide PG&E a little more flexibility in implementing the retention program, but limiting the payments to three years, similar to PG&E’s proposed Tier 2. (ORA Opening Brief at 25-26.)

Because the level of funding authorized by this decision is significantly different than the amount proposed by PG&E (and its unions), PG&E should have the opportunity to consider (and negotiate with its unions) the best way to implement the employee retention program. Accordingly, this decision authorizes rate recovery for up to $160.5 million for an employee retention program that is designed to provide incentives as needed for sufficient PG&E employees to continue working at Diablo Canyon up until the date of its retirement, but this decision does not specify a particular structure or schedule for that program, PG&E is responsible for the effective management of Diablo

13 By comparison, the PG&E’s retaining program is only a general outline and an overall budget.

14 120 out of 176 represented employees,

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settlement on this issue is fair to PG&E. Because the cost of the payment would be recovered in rates, PG&E itself bears no out-of-pocket costs, ORA and TURN argue that PG&E's willingness to provide funding to the community is essentially a type of charitable giving, intended to enhance PG&E's goodwill in the community, and as such should be funded with shareholder dollars, not ratepayer dollars. (ORA and TURN Joint Comments at 6-7.) PG&E, the Local Cities and the County respond that the CIMP payments do not meet the technical definitions of a charitable gift or a goodwill payment. (PG&E Reply at 10-13; Coalition Cities' Reply at 10-11; County Brief at 17-19.) While PG&E and its supporters may be correct that the payments (in large part due to their multiplicity of benefits) may not squarely fall into the technical definitions of charitable giving or goodwill payments, ORA and TURN raise a fair point that as a practical matter, PG&E will garner praise and enhance its reputation in the community as a result of the CIMP. (ORA and TURN Comments at 6-7.)

PG&E also gets another benefit: the support (or at least non-opposition) of the settling parties for its other litigation positions. The settling parties agreed to:

[]Support the Employee Program as proposed by PG&E in its Application initiating this proceeding, and the County, the Cities, and the District agree not to oppose or to take no position on the remaining relief requested in PG&E's Application, as modified by the Agreement. (Joint Motion, December 28, 2016 at 2.)


In short, this appears to be a very good deal for PG&E - it gains some community goodwill, and gets support (or eliminates potential opposition) for its litigation positions, and all at no financial cost.

The fairness to the community is less clear. While the proposed settlement's payment of $85 million is a clear benefit to the recipient community, it is not clear that the payment is allocated fairly. The County, Local Cities, and the School District, which are parties to the proceeding, negotiated the proposed payment with PG&E, are getting a total of $85 million in funding. There are, however, other cities and local districts that will be affected by the retirement of Diablo Canyon that are not parties to the settlement and do not receive direct funding under the proposal.20 (See, Transcript vol. 9 at 1,389-91, 1,436-37.) Overall, the amount and allocation of payments appears to have more to do with PG&E's litigation needs than the economic needs of the community. While the community strongly supports the proposed settlement, we cannot tell from the record whether the proposed payment, and particularly its allocation, is fair to the affected communities. A clearer picture of the economic impacts on the community should be available upon completion of the assessment required under Pub. Util. Code § 712.5.

Finally, it is essential to consider whether the proposed settlement is fair to PG&E's ratepayers, who are being asked to pay the $85 million cost of the payment program. ORA and TURN oppose the proposed payment. ORA argues that the payments to be made "would effectively be a substitute for

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20 They may, however, get funds allocated to them by the County.

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PROPOSED DECISION

Canyon-related property taxes will decrease precipitously and jeopardize the ability of the County to provide basic public and educational services. If the threat actually materializes, the County wants to be made whole. By its recommendation, the County seeks adoption by the Commission of a mechanism that assures that the County has the opportunity to recover the property tax revenues they had a reasonable expectation of receiving but for electric restructurings.

The County recommendation is that this Commission should:

- Find that $158 million (NIP in 1999 dollars) represents a reasonable estimate of the potential difference between property tax revenues that the County would have received from PG&E in the absence of accelerated recovery of Diablo Canyon depreciation and what the County could actually receive given restructuring. [...] [Order that the $158 million in potentially forgone property taxes be collected by PG&E at a rate of $3.95 million per year during the CTC recovery period and held in a separate, segregated interest-bearing account until 2026.]
- Order PG&E, starting in 1999 and continuing thereafter on an annual basis, to withdraw funds from the segregated CTC account and to remit the County the difference between the estimated tax payments based upon straight-line depreciation of Diablo Canyon through the year 2026 [...] and the amount of property taxes actually determined [sic] to be due and payable by PG&E to the County in each year, to the extent such actual taxes are less than the estimated straight-line depreciation based property taxes [...]. [...] The County asserts that adoption of its recommendation will provide protection against the possibility that the County will experience drastic reductions in property tax revenues as a direct result of electric restructurings. If the risk of property tax reductions does not materialize or produces lower tax revenue losses than predicted, any excess amounts otherwise reserved for payment to the County will be returned to ratepayers.
- The County contends that the evidence produced by it shows: -37-

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PROPOSED DECISION

[PG&E and ORA oppose the County. [...] In addition to the problems in predicting the actual impacts of restructuring on the County, PG&E asserts that the County's proposal to recover lost property tax revenues is legally suspect, as PG&E contains no explicit provision to allow utilities to recover costs or lost governmental revenues that they are not liable for but which are incurred by third parties, such as counties, under restructuring. In addition, as a general principle of ratemaking, utilities are not permitted to include in their cost of service payments which in fact they have not incurred or accrued, or forecast to incur, and which they have not become legally obligated to incur or accrue.]

ORA states that the County has not cited any statute or rule that would support its position. ORA notes that there has never been any guarantee that Diablo Canyon property tax revenues would not decrease, even in the absence of electric restructuring and PG&E's accelerated depreciation proposal. For example, if Diablo Canyon continued to perform at current levels in the future such that PG&E recovered more in revenues than intended under the original ratemaking settlement, the Commission could require a reduction in prices as was done in 1995, or the early term of the ratemaking treatment. This would impact San Luis Obispo tax revenues, even in the absence of electric restructuring. In addition, nothing in the existing Diablo Canyon ratemaking treatment precludes the facility from shutting down, not just for catastrophic failure, but for economic reasons as well. Under such circumstances, regardless of electric restructuring, there would likely be no tax revenues for San Luis Obispo. [...] [...] Most telling is ORA's argument that San Luis Obispo would have the Commission impose on ratepayers what is essentially a tax that is entirely unrelated to utility service. The County's proposal that ratepayers pay for property taxes that PG&E does not incur is not permitted under either general ratemaking principles or public utility law. Section 451 of the FE Code requires: "All charges demanded or received by any public utility, for any product or commodity furnished or to be furnished or any service rendered or to be rendered shall be just and reasonable. Every -39-
and the County and School District enter into a settlement that resolves claims by the latter parties relating to the effects of AB 1890 (Brulte), enacted 1996, Chapter 854, then PG&E may recover an additional amount, not to exceed $10 million, through base rates in 1998. (Resolution E-3535 at 3.)

In short, there was express legislative authorization for rate recovery for a payment to the community, which was implemented by Resolution E-3535. Accordingly, ratepayer funding of the CIMP is not authorized. If legislation specifically directs this Commission to provide ratepayer funding for the CIMP (or a similar payment to the community), the Commission would do so, as it did in 1998. PG&E may also choose to use shareholder funds to support the CIMP.

3.5. Recovery of License Renewal Costs

In its Application, PG&E requested rate recovery for $52,688 million in costs incurred for its efforts to renew the NRC operating licenses for Diablo Canyon. (Ex. PG&E-1 at 9-4.) This request was opposed by TURN, ORA, AINR, and Mothers for Peace, who argued that PG&E should not get rate recovery for any of the costs associated with relicensing Diablo Canyon. (See, e.g. TURN Protest at 4-6; AINR Protest at 5-13.)

In late 2009, PG&E filed an application with the NRC to renew Diablo Canyon’s operating licenses. In early 2010, PG&E filed an application with this Commission requesting rate recovery for its estimate of $85 million in costs for Diablo Canyon NRC license renewal and related activities. (Ex. PG&E-1 at 9-4.)

For all three periods, PG&E’s original request included rate recovery for Allowance for Funds Used During Construction (AFUDC), reflecting the financing cost of the license renewal project. (Id.) TURN and AINR questioned PG&E’s request for recovery of AFUDC, given that the license renewal project was abandoned or cancelled. (See, Transcripts Vol. 8 at 1214-1246.)

Subsequent to evidentiary hearings, a joint motion for adoption of a settlement agreement was filed by PG&E, AINR, TURN, ORA, Mothers for Peace, FOE, NRDC, Environment California, IBEW 1245, and CCUR (Settling Parties). The proposed settlement addresses the costs incurred by PG&E for its license renewal activities, and recommended that PG&E be granted $18.6 million in rate recovery. (May 23, 2017 Joint Settlement Motion at 13-15.) The motion explained the basis for this number:

In approaching settlement on this issue, the Settling Parties sought to identify a set of principles upon which to base that settlement. One principle was that PG&E should recover its direct costs incurred during the time that the project was reasonably and prudently undertaken. In this regard, the Settling Parties agreed, for the purpose of compromise and without conceding their litigation positions, that the Commission should consider the project reasonably and prudently undertaken from its inception in 2009 until April 10, 2011, when PG&E requested that the Nuclear Regulatory Commission ("NRC") defer issuance of the Diablo Canyon renewed operating licenses. (Ex. 846.) The Settling Parties agreed that PG&E should not recover the direct costs incurred subsequent to that deferral request. After reviewing the costs of the project as summarized in Exhibit PG&E-2, as corrected in Attachment 2 to this Motion, the Settling Parties submit that...
unreasonable for PG&E to seek to renew Diablo Canyon’s NRC licenses, but did not do so. And finally, the realities on the ground in California were very different in 2009 than they are in 2017. Our current situation, with the rapid growth of renewable generation and CCAs, had not so fully manifested itself yet, making Diablo Canyon look to be a potentially more valuable asset than it is now. There is not a good basis to now find unreasonable PG&E’s decision in 2009 to pursue relicensing of Diablo Canyon. Indeed, it is reasonable to grant PG&E a rate recovery for the costs (not including AFUDC) that it incurred through April 2011, as proposed by the settlement.

The rate recovery structure of the proposed settlement is described:

The Agreement further provides that PG&E should be authorized to recover the $18.6 million through an annual, levelized, expense-only revenue requirement to be recovered from customers over an 8-year period from January 1, 2018, through December 31, 2025, through the generation rate component of PG&E’s rates. (May 23, 2017 Joint Settlement Motion at 15.)

The proposed settlement on license renewal costs is approved, including the amount of cost recovery and the ratemaking structure. The provisions of the proposed settlement addressing cancelled capital projects are discussed in the Proposed Ratemaking and Cost Allocation Issues section below.

3.6. Proposed Ratemaking and Cost Allocation Issues

PG&E’s proposed ratemaking treatment for Diablo Canyon as it approaches retirement does not alter the existing ratemaking treatment, which

5 \*Whether PG&E was reasonable to continue relicensing activities after April 2011 is less clear, and the proposed settlement’s use of that date as a cutoff is reasonable and is supported by the record.

In general, this approach (and the new subaccount) is reasonable. However, the review and true-up process should be reviewed in a GRC (or in a process established in a GRC) rather than by advice letter.

For the employee retirement program, as discussed in the employee program section above, the estimated cost of $11.3 million is recoverable in rates through the NDNRC. PG&E’s request for a two-way expense-only subaccount (the Employee Retraining Program Subaccount) within the existing Diablo Canyon Retirement Balancing Account is approved.

For the employee retirement program, as discussed in the employee program section above, PG&E is authorized rate recovery for up to $160.5 million through the existing ratemaking treatment for the operation of Diablo Canyon, PG&E is authorized to establish a two-way expense-only balancing account (or subaccount) consistent with this decision. PG&E shall file a Tier 2 Advice Letter no later than six months from the date of this decision with a description of its employee retention plan.

For the cost of PG&E’s NRC license renewal project, as discussed in the license renewal costs section above, PG&E is authorized to recover $18.6 million for the license renewal project through an annual, levelized, expense-only revenue requirement of approximately $2.4 million to be recovered from customers over an 8-year period from January 1, 2018, through December 31, 2025, through the generation rate component of PG&E’s rates.

For cancelled capital projects at Diablo Canyon, PG&E is authorized rate recovery generally consistent with the proposed settlement on relicensing costs, under which:

PG&E would be authorized to recover 100% of the direct costs associated with cancelled capital projects at Diablo Canyon recorded to the project as of June 30, 2016, and would be further authorized to

5 In addition, these capital project costs charged would include AFUDC.
the current scope of this proceeding, PG&E is directed to abide by that commitment. (Scoping Memo at 6.)

The commitments and directions in the Scoping Memo are reiterated here in order to ensure that there will be local input and further Commission review prior to the disposition of Diablo Canyon facilities and surrounding lands.

All unaddressed motions are denied.

4. Comments on Proposed Decision
   The proposed decision of ALJ Allen was mailed to the parties in accordance with Section 311 of the Public Utilities Code, and comments were allowed under Rule 14.3 of the Commission’s Rules of Practice and Procedure. Comments were filed on _____ by _______. Reply comments were filed on _______ by _______.

5. Assignment of Proceeding
   Michael Picker is the assigned Commissioner and Peter V. Allen is the assigned Administrative Law Judge in this proceeding.

Findings of Fact
1. Continuing operation of Diablo Canyon Unit 1 beyond 2024 and Unit 2 beyond 2025 would require renewal of NRC licenses, and would not be cost effective.
2. The retirement of Diablo Canyon will not cause adverse impacts on local or system reliability.
3. The impact of the retirement of Diablo Canyon on greenhouse gas emissions is not clear.
4. The IRI proceeding is broader in scope than this proceeding, and is considering issues including greenhouse gas emissions and optimized portfolios of generation resources.

...
be local input and further Commission review prior to the disposition of Diablo Canyon facilities and surrounding lands.

14. Application 16-08-006 is closed

This order is effective today.

Dated ______________, at San Francisco, California.

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DCISC

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

November 18, 2017

Mr. James Welch
Vice President, Nuclear Generation & Chief Nuclear Officer
Pacific Gas & Electric Company
Diablo Canyon Power Plant
Avila Beach, California 93424

Re: DCISC's Twenty-Seventh Annual Report on Safety of Diablo Canyon Operations
July 1, 2016 - June 30, 2017

Dear Mr. Welch:

At its October 18, 2017 meeting in Avila Beach the Diablo Canyon Independent Safety Committee acted to approve and adopt its Twenty-Seventh Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations for the period of July 1, 2016 through June 30, 2017. The two volumes which make up the Annual Report are enclosed. The DCISC made one recommendation during this report period. An electronic copy of the complete report, together with both bound volumes, is also being sent to CNO Support Manager Mr. Hector Garcia, the Committee's principal liaison with Diablo Canyon. Pursuant to the Restated Charter for the Committee approved by California Public Utilities Commission Decision 1708-03-028, the report is hereby submitted to PG&E for its review and written response within forty-five days.

Upon receipt of the PG&E response, this report shall become a part of the DCISC report, and we shall submit the complete report to the Public Utilities Commission, the Attorney General, and the California Energy Commission, as provided by the Restated Charter.

If you have any questions or comments concerning the above, please feel free to contact me.

Very truly yours,

Robert R. Wellington
DCISC, Legal Counsel
Dear Mr. Malbauw,

Thank you for your attendance and the comments you made to the DCISC Members at the October 2017 DCISC public meeting concerning Debbie Canyon Power Plant's adherence to fire prevention regulations.

This will acknowledge receipt of your letter to me of October 20, 2017, together with the enclosed documents including the email from Mr. Loebnau of the Union of Concerned Scientists to which you made reference at the meeting last week. This will also confirm that your letter and all documents have been provided to our Members and Technical Consultants for review. I expect to have a response on behalf of the DCISC to your concerns.

Again, thank you for bringing your concerns to the DCISC's attention and for your participation at its public meetings. Both are much appreciated by the Members and Consultants.

Best regards,

Bob Raisle
DCISC Asst. Legal Counsel
(909)439-4688
raisle@dcsic.org

---

Info@DCISC.org

From: Rochelle Becker, <rochellebecker@gmail.com>
Sent: Friday, October 27, 2017 5:33 PM
To: Info@DCISC.org
Subject: Re: Constructive Criticism re FF Reports

Thank you, Bob, for the quick response.

I look forward to receiving clarification on an issue that of concern that includes cost, deferred maintenance, and a change of bookkeeping (overhead) that raised red flags.

The fog has returned here as well and adorable little goblins fill the park across the street in Groovy Grove.

In peace.

Rochelle

On Fri, Oct 27, 2017 at 6:26 PM, Info@DCISC.org <info@dcsic.org> wrote:

Rochelle – thank you for your comment about the inadvertent use of "we" in discussions concerning PG&E. I know the Consultants will appreciate this constructive criticism and strive for more precise in their fact-finding reports and comments during the public meetings.

I can also confirm that the Committee is preparing and planning to follow up on the concerns expressed to you in your recent letter and I hope to have more information for you in the near future.

Please know that I wish you a very enjoyable weekend – the fog is now over Monterey Bay this evening so the recent heat wave seems to be over for now.

Best regards,

Bob

From: Rochelle Becker <rochellebecker@gmail.com>
Sent: Thursday, October 26, 2017 7:40 PM
To: Info@DCISC.org
Subject: Re: Fire doors (cost, replace vs repair)

Hi Rob,

Attached is a letter explaining the confusion and both video clips referred to in the letter. Hope this is helpful to the committee to understand why we feel the DCISC response is inadequate and/or incorrect.

Rochelle

On Thu, Oct 26, 2017 at 6:38 PM, Info@DCISC.org <info@dcsic.org> wrote:

Rochelle – thank you for your letter and the video clips with reference to your two questions on Consultant Wardell’s report on the July 25-26 fact-finding concerning replacement/repair of the fire doors at the plant. This will acknowledge receipt and confirm that I provided your letter and the video clips to the DCISC Members and Consultants for their review and consideration of a response clarifying the DCISC’s position.

Thank you also for taking the time to express your concerns; it is much appreciated.

Best regards,

Bob Raisle
On Wed, Oct 25, 2017 at 12:18 PM, DCSafety@DCISC.org <DCSafety@DCISC.org> wrote:

Rochelle — I will provide your email to the Members and Technical Consultants for follow-up.

From my notes of the meeting on October 17, after Consultant Wardell’s presentation on the July 25-26 fact-finding which included the fire doors, I have you asking about the fire door degradation and if the pattern of repair rather than replacing a defective door had changed, that is, was the intent previously replacing doors rather than repairing them in the past? Again, from my notes, I have Consultant Wardell responding to your inquiry as to why it is more expensive now than in the past with the statement that the cost has increased due to the addition of corporate overhead charges.

If you have sections of the fire discussion that augment or better explain your question and the issues, they would be helpful and most welcome and I can provide them to the Committee. We do not yet have the audio file used for transcribing the discussion.

Thanks for contacting us on this and we will follow through with a response.

Bob

From: Rochelle Becker [mailto: rochellebecker@gmail.com]
Sent: Wednesday, October 25, 2017 10:39 AM
To: DCSafety@DCISC.org
Subject: Fire doors (cost, replace vs repair)

Dear DCISC,

I have run the DCISC response to my questions on Fire Doors past two industry experts and both are confused by the Committee’s explanation. PG&E was in the room during the response but did not offer clarification and therefore AANR from the DCISC record may be inaccurate. Might it be possible to run this by PG&E for their clarification of cost breakdown and the backing of fire door replacements and/or repairs? I can send sections of the discussion if this might be helpful.

Rochelle Becker, Executive Director
Alliance for Nuclear Responsibility
PO 1328
San Luis Obispo, CA 93406
www.ana.org

In Peace
Rochelle Becker, Executive Director
Alliance for Nuclear Responsibility
PO 1328
San Luis Obispo, CA 93406
www.ana.org
Dear Mr. Jones,

On behalf of the Committee Members, the Technical Consultants and for myself, thank you for contacting the DCISC with your kind email. I know that the DCISC will be closely following the activities of the Community Engagement Panel in connection with the SONGS decommissioning so the DCISC prepares for whatever role it may undertake as Diablo Canyon moves toward decommissioning, with reference to the pending application before the California Public Utilities Commission which would provide for disposal of both units upon expiration of their current operating licenses from the NRC in 2014 and 2025, respectively.

We very much value and appreciate your attendance at the October 2017 public meeting and invite you to attend in person or by live-streaming the next DCISC public meeting scheduled for February 7-8, 2018 in Avila Beach. Please visit our website at www.dcisc.org for more information on the Committee, its members and activities.

Thank you once again, and please accept my apologies for having taken too long to respond to and acknowledge your message.

Best regards,

Bob Rauhla
DCISC Admin/Legal Counsel
(805) 433-4688
info@dcisc.org

From: Judy Jones [mailto:judejones414@gmail.com]
Sent: Friday, October 20, 2017 10:02 AM
To: dcsafety@dcisc.org
Subject: Enjoyed Meeting You

I am a frequent attendee at the CEP near SONGS and really appreciate the in-depth knowledge of your panel. I am very glad I had the experience and I certainly envy the Diablo Canyon area!

Judy Jones
Seabrook, CA
949-433-4086

Simone A. Melboud
309 Henrietta Avenue
Los Osos, CA 93402

October 10, 2017
Robert W Rauhla, Attorney at Law
677 Casa Street
Monterey, CA 93940

Dear Mr. Rauhla:

Here are the copies of documents requested by the Diablo Canyon Independent Safety Committee, from my speech at the meeting in Avila Beach, October 15, 2017. For your information, though only part of the email I sent to Dave Tchihalem, Union of Concerned Scientists, was referenced by me to the committee, he did give me permission to send the whole email. You will find a redacted copy of my email to him.

Do believe his attachments on the email were given either to you or someone else on the committee already. A copy of this packet of documents has also been provided to the Members for Peace. Please note that the documents are NOT stapled together. I was not sure if you wanted that or not. If you need any further clarification, please do not hesitate to contact me.

Thank you very much.

Simone A. Melboud
simonamelboud@gmail.com

G.2 – 624

NPP Fire Safety Standards

By: __________________

G.2 – 625

G.2 – 626
On final point about the modifications — that extensive revisions to procedures and modifications to the reactors were required is highly suggestive of how far out of compliance Diablo Canyon had been from the fire protection regulations. Had it simply been a matter of doing some evaluations to show that the plant’s existing configuration was safe, then I’d have heard of it and raved. But the existing configuration was not safe — extensive procedure revisions and plant modifications were necessary to make it safe.

And if PG&E was always in compliance as it seems to think (or at least claim), why did they spend so many millions of dollars to sustain that purported compliance?

Thanks,

Daveロックbaum
UCS

From: Simone Malboeuf <simonemalboeuf@gmail.com>
Sent: Wednesday, October 18, 2017 4:36:08 PM
To: Daveロックbaum
Subject: NRC Fire Safety Standards

Dear Daveロックbaum,

On April 14, 2016, the NRC approved PG&E's plans for transitioning to NFPA 805. In other words, the NRC granted the amendment that PG&E requested back in June 2013. The NRC's approval letter is attached.

Diablo Canyon is STILL not in compliance with fire protection regulations, even the NFPA 805 ones.

I call your attention to paragraph G.2 on page 6 of the NRC's letter. It requires PG&E to complete the modifications to the plant outlined in their letter dated January 28, 2016. The Unit 1 modifications must be completed by its 30th refueling outage planned for April/May 2017 and the Unit 2 modifications must be completed by its 20th refueling outage in February/March 2018. So, at least Unit 1 has achieved compliance with the NFPA 805 regulations and Unit 2 is less than a year away. Safety IGUs protect no one.

G.2 – 627

15 Fire Safety Regulations not yet sent to ICCSC attorney Robert Radkows, Monterey, CA
15 fire safety petitions sent from 4-12-16 through 9-23-18
365 total signatures.

G.2 – 628

Ann's Powerpoint Summary

NRC's Failure to Enforce Reactor Fire Regulations

G.2 – 629

G.2 – 630
The 1986 explosion at Three Mile Island, despite initial attempts to contain the release of radiation, caused significant environmental damage. The incident raised concerns about the safety of nuclear power plants, leading to increased regulation and scrutiny. The 1980 Nuclear Regulatory Commission (NRC) added a new set of fire protection regulations, called the NUREG-855 project. The 1986 regulations required 30% improvements in plant fire protection, including new ways to detect and respond to fires. The regulations also increased the need for automatic fire suppression systems.

The NRC has for many years turned a blind eye to broad violations of its fire protection regulations, particularly where there has been negligence or a failure to properly maintain and test fire protection systems. Despite knowing that the regulations were not being followed, the NRC has been lenient in its enforcement, even in cases where there has been a failure to maintain fire protection systems.

The NRC has also failed to adequately fund fire protection services, which has led to understaffing and underfunding. The NRC has also been criticized for its inadequate response to fires, such as the 2017 fire at the Davis-Besse Nuclear Power Station.

In conclusion, the NRC needs to make significant improvements to its fire protection regulations and enforcement. The NRC must also prioritize funding and staffing for fire protection services to ensure the safety of nuclear power plants.

46 Reactions at 28 Plants Out of Compliance with Fire Safety Regulations

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In summary, the NRC has failed to adequately protect the public from the risk of fire at nuclear power plants. The NRC must take decisive action to improve its fire protection regulations and enforcement to ensure the safety of nuclear power plants.

Today nearly half of all operating nuclear reactors do not comply with NRC fire regulations.

Longstanding Compliance Problems

The NRC must address several longstanding compliance issues to improve fire protection:

- Manual asbestos: Asbestos, once common in nuclear facilities, can still be found in many reactors.
- Legacy reactors: Many older reactors lack the necessary systems in place to protect against fires.
- Outdated systems: Many fire protection systems are outdated and ineffective.

These issues must be addressed to ensure the safety of nuclear power plants.

G.2 - 631

G.2 - 632

G.2 - 633

G.2 - 634
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**Petition Title: Require Diablo Canyon Nuclear Power Plant to comply with required fire safety standards within 4 years.**

"Why do we need this petition? The current fire protection standards being applied to Diablo Canyon Nuclear Power Plant are grossly inadequate and need to be revised as soon as possible to provide adequate protection to the residents of San Luis Obispo County. This petition is based on the attached article by Robert Lott, Fire Chief of San Luis Obispo County, which addresses the need for fire protection at nuclear plants given the kind of fire protection challenges that are faced by nuclear power plants. The petition also refers to the Fukushima disaster in March 2011. (See attached article.)

"Diablo Canyon's fire protection program does not meet current NPSA 2015 standards which were adopted in 2004. It also leaves the citizens of SLO County vulnerable to the serious and possible life-threatening consequences should a fire be experienced at Diablo Canyon. According to David Lerro, who is now Nuclear Safety Division Manager, our 2008 report suggested a clearer mark of the Harris plant in January 2013. The report was based on a full-blown analysis of the Harris plant's fire protection system, which had been adopted in 2004. More than five years later, the Harris plant was still operating without a fire protection system. Our report sought to accelerate that pace and eliminate additional delays. The Harris plant has successfully completed some of the fire protection improvements in 2005, showing that it indeed can be done and in the less time than Diablo Canyon has taken."

**Petition Signatures**

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Petition Title: Require Diablo Canyon Nuclear Power Plant to comply with required fire safety standards within 4 years.

Petition Signatures: Page 3 Date: 4-17-15

Petition Title: Require Diablo Canyon Nuclear Power Plant to comply with required fire safety standards within 4 years.

Who do we need this petition? The current fire protection standards being applied to Diablo Canyon Nuclear Power Plant are grossly inadequate and need to be reviewed and reformed: please provide protection to the residents of San Luis Obispo County. This petition is based on an earlier article by Robert Lewis, Fire Chief of SLO County Fire Department. This article addresses the need for new fire protection at nuclear plants, given the kinds of fire protection challenges that must be addressed in nuclear power plants. This petition is based on the earlier article by Robert Lewis, Fire Chief of SLO County Fire Department. This article addresses the need for new fire protection at nuclear plants, given the kinds of fire protection challenges that must be addressed in nuclear power plants.

Diablo Canyon's fire protection program does not meet current NFPA 850 standards which were adopted in 2004. It therefore leaves the citizens of SLO County vulnerable to the serious and possible life-threatening consequences should a large fire be experienced at Diablo Canyon. According to David Loehman of Union of Concerned Scientists, "Our 2008 report urged the Southern California Edison to adopt a new fire protection system at Diablo Canyon. In 2009, the Southern California Edison announced that it would adopt a new fire protection system at Diablo Canyon. The new system would allow for a faster and more effective response to a fire at Diablo Canyon. This petition is based on the earlier article by Robert Lewis, Fire Chief of SLO County Fire Department. This article addresses the need for new fire protection at nuclear plants, given the kinds of fire protection challenges that must be addressed in nuclear power plants.

This petition is based on the earlier article by Robert Lewis, Fire Chief of SLO County Fire Department. This article addresses the need for new fire protection at nuclear plants, given the kinds of fire protection challenges that must be addressed in nuclear power plants.
**Petition Title:** Require Diablo Canyon Nuclear Power Plant to comply with required fire safety standards within 4 years.

**Petition Signature Page 1**

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**Petition Title:** Require Diablo Canyon Nuclear Power Plant to comply with required fire safety standards within 4 years.

**Petition Signature Page 1**

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**Petition Title:** Require Diablo Canyon Nuclear Power Plant to comply with required fire safety standards within 4 years.

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To: Supervisor Bruce Gibson, Chairman of San Luis Obispo County Board of Supervisors

Petition Title: Require Diablo Canyon Nuclear Power Plant to comply with required fire safety standards within 4 years.

Why do we need the petition? The current fire protection standards being applied to Diablo Canyon Nuclear Power Plant are grossly inadequate and need to be revised as soon as possible to provide protection to the residents of San Luis Obispo county. This petition is based on an attached article by Robert Lewis Fire Chief of SLO county fire department. This article addresses what was learned about the needs for fire protection at nuclear plants, given the kinds of fire protection challenges "accidents/disasters" nuclear power plants may be subjected to, as evidenced by the Fukushima disaster. In March 2011. (See attached article)

Diablo Canyon's fire protection program does not meet current NFPA 850 standards which were adopted in 2004. It therefore leaves the citizens of SLO county vulnerable to the serious, and possible life threatening consequences should a large fire be experienced at Diablo Canyon. According to David Lofiiburn of Union of Concerned Scientists, "Our 2008 report targeted the Harris Pumps nuclear plant in North Carolina. It was the pilot plant for transitioning to the NFPA 850 standards, which had been adopted in 2004. More than four years later, the Harris plant was still navigating towards compliance. Our report sought to accelerate that pace and eliminate additional delays. The Harris plant has successfully completed transition to the NFPA 850 standards - showing that it indeed can be done and in far less time than Diablo Canyon has taken."

Petition Signatures: Page 1

Petition Signatures: Page 2
**Petition Title:** Require Diablo Canyon Nuclear Power Plant to comply with required fire safety standards within 4 years

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June 28, 2013
PG&E Letter DCL-13-065

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-2001

Diablo Canyon Units 1 and 2
Docket No. 50-375, OL CPRR-01
Docket No. 50-335, OL CPRR-82

License Amendment Request 12-03


References:
2. PG&E Letter DCL-11-076, Request for Extension of Enforcement Deadline and Commitment to Submit Application to 10 CFR 50.94(g) License Amendment Request, dated June 24, 2011
3. NRC Letter to PG&E, "Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Commitment to Submit a License Amendment Request to Transition to 10 CFR 50.94(g), National Fire Protection Association Standard 803, and Request to Extend Enforcement Date until October 2012," dated July 28, 2011

Dear Commissioners and Staff:

Pursuant to 10 CFR 50.99, Pacific Gas and Electric Company (PG&E) hereby requests approval of the enclosed proposed amendment to Facility Operating License Nos. CPRR-01 and CPRR-82 for Units 1 and 2 of the Diablo Canyon Power Plant (DCPP) respectively.

The enclosed license amendment request (LAR) requests Nuclear Regulatory Commission (NRC) approval for adoption of a new fire protection (FP) licensing basis, which complies with the requirements in 10 CFR 50.94(g), 10 CFR 50.94(h), and the guidance in Regulatory Guide (RG) 1.205, Revision 1, 10. Regulation, Performance Based Fire Protection for Existing Light-Water Nuclear Power Plants.

This LAR also follows the guidance in Nuclear Energy Institute (NEI) 04-02.

A member at the EIA's Site-Specific and Resource Sharing Alliance (SISA) - Exercise Week - Diablo Canyon - Paul Merwin - South Texas Project - NAPA 803 - June 28, 2013

The Enclosure 1, Attachments C, D, G, and W Contain Security-Related Information - Without Under 10 CFR 5.100

When requested from these attachments, this document is declassified.

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G.2 – 679

Transition Report
Transition to 10 CFR 50.48(d) – NUREG-805

G.2 – 680

Provisional Operating License Markup

C. This License shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect and is subject to the additional conditions specified as incorporated below.

(1) Maximum Power Level
The Pacific Gas and Electric Company is authorized to operate the facility at reactor core power levels not in excess of 341 megawatts thermal (100% rated power) in accordance with the conditions specified herein.

(2) Technical Specifications
The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 217, are hereby incorporated in the license. Pacific Gas and Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise specified in specific license conditions.

(3) Initial Test Program (SGSR 31, Section 4.4.1)
Any changes to the Initial Test Program described in Section 14 of the FSAR made in accordance with the provisions of 10 CFR 50.59 shall be reported in accordance with 50.59(b) within one month of such change.

(4) Fire Protection (SGSR 31, Section 6.4.1 and SGSR 32, Section 10.2)

a. PG&E shall implement and maintain in effect all provisions of the approved fire protection plan as discussed in its Final Safety Analysis Report Update. In PG&E's December 6, 1994, Appendix B Report, and in the NRC staff's Fire Protection Evaluation Supplement 9, 9, 13, 23, and 31 of the Diablo Canyon Safety Evaluation Report, subject to revision below.
b. PG&E may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.
c. Debated.
a. PG&E shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.46(a) and 10 CFR 50.46(c), as specified in the PG&E amendment request dated June 27, 2013, and as approved by the NRC in its letter dated December 18, 2013, and as approved in the SEP dated January 30, 2014. Except where NRC approval for changes in deviations is required by 10 CFR 50.46(a) and (c) and as approved by the NRC, these changes shall be implemented by PG&E without any prior NRC approval, provided no other regulatory, technical specification, license condition or requirement would require prior NRC approval, and the changes satisfy the requirements of the SEP dated January 30, 2014.

b. Risk Informed Changes that May Be Made Without Prior NRC Approval

A risk assessment of the change must demonstrate that the acceptance criteria below are met. The risk assessment approach, methods, and data shall be acceptable to the NRC and shall be appropriate for the nature and scope of the change being evaluated. Based on the risk assessment, the changes shall be implemented and operational experience at the plant, and reflect the following:

1. Acceptable methods for the risk assessment may include:
   - Acceptable methods may include methods that have been used in the risk assessment of other reactors in the NRC.
   - Acceptable methods may include methods that have been demonstrated to be appropriate for the change.
   - Acceptable methods may include methods that have been demonstrated to be appropriate for the change.

2. Prior NRC review and approval of the change does not require changes to the NRC safety criteria.

   The proposed change must also be consistent with the design basis philosophy and maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

G.2 – 683

5.0 ADMINISTRATIVE CONTROLS

5.4 Procedures

5.4.1 Written procedures shall be established, implemented, and maintained covering the following activities:


b. The emergency operating procedures required to implement the applicable requirements of NUREG-1005 and NUREG-1255, Supplement 1, as stated in Generic Letter 82-03 and responses to the subject NUREG.

c. Quality assurance for efficient and environmentally friendly production.

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G.2 – 687

List of Regulatory Commitments

Commitment 1: (Section 5.4 of Transition Report)

After the approval of the LAR, in accordance with 10 CFR 50.71(a), the DCPP UPNAR will be notified. The item and content will be concurrence with NFE 04-02, Revision 3, FAQ 12-0062.

Commitment 2: (Section 5.5 of Transition Report)

Implementation of the new NPPS FP Program to include procedure changes, process updates, and training to affected plant personnel will occur within 180 days after issuance of the license amendment (see Attachment B, Table 5-3).

Commitment 3: (Section 5.5 of Transition Report)

PG&E will complete modifications necessary to support the new FP licensing basis for transitioning to NPPS by the end of the Units 1 and 2 Refueling Outages, currently scheduled for April/May 2017 (UR20) and February/March 2018 (UR20), respectively.

Commitment 4: (Section 5.5 of Transition Report)

Appropriate compensatory measures will be established per CMS LD2, "Fire System Improvement," and maintained until modifications are complete (see attachment B, Table 5-2).

Commitment 5: (Attachment 6 of Transition Report, Table 5-3)

Table 5-3, implementation items, provided below are those items (procedure changes, process updates, and training to affected plant personnel) that will be completed prior to the implementation of new NPPS FP Fire Protection Program (FP) as defined in Section 5.5 of this LAR.

G.2 – 688

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 14, 2016

Mr. Edward D. Halpin
Senior Vice President and
Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 65, Mail Code 3A65
Avila Beach, CA 93424

SUBJECT: Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Issuance of Amendment to License, Performance-Based Fire Protection Program in Accordance with 10 CFR 50.48(c) (NRC No. 0483 and NRC No. 0484)

Dear Mr. Halpin:

The U.S. Nuclear Regulatory Commission (NRC, the Commission) has issued the enclosed Amendment No. 225 to Facility Operating License No. DPR-80 and Amendment No. 227 to Facility Operating License No. DPR-80 for the Diablo Canyon Power Plant (DCPP), Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Design and Test Specifications (TMs) in response to your application dated June 10, 2013, its supplemental letters dated October 3, 2013, September 25, October 27, October 27, November 26, and December 31, 2014, February 25 (two letters), May 7, July 15, October 15, and December 31, 2015, and January 26, 2016. In the submittal, Pacific Gas and Electric Company (PG&E, the licensee) submitted a license amendment request to revise the fire protection program in accordance with Title 10 of the Code of Federal Regulations (10 CFR), Paragraph 50.48(c), for DCPP, Unit Nos. 1 and 2, and change the license and TMs accordingly.

The proposed amendment would transition the DCPP fire protection program to a risk-informed, performance-based program based on National Fire Protection Association (NFPA) 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2011 Edition" (NFPA 805), in accordance with 10 CFR 50.48(c). NFPA 805 allows the use of performance-based methods such as fire modeling and risk-informed methods such as fire probabilistic risk assessment to demonstrate compliance with the nuclear safety performance criteria.

The fire protection license condition in DCPP, Unit Nos. 1 and 2, licensees are revised to reflect the use of NFPA 805. To assure proper implementation of the licenses, the NRC is issuing License Change 3 through 12 for Unit 1 and License Change 3 through 10 for Unit 2, but the only changes are the changes to the fire protection license condition.

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G.2 – 690
A copy of the related Safety Evaluation is enclosed. The Notice of issuance will be included in the Commission's next regularly scheduled Federal Register notice.

Sharon E. Huber

Sue P. Little, Project Manager
Division of Operating Reactor/Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosures:
1. Amendment No. 225 to DPR-90
2. Amendment No. 227 to DPR-92
3. Safety Evaluation

cc: Wendy Marshall, Distribution via Letter

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AMENDMENT NO. 225 TO FACILITY OPERATING LICENSE NO. DPR-90

PACIFIC GAS AND ELECTRIC COMPANY
DIAZ COYAN POWER PLANT, UNIT NO. 1
DOCKET NO. 50-275

1. The Nuclear Regulatory Commission (the Commission) has found that:

A. The application for amendment No. 225 to DPR-90, received by the Commission on May 31, 2015, as supplemented by letter dated July 10, 2015, was supplemented by letter dated October 28, 2015, and December 3 1, 2015.

B. The facility will operate in accordance with the application, the provisions of the Act, and the rules and regulations of the Commission.

C. There is reasonable assurance (1) that the activities authorized by this amendment will be conducted without a threat to the health or safety of the public, and (2) that such activities will be conducted in compliance with the requirements set forth in Title 10 of the Code of Federal Regulations (10 CFR) Part 11.

D. The issuance of the amendment will not be inconsistent with the common defense and security or to the health and safety of the public and

E. The issuance of the amendment is in accordance with 10 CFR Part 11 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the licensee is advised by changes in the Technical Specifications of the Technical Specifications contained in Appendix A of the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 225, are hereby incorporated in the license. The changes to the Technical Specifications and the Environmental Protection Plan are hereby amended as follows:

(a) Technical Specifications

The Technical Specifications contained in Appendix A of the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 225, are hereby incorporated in the license. The licensee, Pacific Gas & Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. In addition, Paragraph 2.C.1 of Facility Operating License No. DPR-90 is hereby amended as follows:

(b) Fire Protection

A. After consultation with the Commission, the licensee shall:

a. Conduct a review of the plant's fire protection system and the procedures for responding to a fire incident. The review shall include an assessment of the adequacy of the existing system and the need for any modifications. The licensee shall submit a report of the results of this review to the Commission within 60 days of the issuance of this amendment.

b. After the review is completed, the licensee shall implement any necessary modifications to the fire protection system and procedures. The licensee shall submit a report to the Commission documenting the steps taken to address any deficiencies.

G.2 – 693

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ENCLOSURE 1

AMENDMENT NO. 225 TO FACILITY OPERATING LICENSE NO. DPR-90

PACIFIC GAS AND ELECTRIC COMPANY
DIAZ COYAN POWER PLANT, UNIT NO. 1
DOCKET NO. 50-275

2. Accordingly, the licensee is advised by changes in the Technical Specifications of the Technical Specifications contained in Appendix A of the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 225, are hereby incorporated in the license. The changes to the Technical Specifications and the Environmental Protection Plan are hereby amended as follows:

(a) Technical Specifications

The Technical Specifications contained in Appendix A of the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 225, are hereby incorporated in the license. The licensee, Pacific Gas & Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. In addition, Paragraph 2.C.1 of Facility Operating License No. DPR-90 is hereby amended as follows:

(b) Fire Protection

A. After consultation with the Commission, the licensee shall:

a. Conduct a review of the plant's fire protection system and the procedures for responding to a fire incident. The review shall include an assessment of the adequacy of the existing system and the need for any modifications. The licensee shall submit a report of the results of this review to the Commission within 60 days of the issuance of this amendment.

b. After the review is completed, the licensee shall implement any necessary modifications to the fire protection system and procedures. The licensee shall submit a report to the Commission documenting the steps taken to address any deficiencies.

G.2 – 694
as-operated, and maintained plant, and reflect the operating experience at DCPF. Acceptable methods to assess the risk of the change may include methods that have been used in the peer-reviewed Fire Probabilistic Risk Assessment model, methods that have been approved by NRC through a plant-specific license amendment or NRC approval of generic methods specifically for use in NPPA 805 risk assessments, or methods that have been demonstrated to bound the risk impact.

1. Prior NRC review and approval is not required for changes that clearly result in a decrease in risk. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

2. Prior NRC review and approval is not required for individual changes that result in a risk increase less than 1 x 10⁻¹²/mo for CDF and less than 1 x 10⁻⁷/mo for LERF. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

c. Other Changes that May Be Made Without Prior NRC Approval

1. Changes to NPPA 805, Chapter 3, Fundamental Fire Protection Program

Prior NRC review and approval are not required for changes to the NPPA 805, Chapter 3, Fundamental Fire Protection Program elements and design requirements for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is functionally equivalent or adequate for the hazard. PG&E may use an engineering evaluation to demonstrate that a change to an NPPA 805, Chapter 3, element is functionally equivalent to the corresponding technical requirement. A qualified fire protection engineer shall perform the engineering evaluation and conclude that the change will not affect the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard.

PG&E may use an engineering evaluation to demonstrate that changes to NPPA 805, Chapter 3 elements are acceptable because the alternative is "adequate for the hazard." Prior NRC review and approval would not be required for changes to NPPA 805, Chapter 3, for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is adequate for the hazard. A qualified fire protection engineer shall perform the engineering evaluation and conclude that the change will not affect the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard.

The License Condition does not apply to any demonstration of equivalency under Section 1.7 of NPPA 805.

d. Transition License Conditions

1. Before achieving full compliance with 10 CFR 50.49(b), as specified by (2) and (3) below, risk-informed changes to PG&E's Fire Protection Program may be made without prior NRC review and approval unless the change has been demonstrated to have more than a minimal risk impact, as described in c(2) above.

2. PG&E shall implement the modifications described in Attachment B, Table B.3, "Previous Modifications Committee," of PG&E Letter DCL-16-014, dated January 29, 2016, by the end of the Unit 1 and 2 refueling outage currently scheduled for April/May 2017 (1R20) and February/March 2018 (2R20). PG&E shall maintain appropriate compensatory measures in place until completion of the modifications described above.

3. PG&E shall implement the items as listed in Attachment B, Table B.3, "Implementation Items," of PG&E Letter DCL-16-014, dated January 29, 2016, within 305 days after receipt of the safety evaluation licensee amendment with the exception of implementation item 3-3-24, which will be completed for each unit within 90 days after modifications to the respective unit are complete (as listed in Attachment B, Table B.3).
December 29, 2005

PG&E Letter DCL-05-153

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Docket No. 50-275, Ol-DPR-8
Docket No. 50-323, Ol-DPR-82
Diablo Canyon Units 1 and 2


Dear Commissions and Staff,


DCPP will begin the transition to the performance-based standard for fire protection in January 2005. PG&E will pursue a schedule consistent with submittal of a license amendment request within 30 months. The transition process will be considered complete upon receipt and implementation of the approved license amendment authorizing transition to NFPA 805. The NFPA transition process will proceed in three phases:

Phase I – Preliminary assessment of the Fire Protection Program and limited scope fire probabilistic risk assessment (PRA) upgrade.

Phase II – Reviews, engineering analysis, full scope fire PRA upgrade, and submittal of a license amendment request.

Phase III – Implementation.

The specific transition schedule is subject to change depending on the extent to which PG&E determines that it needs to make either physical modifications or changes to the fire protection program to comply with NFPA 805. The license amendment request, as required by 10 CFR 50.48(c)(3)(B), will include an updated implementation schedule.

A member of the [State] Strategic Training and Resource Sharing Alliance
Colway + Communique Peak + Diablo Canyon + Palo Verde + South Texas Project + Wolf Creek

G.2 – 699

PG&E Letter DCL-05-153

In accordance with the NRC's [Redacted] Enforcement Policy (60 FR 32084, June 16, 2004), enforcement discretion is requested for NRC unsolved items, being conservatively treated as noncompliance for the purpose of transitioning to NFPA 805, and PG&E identifies noncompliance related to fire protection. Additionally, PG&E understands that five letter of intent initiates a period of enforcement discretion during which no enforcement actions will be taken for noncompliance (which meet the enforcement policy guidelines) discovered as a result of evaluations to support this licensing basis transition.

PG&E respectfully requests a 36-month enforcement discretion window for the following reasons:

- Efficiencies will be gained by observing completion of the transition for pilot plants and implementing lessons learned.
- PG&E resources would be constrained under a 24-month transition window.
- Industry resources required to assist in the transition will be limited due to the number of plants PG&E anticipates to be transitioning at the same time. There is a limited number of industry experts in the areas of Electrical Engineering (cloth analysis), System Engineering, and Appendix D Safe Shutdown needed to support the transition to NFPA 805.

PG&E recognizes the long-term benefits of a performance-based, risk-informed fire protection program. However, PG&E understands that after submitting this letter of intent to comply with 10 CFR 50.48(c), and prior to submitting the license amendment request, it may withdraw the intent and not complete the transition to 10 CFR 50.48(c) by submitting a letter stating PG&E's intent to retain the existing fire protection licensing basis.

Sincerely,

Jamie E. Becker
Vice President - Operations and Safety Director

A member of the [State] Strategic Training and Resource Sharing Alliance
Colway + Communique Peak + Diablo Canyon + Palo Verde + South Texas Project + Wolf Creek

G.2 – 700

G.2 – 701

mgm4557
cc: Diablo Distribution
cc: Bruce S. Mallett, Region IV
cc: Terry W. Jackson, Deputy Resident Inspector
cc: Alan B. Wang, NRPR
G.2 - 703

I have run the DCISC response to my questions on Fire Doors past two industry experts and both are confused by the Committee’s explanation. PU&G was in the room during the response but did not offer clarification and therefore AANR fears the DCISC record may be inaccurate. Might it be possible to run this by PU&G for their clarification of cost breakdown and the backing of fire door replacements and/or repairs? I can send sections of fire discussion if this might help.

In Peace

Rochelle

In Peace

Rochelle

G.2 - 704

In Peace

Rochelle Becker, Executive Director
Alliance for Nuclear Responsibility
PO 1328
San Luis Obispo, CA 93406
www.anr.org

In Peace

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San Luis Obispo, CA 93406
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In the first video clip from Mr. Warstell, the DCSCC surveyed their concern about a sloppy practice of letting key doors degrade and work around that growing problem using fire watch. But when I posed a safety questions related directly to the fire door issues just expressed by the DCSCC (video link number 2) suddenly, the DCSCC role changed from that of challenging safety practices to defending safety practices -- and the very same safety practices.

So again, why isn't the DCSCC expressing concern about spending money to replace doors that leak properly either that expressed concern that spending $100,000 is too great a cost to replace a $5,000 door?

The second question deals with the issue of recently added "overhead costs" as being a driver of the repair/replace policy for fire doors. Our understanding is that adding corporate overheads can be done, but I strongly doubt it is the only reason for the difference in the differing project costs. Assignment of overhead to a capital project (the replacement option) is required by utility accounting rules and tax law, therefore this would not be a "new" development at Diablo Canyon. There are also overheads charged to a maintenance project (the repair option), although it should be roughly similar. Based on the DCSCC analysis, the replace option is more involved and cooler than the repair option -- adding overheads to a larger number (replacement costs) will exacerbate the difference—but overheads charged are determined by a corporate-wide multiplier approved by FEPC and the CPUC and are not assessed randomly, so overheads can't be the only difference. As an example, if the cost of a repair/replace project is $100, corporate overheads (usually 30 to 40%, so let's use 40%) would raise the cost of the project to $140. If the cost of the maintenance/repair project is $90, corporate overheads would raise the cost to $90 (40% of $70 added for overheads), so the net difference is lower, but the overheads aren't the cause of the underlying difference between the $100 and the $70 costs of the underlying projects.

Bear in mind that the short run costs of capital projects on rates is usually lower than the short run costs of maintenance projects (depreciation plus interest on rates basis is lower in the first year than the full project costs), but the long run net costs of capital projects is higher (the return on rate base adds to total costs charged to rates). Utility accounting follows tax rules on what projects can be depreciated and what projects can be expensed, so there are rules governing what PG&E's options would be, and I believe they have calculated that maintenance/repair is cheaper over the remaining life of the capital/repair option and elected to do the project that qualifies for expensing rather than capitalization.

Either way, simply blaming "corporate overhead" does not get at the root of why the degraded fire door situation was allowed to linger as long as it has, or why "work around" fire watch strategies persisted. The DCSCC should look and present clarification of and remedy for their explanations.

Yours truly,

[Signature]
Rochelle Becher
Executive Director
Alliance for Nuclear Responsibility
Rochelle,

Attached are the slides used by PG&E and by the Committee’s Technical Consultants Rick McWhorter and Fermam Wardell during last week’s DCSC public meeting.

The Committee will be taking step to follow up and review the matter of a continuing role for the DCSC in context of decommissioning activities once the plant ceases to produce power.

It was good to see you and David at the meeting last week.

Best regards,

Bob

-- Original Message --
From: Rochelle Becker [mailto:rochellebecker@gmail.com]
Sent: Wednesday, October 18, 2017 2:54 PM
To: DC safety <dcsc@dcsc.org>
Subject: Re: McWhorter slide

Perfect - thanks

Sent from my iPhone

> On Oct 18, 2017, at 2:45 PM, DC safety <dcsc@dcsc.org> wrote:
> Yes, I’ll have copies of all the powerpoints (in PDF) right after the meeting - will that be OK?
> Sent from my iPhone
> On Oct 18, 2017, at 2:25 PM, Rochelle Becker <rochellebecker@gmail.com>
> wrote:
> Hi Bob
> Can we get the Plant Health Committee slide used by Mr. McWhorter’s
> slide for Sept 6-7, 2017?
>

When Diablo Canyon Nuclear Power Plant ceases operation within the next few years, we will still be faced with the challenges of storage and transportation of the radioactive waste.

Learn about the options and challenges through an

EDUCATIONAL SERIES

presented by San Luis Obispo Mothers For Peace

Friday, October 20, 2017
Topic: On-Site Storage
- Presentation by Holly Johnson, Mothers for Peace
- Radiation Waste Team
- John Paul Davis
- Dan Cash Storage, Sanluisobispo, Calundry Safety, Inc., Clement, CA

Friday, November 10, 2017
Topic: Yucca Mountain – Is it Viable?
- Mark Zambelli, Principal Attr. Western Sands Nuclear Services, NV
- Tony Mont, Assistant Director, Human Waste Team, Los Alamos, NM
- Tony Friedman, Technical Policy Coordinator, Yucca Mountain Project, DOI, Las Vegas, NV

Friday, January 19, 2018
Topic: Transportation of Radioactive Wastes
- Code Martin, Radiation Waste Project Director, NNSA
- Consolidated “Interim” Storage
- Dan Cash, San Luis Obispo, California Safety, Inc.

All presentations begin at 6:00pm
San Luis Obispo County Library, 995 Palm Street, San Luis Obispo, CA
https://slofarmersmarket.com
Hello Annie,

I have been working with the Senator to prepare an update on behalf of our office for DCISC and am happy to speak during public comment on Wednesday for the afternoon session. Unfortunately, I will not be able to stay past 5 pm on Wednesday because I need to pick up my husband from the airport. My sincerest apologies!

Look forward to connecting on Wednesday. Thank you!

All the best,

Anne Aguilera | Assistant District Director
OFFICE OF SENATOR WILLIAM W. MONGEśni
California State Senate Majority Leader
1026 Pala Street Suite 201 | San Luis Obispo, CA 93401
Ph: 805-549-3784 | Fax: 805-549-3779

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G.2 – 715

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Good morning,

I am curious as to which day either October 18th or 19th you would like Senator Mongeśni to speak?

Thank you!

All the best,

Anne Aguilera | Assistant District Director
OFFICE OF SENATOR WILLIAM W. MONGEśni
California State Senate Majority Leader
1026 Pala Street Suite 201 | San Luis Obispo, CA 93401
Ph: 805-549-3784 | Fax: 805-549-3779

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G.2 – 716
**Diablo Canyon**

**INDependent Safety Committee (DCisc)**

**Public Meeting:**

**Wednesday Morning, October 18th 9:00 A.M.**

Public comments and communications to the Committee, business session including presentations by PGE, plant safety and operations including an update on spent fuel storage issues and the potential for commission of the multi-purpose canisters, lessons learned from spent fuel storage activities at decommissioned nuclear facilities, and an update on the status of the NRC, performance indicators, reportable events and notices of violation and the NRC inspection for "Waste" input into a strategic performance area and issues raised by NRC resident inspectors.

**Thursday Afternoon, October 19th 1:00 P.M.**

Public comments and communications to the Committee, business session including reports on site visits by Members and Consultants to DCPA, discussion of the Committee's operations, including activity plans, effectiveness in conducting fact-finding, public meetings, and in preparing its Annual Reports, outreach to state agencies, and future engagement of consultants for specific projects, and the Committee's interaction with PGE.

Please plan to attend! For further information call 1-800-439-4688 or visit the Committee's website at www.dcsisc.org.

Avila Lighthouse Suites
Point San Luis Conference Center
First & San Francisco Streets

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**PUBLIC MEETING OF THE**

**DIABLO CANYON INDEPENDENT SAFETY COMMITTEE**

**DCisc**

**Where:**

**Wednesday Morning, October 18th 9:00 A.M.**

Public comments and communications to the Committee, business session including presentations by PGE, plant safety and operations including an update on spent fuel storage issues and the potential for commission of the multi-purpose canisters, lessons learned from spent fuel storage activities at decommissioned nuclear facilities, and an update on the status of the NRC, performance indicators, reportable events and notices of violation and the NRC inspection for "Waste" input into a strategic performance area and issues raised by NRC resident inspectors.

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**G.2 – 719**

**G.2 – 720**

**G.2 – 722**
PRESS RELEASE:
PUBLIC MEETING OF THE
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE ("DCISC")

WITH:
The Members of the Independent Safety Committee:
Dr. Robert J. Buettner
Dr. Peter Lam
Dr. Per F. Peterson

WHAT:
An opportunity for the public to observe and receive information concerning the activities of the Independent Safety Committee including recent fact-finding visits and informational presentations concerning safety-related issues at Diablo Canyon Nuclear Power Plant:

• Committee business session - Wednesday morning & afternoon
  Approval of the DCISC's 27th Annual Report on Safety of Operations and discussion of plans, effectiveness and public outreach activities.
• Presentation of the State of the Plant including station performance, key events, and the tenth refueling cycles for Unit 2 & Unit 1
• Update on the Joint Proposal under consideration by the California Public Utilities Commission to retire Diablo Canyon by 2025 and an overview of the plant decommissioning process and initial planning.
• Update on spent fuel storage issues including the potential for corrosion of the multi-purpose containers, lessons learned from spent fuel activities at decommissioned nuclear facilities and potential for achieving spent fuel transfer from wet to dry storage
• Update on NRC Performance Indicators, License Event Reports, Notices of Violation, NRC Inspection for "White" Input into a Strategic Performance Area, and Regulatory issues.
• Overview of programs for the classification of structures, systems and components and the status of the transition to National Fire Protection Association Standard 605 fire protection regulations

WHERE:
Avila Lighthouse Suites - Point San Luis Conference Facility
First & San Francisco Streets, Avila Beach, CA

WHEN:
Wednesday and Thursday - October 18-19, 2017

TIMES:
9:00 am - Noon (Wednesday, October 18th)
1:30 pm to approx. 5:00 pm (Wednesday, October 18th)
5:10 pm to approx. 9:00 pm (Wednesday, October 18th)
9:00 am - 1:30 pm (Thursday, October 19th)
1:00 pm to approx. 3:00 pm (Thursday, October 19th)

FOR FURTHER INFORMATION:
Including more information on these and other topics to be reviewed by the Independent Safety Committee of the specific days and times for particular presentations.
Contact 1-800-439-4688
or review the meeting agenda online at www.dciscc.org

The Committee's policy is to schedule public meetings in locations that are accessible to people with disabilities. The Point San Luis Conference Facility is a wheelchair-accessible facility.

The meeting will be rebroadcast live online at 9:00 am on the following links on the Committee's website:

G.2 – 723

G.2 – 724

Where:
Avila Lighthouse Suites - Point San Luis Conference Center
First & San Francisco Streets
Avila Beach, California

Please plan to attend!
For further information:
call 1-800-439-4688 or visit the Committee's website at www.dciscc.org.

A copy of the meeting Agenda packet may be reviewed at the Cal Poly Library's Reference Department and the Agenda is available on the DCISC's website.
The meeting will be rebroadcast live online during the meeting by visiting www.slo-span.org and after a meeting in archived format, index the meeting agenda, or by following links on the Committee's website.

MEETINGS ARE ALSO REPLAYED ON GOVERNMENT ACCESS TELEVISION (CHANNEL 21)

The Committee's policy is to schedule public meetings in locations that are accessible to people with disabilities. The Avila Lighthouse Suites conference facility is a wheelchair-accessible facility.

G.2 – 725

G.2 – 726
October 11, 2017

California Polytechnic State University San Luis Obispo
R.E. Kennedy Library
Documents & Maps Dept.
San Luis Obispo, California 93407

Attention: Mr. Tim Sowers
Re: Diablo Canyon Independent Safety Committee Agenda Packet

Dear Mr. Sowers:

Enclosed please find a copy of the Agenda Packet for the next meeting of the Diablo Canyon Independent Safety Committee which will be held in Avila Beach on October 18-19, 2017. Would you please file this packet in the Reference Department and make it available to the public. Thank you for your cooperation and assistance in this matter.

Very truly yours,

Robert W. Rathie
DCISC Asst. Legal Counsel

RWR:R
Enclosure
cc: None

Reply:

Mr. Edward Higby - POSDEC/PP
Mr. Greg Hecox - POSDEC/PP
Mr. Victor Davis - POSDEC/PP
Sandy K. Paul, Eng. - POSDEC/PP
Mr. Mark Klein - NUC/Energy
Mr. Thomas Beane - PUC/GREA
Mr. David Zarnow - PUC/Energy
Ms. Marie Taylor - PUC/GREA

OFFICE OF LEGAL COUNSEL - ROBERT W. RATHIE
1 R.E. KENNEDY LIBRARY - AVILA BEACH - SAN LUIS OBISPO - CA 93407
TELEPHONE (805) 756-4011 FAX (805) 756-2425 E-MAIL: RWR@DCISC.ORG

Info@DCISC.org

From: Newport, Christopher <Christopher.Newport@nrc.gov>
Sent: Wednesday, October 11, 2017 12:54 PM
To: Info@DCISC.org
Subject: RE: DCISC Public Meeting on October 18-19, 2017

Bob,

Thank you for keeping us informed!

-Chris Newport

Christopher Newport
Senior Resident Inspector
Diablo Canyon
US Nuclear Regulatory Commission
(805)559-2354

From: Info@DCISC.org [mailto:Info@DCISC.org]
Sent: Wednesday, October 11, 2017 5:19 AM
To: Newport, Christopher <Christopher.Newport@nrc.gov>, Raynaos, John <John.Raynaos@nrc.gov>
Cc: Info@DCISC.org
Subject: [EXTERNAL_SENDER] DCISC Public Meeting on October 18-19, 2017

Chris & John —

Attached is the final agenda for the DCISC’s public meeting to be held on October 18-19, 2017, once again at the Avila Lighthouse Suites. I’m sending you the annotated version of the agenda which includes the estimated times for the presentations and identifies the DCISP staff who will be presenting the informational topics to the Committee. The draft agenda packet, including the Minutes of the February 2017 meeting, will be posted on our website at www.dcisc.org very soon.

Hopefully you might be able to find some time to attend some portion of the October public meeting next week – you would be most welcome.

Please give me a call if you should have any questions or require further information.

Best regards,

Bob Rathie
Asst. DCISC Legal Counsel
1-800-419-4688
Info@DCISC.org

From: DCSafety@DCISC.org
Sent: Thursday, October 5, 2017 1:13 PM
To: Megan Hey
Cc: Info@DCISC.org
Subject: RE: DCISC 10-17 meeting

Dear Meg -

Mr. Wellington asked me to respond and to thank you for your email in reference to the invitation on behalf of the DCISC. We certainly appreciate the busy calendars we all keep and if your conflict for the October 18-19 dates continue we certainly understand. The Committee is serious to make every effort to reach out in the attempt to be as responsive and effective as it can be to those persons with interest in Diablo Canyon and its operations and in the many issues which arise, and will arise, in context of the joint Proposal to shut down the plant by the end of 2025 if the approved by the CPUC.

Because of the commitments of its members, the DCISC schedules all its meetings well in advance. After the October 18-19, 2017 public meeting, there are meetings scheduled in 2018 for the dates of February 7-8, June 13-14 and October 17-18. All these meetings are expected to be held in Avila beach and we would certainly welcome and appreciate your attending any of them.

Thank you once again for your response. I will continue to send you a meeting agenda packet in advance of each of our public meetings in order that you can remain current on the Committee and its activities,

I close with the hope that we may have an opportunity to meet in person soon,

Best regards,

Bob Ratliff
DCISC Atty/Legal Counsel
(805) 439-4588
info@dcisc.org

From: Megan Hey [mailto:Megan.Hey@doj.ca.gov]
Sent: Wednesday, October 4, 2017 5:03 PM
To: DCSafety@dcisc.org
Subject: RE: DCISC 10-17 meeting

Dear Mr. Wellington,

Thank you for your letter dated September 29, 2017, inviting me to attend the Diablo Canyon Independent Safety Committee's quarterly meeting on October 18-19, 2017. I am interested in attending, however, calendar conflicts may impede my interest in that regard. If I am able to attend, I will contact you in advance. If I am unable, I'll certainly try to come up for another of the meetings. Thank you again,

Best regards -

Megan Hey
Deputy Attorney General
Re: Invitation to Attend a Meeting of the Diablo Canyon Independent Safety Committee

Dear Ms. Abijian,

On June 21, 2016, PG&E announced a Joint Proposal with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Workers Local 1245, Coalition of California Utility Employees and the Alliance for Nuclear Responsibility to retire Diablo Canyon Nuclear Power Plant at the expiration of its current operating licenses from the Nuclear Regulatory Commission. On August 11, 2016, PG&E filed an Application with the California Public Utilities Commission for approval of the retirement of Diablo Canyon. Implementation of the Joint Proposal, and for recovery of associated costs through proposed rate making, Under the Joint Proposal, Diablo Canyon would continue to operate through the current license periods. If the Application is approved by the Commission, in 2024 PG&E would retire Unit-1, and in 2025 would retire Unit-2.

Under the Joint Proposal, PG&E has committed to continuing the safe operation of Diablo Canyon and to provide resources to complete necessary capital projects and assistance to its transitioning workforce. To continue safe operation under the Joint Proposal it will be critical to retain existing employees, who are highly qualified, and PG&E has committed to provide a retention program and severance payments upon completion of employment. Under the Joint Proposal PG&E also proposes to continue to provide funding to the San Luis Obispo area.

At the last public meeting of the Diablo Canyon Independent Safety Committee the three Committee members discussed how this Committee might seek to continue to best fulfill the mandate from the Public Utilities Commission to review and make recommendations concerning the safe operation of Diablo Canyon. During that discussion the members directed that efforts should be made to reach out to individuals associated with regulatory or legislative entities with oversight responsibilities or who play important roles or have interest in issues affecting or affected by Diablo Canyon’s continued operation and proposed retirement, and that invitations should be extended to such persons to attend a future public meeting of the Committee.

Sincerely,

Robert R. Wellington
Diablo Legal Counsel

Re: Invitation from the DCISC
September 29, 2017
Page 2.

The next public meeting of the Committee will be held on Wednesday and Thursday, October 18-19, 2017, at the Avila Lighthouse Suites in Avila Beach, California, and your attendance is cordially invited. A copy of the meeting agenda is enclosed for your information.

The October public meeting represents a valuable opportunity to receive information on important issues concerning Diablo Canyon’s current and future operation including, among other topics, an update on the Joint Proposal, an overview of the process and plans for plant decommissioning. Issues related to the storage at Diablo Canyon of spent nuclear fuel and the lessons learned from spent fuel storage at decommissioned nuclear power plants including the San Onofre Nuclear Generating Station; and plans for the 20th refueling outage of Unit-2. The Committee also expects to approve its 27th Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations at its meeting in October.

The Committee would also be most interested to hear from you concerning how the Committee might be most useful and responsive to concerns you may have regarding operations at Diablo Canyon or issues within the Committee’s purview under consideration in context of the Joint Proposal.

In response to this invitation, if you or a representative are able to attend the October public meeting, or should you have any questions or wish to receive more information, please contact me. In the event you are unable to attend in October, the Committee will invite your attendance at any of its meetings scheduled during 2018. Public meetings of the Committee will be held on February 7-8, June 13-14, and October 17-18, 2018, with all meetings taking place in Avila Beach, California.

Additional information on the Committee and its members, the agenda for the October 18-19, 2017 public meeting, and on various topics related to Diablo Canyon, is also available by visiting the Committee’s website at www.dcisc.org.

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The October public meeting represents a valuable opportunity to receive information on important issues concerning Diablo Canyon’s current and future operation, including, among other topics, an update on the Joint Proposal, an overview of the process and plans for plant decommissioning, issues related to the storage at Diablo Canyon of spent nuclear fuel and the lessons learned from spent fuel storage at decommissioned nuclear power plants including the San Onofre Nuclear Generating Station, and plans for the 20th refueling outage of Unit-2. The Committee also expects to approve its 2020 Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations at its meeting in October.

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Additional information on the Committee and its members, the agenda for 2017 public meetings, and how to contact the Committee members, and on various topics related to Diablo Canyon, is also available by visiting the Committee’s website at www.dcsic.org.

Sincerely,

Robert R. Wellington
DCISC Legal Counsel

Re: Invitation from the DCISC
September 29, 2017

Page 2.

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Sincerely,

Robert R. Wellington
DCISC Legal Counsel

G.2 – 739

G.2 – 740

G.2 – 741
Re: Invitation to Attend a Meeting of the Diablo Canyon Independent Safety Committee

Re: Invitation to Attend a Meeting of the Diablo Canyon Independent Safety Committee
Re: Invitation to Attend a Meeting of the Diablo Canyon Independent Safety Committee.

Dear Mr. Greene:

On June 21, 2016, PG&E announced a Joint Proposal with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Workers Local 1245, Coalition of California Utility Employees and the Alliance for Nuclear Responsibility to retire Diablo Canyon Nuclear Power Plant at the expiration of its current operating licenses from the Nuclear Regulatory Commission. On August 11, 2016, PG&E filed an Application with the California Public Utilities Commission for approval of the retirement of Diablo Canyon, Implementation of the Joint Proposal, and for recovery of associated costs through proposed rate making. Under the Joint Proposal, Diablo Canyon would continue to operate through the current license periods. If the Application is approved by the Commission, in 2024 PG&E would retire Unit-1, and in 2025 would retire Unit-2.

Under the Joint Proposal, PG&E has committed to continuing the safe operation of Diablo Canyon and to provide resources to complete necessary capital projects and assistance to its transitioning workforce. To continue safe operations under the Joint Proposal it will be critical to retain existing employees, who are highly qualified, and PG&E has committed to provide a retention program and severance payments upon completion of employment. Under the Joint Proposal PG&E also proposes to continue to provide funding to the San Luis Obispo area.

At the last public meeting of the Diablo Canyon Independent Safety Committee the three Committee members discussed how the Committee might seek to continue to best fulfill its mandate from the Public Utilities Commission to review and make recommendations concerning the safe operation of Diablo Canyon. During that discussion the members directed that efforts should be made to reach out to individuals associated with regulatory or legislative entities with oversight responsibilities, or who play important roles or have an interest in issues affecting or affected by Diablo Canyon’s continued operation and proposed retirement, and that invitations should be extended to such persons to attend a future public meeting of the Committee.

Sincerely,

Robert R. Wellington
PG&E Corporate Counsel

G.2 – 474

Re: Invitation to the DCISC September 29, 2017

Page 2

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Sincerely,

Robert R. Wellington
DCISC Legal Counsel

G.2 – 475
G.2 — 751

### Re: Invitation from the DCISC

**September 29, 2017**

**Page 2**

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Sincerely,

Robert R. Wellington
DCISC Legal Counsel

Encl.


c: DCISC Members & Consultants

1 Each session of a public meeting of the Committee is available live and online during the meeting and

G.2 — 752

### DCISC

**September 29, 2017**

**Page 2**

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Sincerely,

Robert R. Wellington
DCISC Legal Counsel

Encl.


c: DCISC Members & Consultants

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The email below, sent to Christopher Newport, was received by the DCSCC Legal Counsel’s office on August 17 from "Jer Man," an otherwise unidentified sender. The "DCSCC" address is often used by those who have visited the DCSCC’s website and used the link on the homepage to contact the Committee.

The message from "Jer Man" was provided to the DCSCC Members and Technical Consultants as is the case, although apparently making little rational sense, does appear to describe some sort of threat to the plant; their direction was that the message should be provided to both the NRC and to DCSCC, hence this email.

The DCSCC has not responded to or acknowledged receipt of the email from "Jer Man" and does not intend to do so. No previous messages have been revealed from "Jer Man." In the event a message is subsequently revealed it will be immediately forwarded to both the NRC and the plant.

Of course, please contact us in the unlikely event that we might be in a position to provide additional information concerning the August 17 email from "Jer Man."

Bob Rehbein
DCSCC Asst. Legal Counsel
(800) 439-4108
info@dcsc.org

From: Jer Man
Sent: Thursday, August 17, 2017 9:34 PM
To: info@dcsc.org
Subject: DCSCC

Bob, thank you for forwarding this to the NRC.
We take all concerns and threats seriously and will disposition this per our established formal procedures.
We will let you know if we need any more information from you.
-Chris Newport

Christopher Newport
Senior Resident Inspector
Diablo Canyon
Nuclear Regulatory Commission
(G85)5955-2354

From: Christopher Newport
Sent: Tuesday, August 22, 2017 2:02 PM
To: NRC Comment, Christopher <Christopher.Newport@nrc.gov>
Cc: Thibodeau, Dolly <Dolly.Thibodeau@nrc.gov>; Peter Lamb <Peter.Lamb@nrc.gov>; Bob Budzick 
<brattlebog587@gmail.com>
Subject: RE: [NRC Comment] [G85-5955] [NRC] Concerns about the NRC's Nuclear Safety Role

The following nightmare seems too strange and terrifying to be real... but it was.

On 09/20/2010 a suicidal man and a Crazy woman with a history of mental threats .go. for a ride on the Central Coast of California. In a van with gasoline and a pressurized Cylinders of 100% Oxygen. The ocean is beautiful in Avila but they are not tourists.
O2. Gasoline & a van make a truck bomb. Oxygen doesn’t burn, it makes everything else burn. The blast wave alone would cause mass casualties, the sail tank could penetrate walls. Potential energy enough to melt steel and steel like butter.

Puny compared Timothy McVeigh’s Ammunition Nitrate Bomb, the potential for destruction exceeded the Oklahoma City disaster by orders of magnitude. Location, location, location.

This toy rides pass 2 reactors, the turbine building and control room, the most secure area of Diablo Canyon Nuclear Power Plant. First critical infrastructure. The Fire Chief is watching them, blowing, as tall 1.000050V reactors play dice with God.

For comparison, Chernoby #4 was a 1.000000e reactor located in a remote area with many wide roads, Diablo Canyon sits upon LA and San Francisco in a densely populated State with inadequate escape routes. On a normal day, roads are jammed. A disaster here could make Fukushima look small, and that almost destroyed Tokyo.

The contractors responsible for this situation can move back home to Asia if they destroy the Central Coast. We get ash with a radioactive house & contaminated water, watching our children die of cancer.

No platoon of Elite saboteurs or FBI’s, no weapons, PG&E’s well armed and trained paramilitary forces, many already rectally probe by Crazy Manager (stronger than fiction, I keep), fail to keep a suicidal person with explosives materials away from the Reactors heart.

No squad, no faster than cannon. The rumored anti-aircraft batteries and armored vehicles useless. They didn’t just politicize the sensitive sites, they were protected. Although sexual blackmail does Wipe out, I have been a factor.

The cause is a conspiracy, 2 Drs for gods sake, people with ethics. For financial gain (approx $3,000,000/yr) they allowed there Crazy Manager to sexually assault and abuse staff, making poor decisions and creating violence. Refuse to notify PG&E of Crazy’s ulterior motives for fully demonstrated incompetence, a lack of respect for Security, PG&E Policy, Safety and Ethics that shocks the conscience.

For personal gain, they risked the lives of Millions.

PG&E’s Contractor Code of Conduct, continuing Desmond Bells no nonsense statement, required COS to report abuses and threats of Violence. But they raised no contractual reprimand if they did that, no more $3,000,000,000, so it was hidden.

She continued to have unescorted access to the most sensitive sites of the plant, allowed to sexually assault and threaten subordinates at will. PG&E security was asleep at the switch, if not in her bed. I hope they used enough tube and wore a glove, but Crazy Manager was very, very strange.

To hide it,3 unavailable Manager, COS staff who reported her terrorist threats, sexual assaults, etc, were fired or forced to quit. Those who confessed could count on glowing performance reviews, pay for time they weren’t there and a source of prescription drugs, like Alarin, not routinely tested for.

Her minions were given advanced medical duties for beyond their training or ability. Crazy Girlfriends became instant Practitioners. Despite zero training, experience or certification they treated Control Room Operators and Nuclear Physicists, They didn’t even have CPR.

Victims tried to report her but Cara On Site changed sexual assault to "hiring as if she’d do.

Threats of violence became just "angry words" and, my personal favorite, routinely exposed her breath became a medically topical lecture on "The Effects of Eisenleon on Nitrate Pigmentation" if COS had reported the facts, there would have been no suicidal joy ride.

Contractors communicate with PG&E via a liaison, responsible for overseeing contractor performance and monitoring the Contractor Code of Conduct. In this case a marlous lady man formed a relationship with Crazy, cutting communication between victims and PG&E.

The Suicidal Patient went to the clinic for help but instead was mistreated by a sexually aggressive Crazy Manager who put him in a van with no security, taking him for a "ride." Unfortunately for her love life, an Emergency Cardiac call came in, the ALS Ambulance was needed to save a life.

In the heat of the moment, she forgot the Monitor/Debilitating (Life Pack 5) and the Fire Chief seems to have been waving. Complications, Compliations. Bigfoot of the Keystone Cops or the Simpson, Probably ran a gauntlet between him and the back of the ambulance.

Crazy responds to the Cardiac Emergency with no defibrillator, turning an Advanced Life Support Ambulance into a taxi. She puts a suicidal psychiatric pt, in a potential truck bomb, Her shocking anyone gets on that day. This fact is not lost on the fire department, 2 crazies and no staff/later

Luckily the suicidal guy chose not to go out in a radioactive blaze of glory. Unfortunately, the event, like so many before it, was concealed by the contractor. Crazy Manager installed an innocent staff member for failing to put the defibrillator in the one. Slightly chastised and verbally abused, she went home sick that day.

What happened to suicide? I don’t know but would love to hear his story ANY hope he got help. Felt a brief months he’d killed millions of lives in his hand. Dice. I’m grateful he changed his mind about dying that day. It wasn’t hard, he did the right thing and deserved better than being in this sh*t. He too is a victim.

Sent from my iPad
Sent from my iPhone
Dear Kayya,

I'd be happy to discuss this topic with you. Monday morning I'm traveling to the airport and would have time to call you and discuss—would this work?

Best,

Per Petersen

On Jul 14, 2017, at 6:11 PM, DCSafety@DICSC.org <dcfinfo@dcisc.org> wrote:

Ms. Balaraman:

This will acknowledge your email below for a media interview regarding dry cask storage of spent nuclear fuel with a representative of the Diablo Canyon Independent Safety Committee.

I provided your request to each of our members and technical consultants and am awaiting confirmation on whether one of them might be available to speak with you before your deadline (Monday, July 17 at 6 PM EST).

I will keep you informed of anything I hear and thank you for contacting the DCISC.

Best regards,

Robert Rathie

DCISC Asst, Legal Counsel

G.2 – 759

--- Original Message ---

From: Becker Rochelle [becker.rochelle@gmail.com]
Sent: Thursday, July 13, 2017 4:49 AM
To: dcinfo@dcisc.org
Subject: Your friend has shared a SFGate link with you

Hi Bob,

Can you share? The NRC came to SLO last night, failed to mention this latest security concern, but we did play the audio of Dr. Radulescu discussing nuclear facilities on the radio last night. We don't know if they were watching or not, but they're the NRC.


This message was sent via sfgate.com.
28th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2017—June 30, 2018
Preface | Executive Summary
Volume I TOC | Volume II TOC | PG& Response | Contact the DCISC

28th Annual Report, Volume II, Exhibit G3, Comments Received at Public Meetings

Comments from members of the public made during the DCISC’s public meetings are included in the Minutes for each meeting.

See Exhibit B.3, B.6, B.9 and B.12.
Interactive map to Avila Lighthouse Suites, 550 Front Street, Northwest corner of First & San Francisco Streets, Avila Beach, California
Map to Avila Lighthouse Suites, Avila Beach, CA
DCISC Agenda for the Tuesday, May 22, 2018 10:00 A.M. Public Meeting

Committee Members:

Robert J. Budnitz  
Peter Lam  
Per F. Peterson

To join the meeting by teleconference: 1. Dial-In Number (1-800) 309-2350. 2. Enter Conference Code: 439 4688.

This public meeting will be livestreamed in real time at: http://www.slo-span.org/local_webcast/DCISC/stream_index.htm.

Public Meeting Location  
The Graduate (formerly the Hotel Durant)  
Board Room Conference Facility  
2600 Durant Avenue, Berkeley, CA

I Call to Order – Roll Call

II Introductions/Establishment of a Quorum

III Action Item

A. Consideration of approval of a letter commenting on California Senate Bill 1090 (Monning) with reference to funding for the Diablo Canyon Nuclear Power Plant employee retention program. Approve.

IV Public Comments and Communications

Anyone wishing to address the Committee on matters not appearing on the Agenda
may do so now. The public may comment on any matter listed on the Agenda at the
time the matter is being considered by the Committee. There will be a time limit of not
more than five minutes for each speaker. No action will be taken by the Committee on
matters brought up under this item but they may be referred to staff for further study,
response or action. (Please Note: (a) The Committee may consider at any time
requests to change the order of a listed agenda item; (b) Information distributed to the
Committee at a Public Meeting becomes part of the public record of the DCISC. A copy
of written material, pictures, etc. must be provided to the Committee’s Legal Counsel
for this purpose.)

V Adjournment of Public Meeting

The Committee’s policy is to schedule its public meetings in locations that are
accessible to people with disabilities. The Graduate is an accessible facility. A person
who needs a disability-related accommodation or modification in order to participate in
the meeting may make a request by contacting the DCISC office at (800) 439-4688 or
sending a written request to the DCISC office at 857 Cass Street, Ste. D., Monterey,
CA 93940. Providing your request at least five business days before the meeting will
help ensure availability of the requested accommodation.
DCISC Agenda for the next Public Meeting

The agendas for the June 5–6, 2019 and October 23–24, 2019 Public Meetings of the Diablo Canyon Independent Safety Committee will be published here when they are available.
DCISC Public Tour Information

Diablo Canyon Nuclear Power Plant (DCPP) Public Tour with the Members of the Diablo Canyon Independent Safety Committee

Information regarding the next public tour of the Diablo Canyon Power Plant, offered in conjunction with the next Public Meeting by the DCISC, will be posted here when it is available.
For more information about DCISC contact:

Diablo Canyon Independent Safety Committee  
Office of the Legal Counsel  
857 Cass Street, Suite D  
Monterey, California 93940

Telephone:

In California call 800-439-4688  
Outside of California call 831-647-1044

Send E-mail to: dcsafety@dcisc.org
Contact the Diablo Canyon Independent Safety Committee
The Diablo Canyon Independent Safety Committee (DCISC) is a three-person Committee charged with reviewing and making recommendations concerning the safety of operations at Pacific Gas and Electric Company’s (PG&E) Diablo Canyon Nuclear Power Plant (DCPP).

The DCISC was created by the State of California’s Public Utilities Commission (CPUC) and held its first meeting in May 1990.

The Diablo Canyon Power Plant is located on a 750-acre site along the central California coastline in San Luis Obispo County.

Diablo Canyon provides electricity for more than two million northern and central Californians from operation of its two 1,100 megawatt Westinghouse 4-

The Diablo Canyon Independent Safety Committee is interested in receiving expressions of interest, together with statements of qualifications, from persons interested in a temporary assignment to serve as a technical consultant, on an ad hoc basis, to assist the Committee in the identification of decommissioning-related issues. A letter or email from interested persons should be directed as soon as possible to the Office of the DCISC Legal Counsel, 857 Cass Street, Suite D, Monterey, CA 93940 and/or to dcsafety@dcisc.org. The next meeting of the DCISC is scheduled to be held on February 27-28, 2019, and this matter will be on the agenda for consideration.

The Committee is also seeking to receive comments from members of the public concerning a potential continuing role for the Committee to review decommissioning-related matters following the cessation of electricity-generating operations by DCPP.

DCISC Post-Shutdown Summary—Draft—For Discussion Purposes (PDF)
loop pressurized water reactors fueled by uranium dioxide. Diablo Canyon began commercial operation in 1985 and is licensed by the U.S. Nuclear Regulatory Commission (NRC) to continue operating Unit-1 until 2024 and Unit-2 until 2025.

The Committee holds public meetings and plant tours, conducts inspections and publishes an annual report on the safety of Diablo Canyon, assisted by technical consultants and legal counsel.


Review of Decommissioning-related Issues

- Diablo Canyon Decommissioning Engagement Panel
- Dr. David Victor's slide presentation, Decommissioning San Onofre Nuclear Generation Station (PDF)

Review of Seismic Safety Issues

- NRC Staff Assessment of DCPP's Post Fukushima Seismic Hazard Reevaluations – December 21, 2016 (PDF)
- Decision of NRC Director of Nuclear Reactor Regulation re Petition concerning DCPP Operational Safety and Safe Shut Down due to Earthquake – April 21, 2017 (PDF)

Review of Tsunami Hazard and Risk at DCPP and Its Environs

- May 14, 2015 Public Meeting Video
- Dr. R. T. Sewell Tsunami Hazard Presentation: Power Point Slides June 21, 2016 (PDF)
- Dr. R.T. Sewell Letter of April 4, 2017: Questions on Tsunami Risk Presentation (PDF)

Evaluations of Safety Issues for Alternate Cooling Technologies or Modification to DCPP Once-Through Cooling System

- September 5, 2013, Evaluation of Bechtel Final Technologies Assessment (PDF)
- October 17, 2014, Preliminary Evaluation of Addendum to Bechtel Final Technologies Assessment (PDF)

Information on CA Public Utilities Commission Decision D.18-01-022 to Retire Diablo Canyon Power Plant (DCPP) at the Expiration of the Current Operating Licenses

- DCISC Comments on Senator Monning’s CA Senate Bill 1090 (PDF)
- Decision Approving Retirement of Diablo Canyon Power Plant (PDF)
- Summary of PG&E’s Joint Proposal to Retire Diablo Canyon Power Plant (DCPP) at Expiration of the Current Operating Licenses
- The Joint Proposal Overview (PDF)
- The Application of PG&E for Approval of the Retirement of Diablo Canyon Power Plant (PDF)
- Assigned Commissioner and ALJ’s Scoping Memo & Ruling (PDF)
- Joint Parties Motion for Approval of Community Impacts Settlement


Used Fuel Storage Program Video

Steam Generator Replacement Video.
Glossary of Terms and Definitions Used by the DCISC

Aging Management
is a program for monitoring and dispositioning materials and components whose characteristics change with time or use. PG&E defines aging management as "Engineering, operations, and maintenance activities to control age-related degradation and to mitigate failures of systems, structures, or components (SSC) that are due to aging mechanisms."

As Low As reasonably Achievable (ALARA)
refers to maintaining offsite radioactive releases and occupational radiation exposures as low as achievable in a reasonable, cost-effective manner.

Bank
As used in “main bank transformer” or “main transformer bank” references refers to a set of installed electric transformers.

Benchmarking
is the act of reviewing and evaluating practices at other nuclear plants, which are known for excellence in a specific area, for incorporation or improvement at one’s plant.

Capacity Factor
is the fraction of power actually produced compared to the maximum which could be produced by operating at full power during a period of time (expressed in percent).

Civil Penalty
is a penalty in the form of a monetary fine levied by the Nuclear Regulatory Commission for a significant violation of its regulations.

Control Rods
Are long slender metal-clad rods which move into or out-of nuclear fuel assemblies in the reactor core to control the rate of the nuclear fission process. The rods contain a neutron absorbing material which, when inserted into the fuel, absorb neutrons, slowing down the fission rate and thus the heat generation rate and reducing the power level of the reactor.

Cross-cutting Aspect
A nuclear plant activity that affects most or all of NRC’s safety cornerstones, which include the plant’s corrective action program, human performance, and "safety-conscious work environment." A Substantive Cross-cutting Issue refers to a performance deficiency characteristic that compromises more areas than just the
specific situation in which it occurred.

Design Bases
Are the current features and criteria upon which the nuclear plant is designed and are also the bases for Nuclear Regulatory Commission review and approval.

Diesel Generator (DG)
is a standby source of emergency electrical power needed to power pumps and valves to provide cooling water to the fuel in the reactor to prevent its overheating and possible melting. The diesel generator is designed to start up and provide power automatically if normal power is lost.

Emergency Operations Center (EOC)
is the facility away from the immediate vicinity of the plant which is used to direct the operations for mitigation of and recovery from an accident.

Emergency Preparedness (EP)
is the assurance that the plant and its personnel are practiced and prepared for postulated emergencies to be able to mitigate them and recover with a minimum of damage and health effects.

Engineered Safety Features (ESF)
Are the features (systems and equipment) engineered into the plant to mitigate the effects of anticipated and postulated accidents.

Erosion/Corrosion
is a phenomenon which takes place in carbon steel power plant water systems. The inside metal pipe will continually corrode due to galvanic action, forming a magnetite coating as erosion (due to high water velocity and/or changes in flow direction) continually wears away the magnetite layer, permitting the corrosion layer to reform, etc. The continual combination of effects wears away and thins the pipe wall.

Escalated Enforcement Action
is action taken by NRC beyond a notice of violation of its requirements for a single severe violation or recurring violations. Examples include a civil penalty, suspension of operations, and modification or revocation of a license to operate a nuclear plant.

Final Safety Analysis Report (FSAR)
is the document which describes the plant design, safety analysis, and operations for Nuclear Regulatory Commission review and approval for licensing for plant operation.

Fitness for Duty (FFD)
describes the state of an employee (cleared to access the nuclear plant) being in sound enough physical and mental condition to adequately and safely carry out his or her duties without adverse effects.

High Impact Team (HIT)
is a term denoting a multi-disciplinary or multi-functional team of people put together to focus on solving a particular problem or perform a particular task. The disciplines included are those necessary to effectively accomplish the task.

High Level Waste (HLW)
is highly radioactive waste, usually in the form of spent fuel (or fuel which has been discharged from the reactor as waste) containing a high level (as defined by NRC regulations) of radioactive fission products. HLW is handled remotely, using water or a thick container as a radiation shield.

Individual Plant Examination (IPE)
is a level 2 Probabilistic Risk Assessment (PRA) analysis of plant accident sequences.
The analysis includes core damage progression through the release of radioactive material to the containment and the subsequent containment failure but stops short of determining potential impact on the public or property. The NRC requested all nuclear plants be analyzed in this way to get a better understanding of severe accident behavior. An IPEEE is an IPE which is initiated by External Events to the plant.

INPO, the Institute of Nuclear Power Operators

is a nuclear industry group formed after the Three Mile Island accident to help improve nuclear plant operations through regular assessments of each nuclear plant, evaluations, best practices, and nuclear operator training accreditation.

ISFSI, or Independent Spent Fuel Storage Installation, is the term for DCPP’s on-site storage facility for the dry cask storage of spent nuclear fuel.

Inservice Inspection (ISI) and Inservice Testing (IST)

Are the practices of inspecting and testing certain selected components periodically during their service lives to determine degradation patterns and to repair, if necessary, any degradation beyond acceptable limits.

Leg

– with reference to the Hot Leg or Cold Leg refers to piping trains leading to or from the reactor vessel. The Hot Leg removes heat and the Cold Leg provides cooling water to the vessel and nuclear core.

Licensee Event Reports (LERs)

Are reports from the plant operator to the Nuclear Regulatory Commission describing off-normal events or conditions outside established limits at a nuclear plant.

Line Organization refers to the direct reporting supervisory chain in an organization through which orders and information flow. It is also known as the “chain of command.”

Loss of Offsite Power (LOOP)

is an occurrence whereby the normal supply of electrical power from offsite is interrupted. Nuclear reactors need power from offsite when shutdown for spent fuel cooling and residual heat removal. There are usually several sources of offsite power; however, loss of all sources would result in the automatic start-up of the diesel generators to supply power.

Low Level Waste (LLW)

is waste containing a low level of radioactivity as defined by NRC regulations. LLW is usually in the form of scrap paper, plastic, tape, tubing, filters, scrap parts, dewatered resins, etc. LLW requires packaging to prevent the spread of contamination but little radiation shielding.

Maintenance Rule

is the NRC proposed rule which requires that nuclear power plant licensees monitor the performance or condition, or provide effective preventative maintenance of certain structures, systems and components against licensee-established goals. The Rule becomes effective July 10, 1996.

Microbiologically-Influenced (or Induced) Corrosion (MIC)

is corrosion, usually in the form of pitting, on steel piping systems containing stagnant or low-flow water conditions. The corrosion is caused by surface-attached microbe-produced chemicals which attack the piping surface. Depending on severity, MIC is controlled by mechanical and chemical cleaning combined with biocides.

Mid-Loop Operation

is an infrequently-used refueling outage procedure in which, after shutdown and a
cooling period, reactor coolant is lowered below the hot and cold legs, permitting work to be performed in a relatively dry environment. The operation is a relatively high-risk condition due to the potential for loss of cooling.

Misposition

means a positionable component, such as a valve, placed or left out of the required position for existing plant conditions when the component’s required position is tracked by a station status control tool, such as a procedure, drawing, or valve list.

Motor-Operated Valves

Are valves opened or closed by remotely-or locally-operated integral electric motors. The valves are used in power plant piping systems to divert, block or control the flow of steam or water.

Notification,

formerly known as an "Action Request" or "AR" is a document, which is used to identify and track resolution of a problem and incorporate it into the Corrective Action Program.

Nuclear Excellence Team (NET)

is a organization of several well-qualified senior people whose mission is “To improve plant performance through the use of performance-based self-assessments within the NPG (Nuclear Power Generation) organization." The Team is augmented by at least one other PG&E and one outside individual with expertise appropriate to the particular investigation.

Nuclear Regulatory Commission (NRC)

is the Federal agency which regulates and licenses the peaceful uses of domestic nuclear and radioactive applications such as nuclear power plants, experimental nuclear reactors, medical and industrial radioisotope applications, radioactive waste, etc.

Nuclear Steam Supply System (NSSS)

is the nuclear reactor and its closely associated heat removal systems which produce steam for the turbine. The NSSS usually includes the nuclear reactor, nuclear fuel, reactor coolant pumps, pressurizer, steam generators, and connected piping.

Operational Capacity Factor

is the capacity factor as measured between, but not including, refueling outages.

Primary Side and Secondary Side

refer, respectively, to the Reactor Coolant System, which is used to remove heat from the nuclear reactor and the Main Steam and Feedwater Systems which provide cooling to the Steam Generators and generate and provide steam to the Turbines.

Probabilistic Risk Assessment (PRA)

is a formal process for quantifying the frequencies and consequences of accidents to predict public health risk.

Protected Area

is the outermost area of the nuclear plant which is protected by physical means, a security system, and security force to prevent unauthorized entry (see also Vital Area).

Quality Assurance (QA)

comprises all those planned and systematic actions necessary to provide confidence that a structure, system or component will perform satisfactorily is service.

Reactor Coolant System (RCS)

is the collection of piping, reactor vessel, steam generators, pumps, pressurizer, and associated valves which function to circulate water through the reactor to remove heat.
Reactor Oversight Process
is the process by which the NRC monitors and evaluates the performance of commercial nuclear power plants. Designed to focus on those plant activities that are most important to safety, the process uses inspection findings and performance indicators to assess each plant’s safety performance.

Refueling Outage
is a normal shutdown of a nuclear power unit to permit refueling of the reactor, along with maintenance, inspections and modifications. Typical DCPP refueling outages occur about every 18 months and last for about two months. The outages are numbered by unit number (1 or 2), "R", and the consecutive outage number. For example, "1R5" is the fifth refueling outage for Unit 1 since start-up.

Reliability Centered Maintenance (RCM)
is the practice of maintaining equipment on the basis of the logical application of reliability data and expert knowledge of the equipment, i.e., a systems approach. Normal preventive maintenance (PM) is performed on the basis of time, i.e., maintenance operations are performed on a schedule to prevent poor performance or failure.

Residual Heat Removal (RHR)
is the removal of the residual heat generated in the reactor fuel after reactor shutdown to prevent the fuel overheating and possibly melting. The heat removal is performed by a set of pumps, piping, valves and heat exchange equipment circulating water by the fuel while the reactor is shut down.

Safety System Functional Audit and Review (SSFAR)
is an investigation of a single plant safety system from all perspectives such as design basis, operations, maintenance, engineering, testing, materials, problems and resolutions, quality control, etc. The review is performed by a multi-functional team and can last several months.

Simulator
is a simulated nuclear power reactor control room with gauges, instruments and controls connected to a computer. The computer is programmed to behave like a nuclear reactor and respond to operator actions and commands. The simulator is used in training nuclear operators in controlling the reactor and responding to simulated transients and accidents.

Single Point Vulnerability (SPV)
is an individual component, which does not have a significant level of component redundancy and whose failure alone could adversely impact the system or plant performance. DCPP defines a SPV as "a High-Critical component whose failure results in a plant trip or derate > 2%.

Spent Fuel Pool (SFP)
is an in-plant stainless-steel-lined concrete pool of water into which highly radioactive spent nuclear fuel is stored when it has been discharged from the reactor. The spent fuel is maintained in the pool until its ultimate disposal is determined.

Steam Dump Valve
is a device to discharge (dump) steam from the power plant piping to lower its pressure and reduce the energy in the line. This is done to permit faster shutdowns.

Steam Generator
is a large, vertical, inverted-U-tube-and-shell heat exchanger with hot reactor coolant on its tube side transferring heat to and boiling the non-nuclear feedwater to form steam on the shell side. Besides transferring heat, the steam generator is important as
a barrier between the nuclear and non-nuclear coolants.

Surveillance
is the process of testing, inspecting, or calibrating components and systems to assure that the necessary quality is maintained, operation is within safety limits, and operation will be maintained within limiting conditions.

Technical Specifications (TS)
Are the rules and limitations by which the plant is operated. They consist of safety limits, limiting safety system and control settings, limiting conditions for operation, surveillance requirements, description of important design features, administrative controls, and required periodic and special notifications and reports.

Technical Support Center (TSC)
is the in-plant facility which directs plant activities in mitigating accidents and minimizing their effects.

Trains
refers to individual functional lines of system piping, components, or wiring which are usually independent of other parallel lines, which have the same redundant function.

Trip
(or scram) is the shutting down of the nuclear reactor by inserting control rods which shut down the nuclear fission process. An automatic trip is initiated by plant monitoring systems when one or more parameters differ from preset limits. A manual trip is initiated by plant operators in an off-normal event to prevent preset limits from being exceeded or as a backup to the automatic system.

Vital Area
is an area inside the plant within the Protected Area which contains equipment vital for safe operation.
How a Pressurized Water Reactor Works

PWRs keep water under pressure so that it heats, but does not boil. Water from the reactor and the water in the steam generator that is turned into steam never mix. In this way, most of the radioactivity stays in the reactor area.

Please read the United States Nuclear Regulatory Commission (NRC) disclaimer.
How a Pressurized Water Reactor Works

## DCISC Post-Shutdown Summary

### Phases Following Cessation of Operations

<table>
<thead>
<tr>
<th>Plant Status →</th>
<th>Phase A</th>
<th>Phase B</th>
<th>Phase C</th>
<th>Phase D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spent Fuel Pools Operational.</td>
<td>Spent Fuel Pools Operational.</td>
<td>Decommissioning in Progress</td>
<td>ISFSI Operational and/or spent fuel being shipped from site</td>
<td></td>
</tr>
<tr>
<td>Decommissioning beginning</td>
<td>Decommissioning in Progress</td>
<td>ISFSI Operational</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISFSI Operational</td>
<td>ISFSI Operational</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Areas for DCISC Review ↓

<table>
<thead>
<tr>
<th>No.</th>
<th>Area</th>
<th>Phase A</th>
<th>Phase B</th>
<th>Phase C</th>
<th>Phase D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Health of Safety Systems</td>
<td>All Systems*</td>
<td>SFP-Related Systems</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Health of Electrical and Other Supporting Systems</td>
<td>All Systems*</td>
<td>SFP-Related Systems</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>Operator Staffing, Training, and Licensing</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Regulatory Compliance</td>
<td>Yes</td>
<td>Yes</td>
<td>TBD**</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Offsite Emergency Preparedness</td>
<td>Yes</td>
<td>Yes</td>
<td>TBD**</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>Quality Verification and Related Activities</td>
<td>Yes</td>
<td>SFP-Related Systems</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>7</td>
<td>Engineering &amp; Other Programs</td>
<td>Yes</td>
<td>SFP-Related Systems</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td>Human Performance</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td>Performance Improvement and Corrective Action Programs</td>
<td>Yes</td>
<td>Yes</td>
<td>TBD**</td>
<td>No</td>
</tr>
<tr>
<td>10</td>
<td>Fire Protection</td>
<td>Yes</td>
<td>SFP-Related Systems</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
### DCISC Post-Shutdown Summary - DRAFT - For Discussion Purposes

<table>
<thead>
<tr>
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<th>Phase B</th>
<th>Phase C</th>
<th>Phase D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Status → Reactors Shutdown with Fuel Remaining in Reactors.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spent Fuel Pools Operational.</td>
<td>Fuel Removed from Both Reactors.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decommissioning beginning</td>
<td></td>
<td>Spent Fuel Pools Operational.</td>
<td>Decommissioning in Progress</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISFSI Operational</td>
<td></td>
<td>ISFSI Operational</td>
<td>ISFSI Operational</td>
<td>Decommissioning Complete.</td>
</tr>
<tr>
<td>11 Beyond Design Basis &amp; FLEX</td>
<td>Yes</td>
<td>SFP-Related Systems</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>12 ISFSI Operations</td>
<td>Yes</td>
<td>Yes</td>
<td>TBD**</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>13 ISFSI Storage Cask Aging Management</td>
<td>Yes</td>
<td>Yes</td>
<td>TBD**</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>14 Management of Risk from External Hazards</td>
<td>Yes</td>
<td>SFP-Related Systems</td>
<td>TBD**</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>15 Decommissioning Planning and Execution</td>
<td>Yes</td>
<td>SFP-Related Systems</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>16 Nuclear Safety Culture and Employee Concerns Programs</td>
<td>Yes</td>
<td>Yes</td>
<td>TBD**</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>17 Radiological Protection and Health Physics, including Worker Radiation Safety and Annual Reports</td>
<td>Yes</td>
<td>Yes</td>
<td>TBD**</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>18 Interface Between Security and Safety</td>
<td>Yes</td>
<td>Yes</td>
<td>TBD**</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>19 Plans and Execution of Spent Fuel Shipments Departing DCPP for Long-Term Storage or Disposal</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
DCISC Post-Shutdown Summary - D R A F T - For Discussion Purposes

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<tbody>
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<td><strong>Plant Status →</strong></td>
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</tr>
<tr>
<td>Reactors Shutdown with Fuel Remaining in Reactors.</td>
<td>Phase B</td>
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<tr>
<td>Decommissioning beginning</td>
<td>Decommissioning in Progress</td>
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<td>ISFSI Operational</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>RISK</strong></th>
<th><strong>ESTIMATED TIME/DURATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant risk of radiological release but less than during power operation.</td>
<td>TBD but probably a period of months</td>
</tr>
<tr>
<td>Risk from a potential accident from spent fuel pool, begins as important, diminishes to lower risk in a few years, and becomes much less important toward the end of Phase B.</td>
<td>10 YEARS AFTER SHUT DOWN</td>
</tr>
<tr>
<td>Risk from fuel transfer and decommissioning activities is low.</td>
<td>TBD</td>
</tr>
<tr>
<td>Residual risk of an accident that could release important radioactivity to the plant site and the environment will be quite small.</td>
<td>TBD</td>
</tr>
<tr>
<td>Radiological risk from the decommissioning activities will be low due to radioactive decay and will diminish later in the decommissioning process as the number of radioactively contaminated components becomes fewer and fewer.</td>
<td>TBD</td>
</tr>
<tr>
<td>Risk from a radiological release from the ISFSI will remain quite small.</td>
<td>TBD</td>
</tr>
</tbody>
</table>

ESTIMATED TIME/DURATION: TBD but probably a period of months. 10 YEARS AFTER SHUT DOWN. TBD.
## DCISC Post-Shutdown Summary - DRAFT - For Discussion Purposes

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<td>Reactors Shutdown with Fuel Remaining in Reactors.</td>
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<td></td>
<td>ISFSI Operational</td>
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**PROPOSED RECOMMENDATION CONCERNING DCISC REVIEW**

<table>
<thead>
<tr>
<th></th>
<th>Phase C</th>
<th>Phase D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spent Fuel Pools Empty</td>
<td>Decommissioning Complete.</td>
</tr>
<tr>
<td></td>
<td>Decommissioning in Progress.</td>
<td>ISFSI Operational and/or spent fuel being shipped from site</td>
</tr>
</tbody>
</table>

**DCISC review should continue but with reduced scope and should probably terminate when all fuel is at the ISFSI, but defer final recommendation until middle of Phase B**

TBD

**Unnecessary**

---

* Systems important to safety or affecting safety systems

** TBD – The need for future DCISC review to be considered during Phase B
Community Engagement In The Decommissioning Process

David G Victor
Chairman,
Community Engagement Panel
Community Engagement Panel (CEP)

Make Up
• 18 Members
  • Public Officials, NGO's, Labor, Business, Environmental, Native American
• Quarterly Meetings
• Workshops
• Expert Presentations
• Not a Formal Decision Making Body
• No Official Oversight Function
• SCE provides resources for meetings

Functions as a Two-Way Conduit
• Provides for SCE to learn about the concerns of the Community
• Provides for Community to learn about the impact of the decommissioning process
Public CEP Meetings

- Update From Edison With Timeline
- Expert Presentation
- Questions and Dialogue with CEP Members
- Public Comment and Question Period
- Questions Directed to Expert or SCE
- Currently trying to revamp public comment
Planned Future State
A Surprise For Many!

Today

Late 2020's
Public Concerns

• Safety
• Removal of the spent fuel
• Integrity of Canisters (Corrosion, seismic, sea level rise, possible terrorist attack)
• Radiation Monitoring
• Environmental (e.g., Disposition of the Offshore Conduits)
• Preparedness for first responders
• Jobs
• Cost
Preparing for ISFSI-only status: Defense In Depth

• Regular monitoring (and what is learned from monitoring)
• Inspection of canisters
• Test canister
• Dealing with potential worst case scenarios
Expect the Unexpected

- At the August 9\textsuperscript{th} CEP Meeting, a safety worker described an loading incident that took.
- A spent fuel canister got caught on an inner guide ring during lowering.
- The incident has led to a NRC investigation.
- Transfer of spent fuel was halted.
Current Status At SONGS

- Transfer of spent fuel has been temporarily halted.
- NRC investigation underway. Awaiting NRC’s findings and recommendations.
- NRC will hold a public meeting to disclose their findings.
- It is anticipated that upon implementation of NRC’s and SCE’s recommendations, transfer of spent fuel will resume.
Community Struggles With: Who To Trust?

• Utility – SCE?

• Government – NRC?

• NGO's – Union of Concerned Scientists?

• Outside Experts?

• Trust but verify!
Trust Moves At the Speed of Collaboration

- You believe in the party's competency
- You believe their decisions have your best interests at heart
- They listen and hear: Intense, widespread, and continuing dialogue with citizens, affected parties and decision makers - This does not necessarily mean agreement
- Tackle challenges head on
- Process is important
- Commitment to transparency
Lessons Learned

• Make sure that the Panel, early and often, does practical things that add value

• Take the necessary time – go slow in order to go fast.

• Assign importance to the societal considerations – as well as the technical ones

• There are many ways to effectively engage the public and key stakeholders – overcommunicate

• Listening, respecting, and then responding can build trust and even advocacy, particularly in the local community

• Plan carefully and involve the right experts

• Be prepared to respond in real time to unexpected events

• Promise, then deliver, then do it again and again

• Be prepared for some “fake news"
Mr. Edward D. Halpin  
Senior Vice President and Chief Nuclear Officer  
Pacific Gas and Electric Company  
P.O. Box 56  
Mail Code 104/6  
Avila Beach, CA 93424

SUBJECT: DIABLO CANYON POWER PLANT, UNIT NOS. 1 AND 2 - STAFF ASSESSMENT OF INFORMATION PROVIDED UNDER TITLE 10 OF THE CODE OF FEDERAL REGULATIONS PART 50, SECTION 50.54(f), SEISMIC HAZARD REEVALUATIONS FOR RECOMMENDATION 2.1 OF THE NEAR-TERM TASK FORCE REVIEW OF INSIGHTS FROM THE FUKUSHIMA DAI-ICHI ACCIDENT (CAC NOS. MF5275 AND MF5276)

Dear Mr. Halpin:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued a request for information under Title 10 of the Code of Federal Regulations, Part 50, Section 50.54(f) (hereafter referred to as the 50.54(f) letter) (Agencywide Documents Access and Management System Accession No. ML12053A340). The request was issued as part of implementing lessons learned from the 2011 accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 1 to the 50.54(f) letter requested that licensees reevaluate seismic hazards for their sites using present-day methodologies and guidance.

By letter dated March 11, 2015, Pacific Gas and Electric Company (the licensee, PG&E) responded to this request for Diablo Canyon Power Plant, Unit Nos. 1 and 2 (DCPP). The NRC staff has reviewed the information provided related to the reevaluated seismic hazard for DCPP and, as documented in the enclosed staff assessment, determined that the licensee provided sufficient information in response to Items (1) – (3), (5) – (7), and the comparison portion to Item (4) identified in Enclosure 1 of the 50.54(f) letter. Further, the NRC staff concludes that the licensee's reevaluated seismic hazard is suitable for use in the other seismic assessments associated with the 50.54(f) letter.

Contingent upon the NRC's review and acceptance of PG&E's seismic risk evaluation, including the high frequency confirmation and spent fuel pool evaluation (i.e., Items 4, 8, and 9) for DCPP, the seismic hazard reevaluation identified in Enclosure 1 of the 50.54(f) letter will be completed.
If you have any questions, please contact me at (301) 415-1617 or at Frankie.Vega@nrc.gov.

Sincerely,

Frankie Vega, Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:
Staff Assessment of Seismic Hazard Evaluation and Screening Report

cc w/encl: Distribution via Listserv
1.0 INTRODUCTION

By letter dated March 12, 2012 (NRC, 2012a), the U.S. Nuclear Regulatory Commission (NRC or Commission) issued a request for information to all power reactor licensees and holders of construction permits in active or deferred status, pursuant to Title 10 of the Code of Federal Regulations (10 CFR), Section 50.54(f), “Conditions of Licenses” (hereafter referred to as the “50.54(f) letter”). The request was issued in connection with implementing lessons-learned from the 2011 accident at the Fukushima Dai-ichi nuclear power plant, as documented in the NRC’s Near-Term Task Force (NTTF) report (NRC, 2011a). Recommendation 2.1 in that document recommended that the NRC staff issue orders to all licensees to reevaluate seismic and flooding hazards for their sites against current NRC requirements and guidance. Subsequent staff requirements memoranda associated with SECY-11-0124 (NRC, 2011c) and SECY-11-0137 (NRC, 2011d) directed the NRC staff to issue requests for information to licensees pursuant to 10 CFR 50.54(f) to address this recommendation.

Enclosure 1 to the 50.54(f) letter requests that addressees perform a reevaluation of the seismic hazards at their sites using present-day NRC requirements and guidance to develop a ground motion response spectrum (GMRS).

The required response section of Enclosure 1 requests that each addressee provide the following information:

1. Site-specific hazard curves (common fractiles and mean) over a range of spectral frequencies and annual exceedance frequencies;

2. Site-specific, performance-based GMRS developed from the new site-specific seismic hazard curves at the control point elevation;

3. Safe shutdown earthquake (SSE) ground motion values, including specification of the control point elevation;

4. Comparison of the GMRS and SSE. A high-frequency evaluation (if necessary);

5. Additional information, such as insights from NTTF Recommendation 2.3 walkdown and estimates of plant seismic capacity developed from previous risk assessments, to inform NRC screening and prioritization;
Interim evaluation and actions taken or planned to address the higher seismic hazard relative to the design basis, as appropriate, prior to completion of the risk evaluation (if necessary);

Selected risk evaluation approach (if necessary);

Seismic risk evaluation (if necessary); and

Spent fuel pool (SFP) evaluation (if necessary).

Present-day NRC requirements and guidance for characterizing seismic hazards use a probabilistic approach in order to develop a risk-informed, performance-based GMRS for the site. Regulatory Guide (RG) 1.208, "A Performance-based Approach to Define the Site-Specific Earthquake Ground Motion" (NRC, 2007), describes an acceptable approach. As described in the 50.54(f) letter, if the reevaluated seismic hazard, as characterized by the GMRS, is not bounded by the current plant design-basis SSE, further seismic risk evaluation of the plant is merited.

By letter dated November 27, 2012 (Keithline, 2012), the Nuclear Energy Institute (NEI) submitted Electric Power Research Institute (EPRI) report "Seismic Evaluation Guidance: Screening, Prioritization, and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1 Seismic" (EPRI, 2012), hereafter called the SPID. The SPID provides guidance to support licensees when responding to the 50.54(f) letter in a manner that will address the Requested Information Items in Enclosure 1 of the 50.54(f) letter. By letter dated February 15, 2013 (NRC, 2013a), the NRC staff endorsed the SPID.

The required response section of Enclosure 1 to the 50.54(f) letter specifies that Western U.S. (WUS) licensees will provide their Seismic Hazard and Screening Report (SHSR) within 3 years after issuance of the 50.54(f) letter. The WUS licensees were granted an additional year to submit the SHSRs because their sites could not use the updated EPRI seismic ground motion models and seismic source characterization (SSC) models for the Central and Eastern U.S. (CEUS) (NRC, 2012b; EPRI, 2012). As specified in Enclosure 1 to the 50.54 (f) letter, the WUS licensees used the Senior Seismic Hazards Advisory Committee (SSHAC) Level 3 process to develop the ground motion characterization (GMC) and SSC models necessary for the more complex geology at WUS sites.

Industry also proposed that licensees perform an expedited assessment, referred to as the Augmented Approach, for addressing the requested interim evaluation (Item 6 above), which would use a simplified assessment to demonstrate that certain key pieces of plant equipment for core cooling and containment functions, given a loss of alternating current (ac) power, would be able to withstand a seismic hazard up to two times the design basis. By letter dated April 9, 2013 (Pietrangelo, 2013), the Nuclear Energy Institute (NEI) provided a revision to the 50.54(f) letter schedule for plants needing to perform: (1) the Augmented Approach by implementing the Expedited Seismic Evaluation Process, and (2) a seismic risk evaluation. By letter dated May 7, 2013 (NRC, 2013b), the NRC determined that the modified schedule was acceptable.
2.0 REGULATORY BACKGROUND

The structures, systems, and components important to safety in operating nuclear power plants are designed either in accordance with, or meet the intent of Appendix A to 10 CFR Part 50, General Design Criteria (GDC) 2; "Design Bases for Protection Against Natural Phenomena" and Appendix A to 10 CFR Part 100, “Reactor Site Criteria.” GDC 2 states that structures, systems, and components important to safety at nuclear power plants shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions.

For initial licensing, each licensee was required to develop and maintain design bases that, as defined by 10 CFR 50.2, identify the specific functions that structures, systems, or components of a facility must perform, and the specific values or ranges of values chosen for controlling parameters as reference bounds for the design. The design bases for the structures, systems, and components reflect appropriate consideration of the most severe natural phenomena that had been historically reported for the site and surrounding area. The design bases are also to reflect sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.

The seismic design bases for currently operating nuclear power plants were either developed in accordance with, or meet the intent of, GDC 2 and 10 CFR Part 100, Appendix A. Although the regulatory requirements in Appendix A to 10 CFR Part 50 for determining the seismic design-basis ground motions for new reactor applications after January 10, 1997, requires that uncertainties be addressed through an appropriate analysis, such as a probabilistic seismic hazard analysis (PSHA), as described in 10 CFR 100.23.

Section 50.54(f) of 10 CFR states that a licensee shall at any time before expiration of its license, upon request of the Commission, submit written statements, signed under oath or affirmation, to enable the Commission to determine whether or not the license should be modified, suspended, or revoked. On March 12, 2012, the NRC staff issued requests for licensees to reevaluate the seismic hazards at their sites using present-day NRC requirements and guidance, and identify actions planned to address plant-specific vulnerabilities associated with the updated seismic hazards.

2.1 Screening Evaluation Results

The Diablo Canyon Power Plant, Unit Nos. 1 and 2 (DCPP) has several different response spectra that were used in the seismic design of Units 1 and 2. By letter dated April 29, 2013 (PG&E, 2013a), Pacific Gas and Electric Company (PG&E, the licensee) clarified that the double design earthquake (DDE) corresponds to the SSE for DCPP. By letter dated March 11, 2015 (PG&E, 2015a), the licensee provided its SHSR for the DCPP site. The licensee’s SHSR concluded that the site GMRS exceeds the DDE (i.e., the SSE) for the DCPP site within the frequency range of 1 Hertz (Hz) to 10 Hz. Therefore, the licensee will perform a risk evaluation. Because the GMRS exceeds the SSE above 10 Hz the risk evaluation will include a high frequency confirmation. Further, the licensee indicated that it will perform a SFP evaluation.
On May 13, 2015 (NRC, 2015a), and October 27, 2015 (NRC, 2015b), the NRC staff issued letters providing the outcome of its screening and prioritization evaluation for WUS plants. As indicated in the letters, the NRC staff confirmed the licensee's screening results and examined key parameters to prioritize plants for completing seismic risk evaluations. These prioritization parameters included: (1) the maximum ratio of the reevaluated hazard (i.e., GMRS) to the SSE in the 1-10 Hz range; (2) the maximum ground motion in the 1-10 Hz range; and (3) insights from previous seismic risk evaluations. As such, Group 1 plants are generally those that have the highest reevaluated hazard relative to the original plant seismic design-basis (i.e., GMRS to SSE), as well as ground motions in the 1-10 Hz range that are generally higher in amplitude. Based on these criteria, the DCPP is prioritized as a Group 1 plant and is expected to conduct a seismic risk evaluation that will be submitted to NRC by September 30, 2017.

The NRC staff issued requests for additional information (RAIs) on June 29, 2015 (NRC, 2015c), August 27, 2015 (NRC, 2015d), October 1, 2015 (NRC, 2015e), and November 13, 2015 (NRC, 2015f). The licensee provided its responses to these RAIs on August 12, 2015 (PG&E, 2015b), September 16, 2015 (PG&E, 2015c), and December 21, 2015 (PG&E, 2015d). This additional information is also included in the NRC staff’s review of the licensee’s SHSR submittal.

3.0 TECHNICAL EVALUATION

The NRC staff evaluated the licensee’s submittal to determine if the provided information responded appropriately to Enclosure 1 of the 50.54(f) letter with respect to characterizing the reevaluated seismic hazard. In addition to an evaluation of the technical information, the NRC staff also determined if the process used to develop the reevaluated seismic hazard was acceptable and consistent with applicable guidance.

3.0.1 Summary of Regional Seismotectonic Setting

The DCPP is located in the Irish Hills along the central California coast in the coastal flank of the San Luis Range. The San Luis Range is one of several ranges in central California that compose the California Coastal Ranges. These ranges are fault-bounded bedrock blocks that are being slowly uplifted in response to transpressional stresses generated by the differential tectonic motions of the North American and Pacific plates (Lettis and Hanson, 1991; Lettis and Hall, 1994; McLaren and Savage, 2001). The transpressional stress comprises simultaneous NNW-SSE right-lateral (clockwise) horizontal shear and north east-south west (NE-SW) compression oriented at roughly ninety degrees to the North American-Pacific plate boundary. Most of the resulting tectonic deformation is manifested as right-lateral strike-slip motion between the North American and Pacific plates, primarily along the San Andreas Fault. The San Andreas fault runs subparallel to the California coastline, but is located approximately 80 kilometer (km) inland from the DCPP (see Figure 3.0-1 of this staff assessment). The remaining component of horizontal motion occurs as right-lateral slip on a series of coast-parallel strike-slip faults nearer to the DCPP, including the Hosgri and Shoreline faults (Atwater, 1989; Argus and Gordon, 2001; Lettis et al., 2004). Within the regional tectonic setting, the Hosgri fault forms the southernmost segment of the 410 km-long San Gregorio-San Simeon-Hosgri fault system. The compressional component of transpressional stress is accommodated by oblique-
slip and reverse-slip faulting on block-bounding NW-SE trending faults that uplifted crustal blocks of the Coast Ranges, including the San Luis Range. Within this tectonic setting, the Southwest Boundary fault zone and Los Osos faults accommodate this uplift.

Earthquake focal mechanisms in south central California (see Figure 3.0-1 of this staff assessment) are mainly reverse and strike-slip, consistent with right-lateral transpression (e.g., McLaren and Savage, 2001; Hardebeck, 2010). In particular, focal mechanisms and the spatial distribution of seismic events along the Hosgri fault in the subsurface are predominantly right-lateral strike-slip on a nearly vertical to steeply east-dipping fault zone, with active seismicity to a depth of about 12 km (McLaren and Savage, 2001; Hardebeck, 2010; McLaren et al., 2008). A similar distribution of hypocenters illuminates the Shoreline fault. There is also relatively abundant seismicity recorded beneath the DCPP and to the east of the Hosgri fault with both reverse and strike-slip focal mechanisms. However, the rates of seismicity diminish considerably west of the Hosgri fault within the Santa Maria Basin. The 2003 M6.5 San Simeon earthquake, which was one of the largest recorded earthquakes in the central California Coastal Ranges (see Figure 3.0-1 of this staff assessment), was primarily a reverse-faulting event that resulted from right-lateral transpression. McLaren et al. (2008) concluded that the fault patterns illuminated by the main shock, which was located approximately 40 km NNW from the DCPP, and aftershocks showed well-defined reverse slip on the Oceanic fault with antithetic back-thrusting, resulting in uplift of the Santa Lucia Range as a popup block.

Global Positioning System (GPS) data also show right-lateral shear and plate-normal convergence (DeMets, 2012; DeMets et al., 2014; Murray, 2012; Bird, 2012). Based on the GPS data, the total horizontal slip budget available for faults west of the Oceanic fault is 1–3 mm/yr. Plate-normal rates are significantly lower, on the order of 0.2–0.5 mm/yr. For comparison, horizontal slip of the San Andreas Fault in central California is estimated to be 25–36 mm/yr (e.g., Sieh and Jans, 1984; Titus et al., 2005; Toku et al., 2011; Titus et al., 2011).

3.0.2 Summary of Local Geology and Site Area Faults

The DCPP is located on a relatively broad Quaternary terrace surface near the mouth of Diablo Canyon Creek. Bedrock geology of the site consists of the Miocene (5–23 million years ago) Obispo Formation, which is a 400 m thick sequence of thin to thickly-bedded marine volcanic and volcanioclastic deposits. Beneath the DCPP site, the Obispo Formation has been both faulted and folded and typically dips 35° to 75° to the north (Hall, 1973). A thin veneer of marine sands and gravels (typically 1- to 2-meters thick) underlain by a relatively thick sequence of nonmarine fluvial sands and gravels and colluvium (1 meter thick to several tens of meters thick) overlies the Obispo Formation. The basal contact between the overlying marine sands and gravels and the underlying Obispo Formation is a gently southwest-sloping eroded marine terrace platform. This eroded platform can be very sharp and planar or have considerable relief, depending on the resistance of the beds within the Obispo Formation.

Based on surface geologic mapping, the structure of the Irish Hills is a syncline cored by Tertiary age (2.6–65 million years ago) rocks of the Obispo, Monterey, and Pismo Formations. The Obispo Formation rests unconformably above highly deformed bedrock, including the Jurassic (144–200 million years ago) Franciscan Formation. The Franciscan Formation is a chaotic mélange of basaltic volcanic rocks (many of which have been altered to greenstone),
radiolarian chert, sandstone, limestone, serpentine, shale, and high-pressure metamorphic rocks. This diverse mix of rock types makes it difficult to accurately decipher geologic features in the subsurface, especially folds and faults.

An important geological dataset used to interpret the recent tectonic and seismic history of the DCPP site is the marine terraces and their associated wave-cut platforms and paleoshorelines. These marine terraces develop at the shoreline impact zone, as waves cut into and erode rocks along the beach line. The identification and dating of these marine terraces in the DCPP region, coupled with the known chronology of sea-level elevations during different sea-level “stands” (i.e., periods of time when the sea level was stable long enough for a platform to be developed), allow geologists to estimate the uplift rates of the fault-bounded blocks of the California Coastal Ranges, including the San Luis Range and the Irish Hills. The location, elevation, geomorphic characteristics, and ages of these features were mapped in detail by Hanson et al. (1994) and by PG&E as part of the Long-Term Seismic Program (PG&E, 1988, 1991a). These studies showed that the uplift rate for the Irish Hills is approximately 0.2 mm/yr, compared to a lower uplift rate of less than 0.1 mm/yr for areas south of the DCPP, including San Luis Bay.

As further addressed in Section 3.3 of this staff assessment, the faults that are most significant to the seismic hazard at the DCPP are the Hosgri, Los Osos, San Luis Bay (within the Southwestern Boundary fault zone), and Shoreline faults. Other named faults that were included in the SSC evaluation are the Wilmar Avenue, Oceano, Casmalia, San Miguelito, Edna, West Huasna, and Rinconada faults. The surface traces of these faults are shown in Figure 3.0-2 of this staff assessment.

The Hosgri fault is located just a few kilometers offshore of south-central California and forms the eastern boundary of the offshore Santa Maria Basin (PG&E, 1988; Clark et al., 1991; Steritz and Luyendyk, 1994). Characterization of the fault is primarily derived from traditional marine seismic reflection data and single-channel, high-resolution sparker data. The Hosgri fault has been mapped along its entire length using petroleum industry multichannel seismic-reflection data that images the traces of the fault to 3 km depth beneath the seafloor (PG&E, 1988, 1991a; Willingham et al., 2013). Significant sections of the Hosgri fault also were remapped using single-channel, high-resolution U.S. Geological Survey (USGS) sparker data (Johnson and Watt, 2012; PG&E, 2014). In the immediate vicinity of the DCPP, the Hosgri fault trends N 25° to N 30° W and comprises multiple fault traces, with individual segment lengths up to 18 km long that overlap en-echelon, forming a fault zone up to 2.5 km wide. In the seismic reflection profiles, fault traces appear to be vertical to steeply dipping in the uppermost sedimentary section, but some of the fault traces below about 1 km depth appear to be subvertical or dipping steeply to the east.

The Shoreline fault is a 16–23 km-long fault that bounds most of the western margin of the Irish Hills. At its closest approach, the fault is located approximately 600 m from the DCPP. The fault was identified from a number of geological and geophysical observations, including the nearly vertical alignment of earthquake hypocenters (Hardebeck, 2013) that coincides with linear magnetic anomalies revealed as part of the high-resolution aeromagnetic data (e.g., Langenheim et al., 2009). High-resolution two-dimensional and three-dimensional seismic imaging data within the San Luis Bay further supports the location and lateral extent of the Shoreline fault (PG&E, 2011; 2014). The NRC staff previously reviewed much of the geological
and geophysical information characterizing the Shoreline fault as part of a deterministic seismic hazard evaluation (NRC, 2012c).

The Los Osos fault, located about 10 km north-northeast (NNE) of the DCPP, is mapped as a southwest dipping, reverse or right-oblique fault that separates the uplifted San Luis-Pismo block to the southwest from the lower terrane of the Cambria block to the northeast. Its surface trace is a series of discontinuous subparallel fault strands that extend from an intersection with the Hosgri fault in Estero Bay in the north to an intersection with the West Huasna fault southeast of the city of San Luis Obispo.

The Southwestern Boundary zone is a collection of reverse and oblique reverse-strike-slip faults that collectively uplift the San Luis-Pismo block from the subsiding Santa Maria Valley. This zone of faults, which includes the San Luis Bay fault, is 4–10 km wide and extends from the northwest at the intersection of the San Luis Bay fault with the Shoreline or Hosgri faults to the southeast, where this zone of faults is inferred to merge with the Oceanic-West Huasna fault zone along the western base of the San Rafael Range.

3.0.3 Senior Seismic Hazards Analysis Committee Approach

Consistent with current NRC guidance, the licensee used SSHAC Level 3 studies to develop both the SSC and GMC models for the DCPP site (PG&E, 2015e; GeoPentech, 2015). Similar to the SSHAC Level 3 studies developed for the Palo Verde Nuclear Generating Station; the SSHAC Level 3 studies for the DCPP include a site-specific SSC model, but rely on a GMC model that was developed within the Southwestern United States (SWUS) Ground Motion Characterization Project. The SWUS project was sponsored by both PG&E and Arizona Public Service.

The SSHAC process was developed as a formal approach that incorporates expert judgment to evaluate uncertainties in a PSHA for nuclear power plants (Budnitz et al., 1997). The process allows for the consideration of the complete set of seismological, geological, and geophysical data, models, and methods that exists within the larger technical community, which are relevant to the seismic hazard analysis. In the SSHAC process, technical experts evaluate and integrate available data, models, and methods into the PSHA to ensure that the hazard results capture the center, body, and range of technically-defensible interpretations (i.e., consider the range of diverse technical interpretations from the larger technical community) (NRC, 2012c).

Site-specific hazard curves and associated seismic engineering inputs (e.g., GMRS or design spectra) are derived from three component studies: SSC, GMC, and site response. The SSC and GMC models, developed through the SSHAC studies, provide the inputs to the PSHA. The models are represented by logic trees, with weighted branches that account for epistemic uncertainty (i.e., uncertainty attributable to incomplete knowledge about a phenomenon). A fundamental aspect of the SSHAC methodology is the distinct and separate treatment of epistemic and aleatory uncertainty (i.e., uncertainty inherent in a random phenomenon). The outputs from the PSHA are a suite of probabilistic hazard curves (i.e., peak ground acceleration and spectral ground accelerations) for either a reference rock or soil condition. Section 3.1 of this staff assessment evaluates the SSC, and the GMC is evaluated in Section 3.2. The PSHA
is reviewed in Section 3.3. Site response for the DCPP, which was not developed using a SSHAC process, is evaluated in Section 3.4 of this staff assessment.

As requested in the 50.54(f) letter (NRC, 2012a), the licensee conducted SSHAC Level 3 studies for both the SSC and GMC using the guidance in NUREG/CR-6372 (Budnitz et al., 1997) and NUREG-2117 (NRC, 2012c). The licensee served as project sponsors for the SSC component of the SSHAC, while both PG&E and Arizona Public Service co-sponsored the GMC. These respective licensees identified the Project Technical Integrators (PTIs), who were the technical leads for the SSC and GMC. Technical Integration Teams (TI Teams) developed and documented the SSC and GMC models. In addition, the TI Team members served as both evaluator and integrator experts during the SSHAC process.

The SSHAC studies for both the SSC and GMC followed the same fundamental process. The TI Team developed a project plan and began compiling a project database. The TI Team then organized a series of workshops to discuss applicable data and models. Initial workshop(s) focused on the compilation and development of data needed to support the models, which were identified by resource experts. Subsequent workshop(s) focused on development of models and consideration of alternative models, which were supported by proponent experts. Observers, including NRC staff, also attended the workshops along with Participatory Peer Review Panel (PPRP) members. The TI Team then developed preliminary models, and performed initial hazard calculations and sensitivity analyses. These preliminary insights were discussed at an additional workshop, and the TI Team adjusted the models based on feedback from this workshop and additional discussions with the PPRP. The TI Team conducted the final hazard calculations and sensitivity analyses, and documented the results of the SSHAC in a final project report (PG&E, 2015e).

An important part of a SSHAC Level 3 process is a PPRP, which provides peer review and feedback to the TI Teams throughout the evaluation. The PPRP attended workshops and working meetings, reviewed work products, and provided input to the TI Teams throughout SSC and GMC development. The PPRP also provided a formal review of the resulting hazard study (Appendix B, PG&E, 2015e). In addition, the project management teams at the DCPP and within the SWUS project developed an electronic library of workshop materials for the SSHAC participants, which included workshop summaries, presentations, references, and data.

Additional details about the SSHAC process are discussed and evaluated in the following sections of this staff assessment, in the context of technical topics for the SSC and GMC development. In each subject area, the reviews identify the most significant technical issues for the PSHA, and discuss how the NRC staff evaluated these issues.

3.1 Seismic Source Characterization

The SSC for the DCPP (PG&E, 2015e) site represents the first stage of a PSHA. The TI Team's goal was to develop an SSC model for the PSHA based on evaluation of available geological, geophysical, and seismological information. For the SSC, the TI Team considered two types of seismic sources: faults and areal source zones. The SSC TI Team developed input parameters for these seismic sources from: (1) earthquake records, based on the instrumented and historical seismicity catalogued for the region; (2) geologic evidence of the
magnitude, age, and frequency of past seismic events; (3) geological and geophysical evidence for the location and geometry of faults; (4) geological and geophysical evidence to constrain the amount and timing of fault slip; and (5) geophysical evidence to determine the nature of tectonic stresses and to quantify the resulting crustal strain, largely based on GPS measurements.

3.1.1 Assessments of the SSHAC Process for SSC

To develop the SSC for the DCPP site, the TI Team first compiled existing information from plant licensing documents, the extensive record of information acquired as part of the on-going Long-Term Seismic Program, information acquired through cooperative activities with other governmental agencies such as the California Coastal Commission, academic institutions, the USGS, and published technical information. This compilation helped focus the first SSHAC workshop (held November 29–December 1, 2011) on identifying data needs, which considered a range of presentations from resource experts. The resource experts provided summaries of available data sets to assist in addressing significant issues, including legacy data from the prior Long-Term Seismic Program studies (PG&E, 1988). Hazard results from prior PSHA studies, especially the PSHA developed by PG&E for the Shoreline fault zone study (PG&E, 2011), provided the basis to inform and focus the discussions of data needs on the most hazard significant issues. Based on the discussions during the first workshop, the TI Team recognized the need to conduct additional studies to improve the characterization of fault geometries in the subsurface and to develop information on Quaternary (i.e., less than 2.6 million years ago) deformation and slip rates on the fault sources. Following the first workshop, significant new information was provided to the TI Team, especially because of the significant new seismic imaging program that was being conducted for the California Coastal Commission Seismic Imaging Project (CCCSIP) (PG&E, 2014).

The second SSHAC workshop (held November 6–8, 2012) focused on developing models and associated data that were most significant to seismic hazards at the DCPP site. For the second SSHAC workshop, multiple experts were queried for data and model information, including information about data gaps and alternative interpretations of the available information, from which several technical challenges emerged regarding development of SSC models for the PSHA. These key technical challenges included: (1) how to treat multi-fault ruptures that could lead to very large earthquake magnitudes, especially as envisioned in the State of California's Uniform California Earthquake Rupture Forecast v.2 (UCERF2) model (Field et al., 2009); (2) the tectonic forces driving the uplift of the Irish Hills, and whether or not to project a blind thrust fault beneath the Irish Hills; (3) the use of relocated hypocenters in distinguishing fault sources or areal source zones; (4) sensitivity of the PSHA results to the choice of a magnitude scaling relationship; and (5) whether or not to include the potential for non-Poissonian (i.e., time-dependent) earthquake recurrence.

At the third SSHAC workshop (held March 25–27, 2014), the TI Team presented the preliminary SSC model with an emphasis on obtaining feedback from the PPRP. The TI Team described the technical bases for the models to allow for a reasoned discussion of the constraints interpreted from the available data. The main topics of discussion for the SSC model focused on the potential for non-Poissonian earthquake recurrence, conceptual development of linked fault ruptures, slip rate allocation models, and magnitude-distribution models. In addition, resource experts provided updates to the CCCSIP onshore and offshore investigations. Much
of the interaction between the PPRP and TI Team centered on the basis for developing SSC logic trees and associated weighting schemes, including consideration of alternative models and data uncertainties. The PPRP also used the hazard sensitivity analyses to focus the TI Team's attention on further refining data and models that had the greatest potential contribution to the resulting PSHA at the DCPP site.

Several analyses on specific elements of the SSC model were incomplete at the third workshop, including implementation of alternative magnitude-frequency distributions and the time-dependence uncertainty model for fault sources. These incomplete analyses in the SSC model were identified to the PPRP during the workshop, and required subsequent presentations to the PPRP after the conclusion of the third workshop. These working meetings were held in July and October of 2014.

After reviewing the preliminary SSHAC report, the PPRP provided extensive comments to the TI Team and then reviewed the TI Team’s responses. In summary, the PPRP concluded in its endorsement letter (PG&E, 2015e, Appendix B):

Based on our observation of the completeness and professional standard by which the evaluation and integration activities were conducted, the Panel concludes that the data, models, and methods within the larger technical community have been properly evaluated, and that the center, body, and range of technically defensible interpretations have been appropriately represented in the SSC model. Accordingly, the Panel concludes that both the process and technical aspects of the DCPP SSC assessment fully meet accepted guidance and current expectations for a SSHAC Level 3 study.

STAFF EVALUATION

Based on observations made during the SSHAC workshops and review of the SSHAC documentation, the NRC staff concludes that the licensee conducted the SSHAC workshops in a manner that is consistent with applicable NRC guidance. In addition, the NRC staff does not find significant departures from the guidance in the approach used by the TI Team to develop the SSC model. Due to the potential for anchoring to previous models, the TI Team addressed the potential for cognitive bias during each workshop. The PPRP also discussed sensitivity to cognitive bias as part of the SSHAC process and addressed this in their review. An important component of the SSHAC process is complete documentation. Based on its review, the NRC staff concludes that the SSHAC documentation (PG&E, 2015e) provides an acceptably complete record of the approach used to develop the SSC model. Based on observations made during the SSHAC workshops and review of the SSHAC documentation, the NRC staff also concludes that a reasonable range of resource and proponent experts were engaged in the SSHAC workshops; and that a broad range of alternative data and models were considered. The NRC staff used these observations, and their knowledge of the geology and seismology of the DCPP site region, to conclude that the TI Team took appropriate steps to ensure that the resulting SSC model captures the center, body, and range of the technically-defensible interpretations.
The success of a SSHAC Level 3 depends strongly on the effective review and engagement of the PPRP with the TI Team. To evaluate the effectiveness of the PPRP for the SSC model development, the NRC staff reviewed the PPRP and TI Team correspondence, including comment and response logs, and observed workshop interactions. The NRC staff observed open dialog between the TI Team and the PPRP at workshop meetings, which included several significant comments or suggestions from the PPRP that required appreciable effort by the TI Team to resolve. The NRC staff also observed that the PPRP members were well engaged after the third workshop to ensure that the technical aspects of the final SSC model that were not included in the workshop discussions were sufficiently justified and fully documented. Moreover, during the duration of the project, one or more members of the PPRP attended many of the 36 working meetings as observers. The NRC staff concludes that the PPRP was effective and engaged throughout the SSC SSHAC study and that there were no unresolved PPRP issues at the end of the project, as fully described in the PPRP closure letter (PG&E, 2015e).

In summary, based on the NRC staff’s review of the SSHAC documentation, observations made at SSHAC workshops, and knowledge of the geological and seismological characteristics of the DCPP region, the NRC staff concludes that the licensee acceptably implemented a SSHAC Level 3 process to develop the SSC model.

3.1.2 Summary of SSC Database

As described in Chapter 4 of the SSC SSHAC report (PG&E, 2015e), the SSC SSHAC study relied on a database that consisted of several generations of data and related technical information. In response to License Condition 2.C.(7), which was imposed on PG&E by the NRC when the operating license for Unit 1 was issued in 1984, PG&E reevaluated the seismic design bases of the DCPP. As part of the ensuing Long-Term Seismic Program, PG&E committed to an ongoing effort to study seismic issues and to perform periodic seismic reviews of the DCPP (PG&E, 1991b and 1991c). To date, data acquisition for the Long-Term Seismic Program has included: (1) earthquake records from seismic monitoring, including the PG&E Central Coast Seismic Network; (2) high-resolution potential field data (magnetics and gravity); (3) seismic reflection data; (4) bathymetric measurements; and (5) topographic data.

This commitment to ongoing research and review included the CCCSIP offshore and onshore studies, independent research by USGS investigators under the PG&E-USGS Cooperative Research and Development Agreement (CRADA) program, studies funded by PG&E to university researchers and consultants, and independent research by university researchers and the California Geological Survey (CGS). Through the CRADA program, important geological, geophysical, and seismological data were acquired from 2008 through 2011, with an emphasis on characterizing the Shoreline fault (PG&E, 2011). In addition to recompiled and new onshore and offshore gravity and magnetic surveys, this data set included updates to the geological maps of the DCPP site, new high-resolution single-channel reflection profiles (Sliter et al., 2010), and multi-beam echo-sounder (MBES) surveys of the seafloor bathymetry in the nearshore regions from Estero Bay to San Luis Obispo Bay. The MBES data were acquired by the Seafloor Mapping Lab at the California State University Monterey Bay (CSUMB, 2012).
In 2006, California Assembly Bill 1632 directed the California Energy Commission to assess, among other things, the potential vulnerability of the DCPP to a major disruption due to a seismic event. To support this assessment, PG&E collected additional onshore and offshore geophysical data to reduce uncertainties in the characterization of seismic sources, using current state-of-the-practice methods and approaches. This geophysical program began in 2011 and ended in 2014, and included both two-dimensional (2D) and three-dimensional (3D) seismic reflection data in the offshore and onshore regions near the DCPP (PG&E, 2014). Within this phase of data collection, PG&E collected a significant amount of new onshore and off-shore seismic images from 2D- and 3D-low energy seismic signals (LESS) (PG&E, 2014).

Specifically, the LESS surveys were designed to image near-surface features of the Hosgri fault north of Point Buchon, and the Shoreline fault in San Luis Bay. In addition, PG&E acquired high-resolution tomographic data within a 1 km³ volume directly beneath the DCPP site. This high-resolution seismic tomographic data provides a detailed characterization of compressional-wave and shear-wave velocity structure beneath the DCPP, which was used in the site response analysis (Section 3.4 of this staff assessment).

In 2012, the USGS acquired additional high-resolution multibeam images of the Hosgri fault in Estero Bay (Hartwell et al., 2013). As part of this survey, the USGS remapped a linear southwest-facing bathymetric slope, which is referred to as the cross-Hosgri-slope. This feature is important because it provides one of the constraints on the slip rate of the Hosgri fault. Johnson et al. (2014) interprets this feature as the shoreface of a Pleistocene (i.e., the period between 11,500 years ago and 2.5 million years ago) sand spit that has been offset by strike-slip motion on the Hosgri fault.

Through the CRADA program, the USGS also compiled a database of earthquake hypocenter and focal mechanism data that were used to support fault characterizations (Hardebeck, 2010, 2013). Within this set of studies, refinements were made to the locations of the earthquake hypocenters based on an advanced technique called double-difference tomography to develop a 3D crustal velocity model (Zhang and Thurber, 2003).

In addition to the aforementioned datasets, the database developed for the SSC SSHAC study by PG&E included new geologic mapping and geomorphic analysis to support the TI Team’s characterization of the Los Osos, Cambria, and San Luis Bay faults, including constraints on fault slip rates. These data included updates to fluvial and marine terrace characterizations, revised geologic maps, and subsurface data compiled from oil and gas wells, CalTrans wells, and existing geotechnical studies. This information is detailed in the CCCSIP Report (PG&E, 2014).

STAFF EVALUATION

The success of the SSHAC process in developing the center, body, and range of technically defensible interpretations begins by providing the TI Team with a broad range of geological, geophysical, and seismological information. The project database includes the extensive geological, geophysical, and seismological information that has been collected since the initiation of the Long-Term Seismic Program in 1984, in addition to new data that were collected as part of the SSHAC study and in response to the data issues identified at the first Workshop. The NRC staff previously reviewed much of these data during extensive technical interactions.
with the licensee. This includes the staff’s review of the Long-Term Seismic Program that is documented in NUREG-0675, Supplement No. 34 (NRC, 1991), which concluded that PG&E met the requirements of License Condition 2.C(7). In addition, the staff reviewed the PG&E Shoreline Report (PG&E, 2011), which is documented in Research Information Letter 12-01 (NRC, 2012c). Moreover, the NRC staff observed that many of the proponent models that were provided at the second workshop relied extensively on the same data. Based on the NRC staff’s observations at the SSHAC workshop, prior NRG technical evaluation of much of this data, and careful review of the summary of data provided in Chapter 4 of the SSC SSHAC report (PG&E, 2015e); the NRG staff concludes that the licensee assembled an adequate database necessary for a SSHAC SSC study, which is up-to-date and includes an appropriate range of geological, geophysical, and seismological information.

Moreover, in conducting the technical review for this staff assessment, the NRC staff relied on a subset of the seismic imaging data to independently evaluate the slip rate of the Hosgri fault. The details of this portion of the staff’s review are described in Section 3.1.4.2 of this staff assessment. For this independent evaluation of the Hosgri fault, the staff used an aggregation of offshore seismic data from Southern Estero Bay that included the USGS 2008–2009 high-resolution sparker tracklines and the 1986 joint PG&E and Alaska COMAP lines.

### 3.1.3 SSC Modeling Approach for Seismic Sources

As described in Chapter 6 of the SSC SSHAC report (PG&E, 2015e), the TI Team developed an overall logical framework to evaluate active faults and associated faulting characteristics, including fault slip, fault rupture, and faulting recurrence. In this overall framework, the TI Team developed both fault and areal sources. The TI Team defines fault sources as representations of well-defined and geologically mapped seismogenic fault zones. Fault sources are characterized by the TI Team based on their location, geometry, depth extent, slip sense, slip rate, magnitude-frequency distribution, and probability of occurrence of an earthquake in a given time period. The TI Team categorized the fault sources as primary faults (Hosgri, Shoreline, Los Osos, and San Luis Bay faults), connected faults (local and regional faults that directly connect to the primary faults as part of a potentially complex fault rupture), the San Andreas fault, and other regional faults, including those derived from the UCERF3 model (Field et al., 2013).

Areal sources are defined by an areal source boundary, maximum magnitude earthquakes ($M_{\text{max}}$), and magnitude-frequency distributions. Within the areal source that encompasses the DCPP, the TI Team used a series of virtual faults to model the source zone seismicity. For the other areal source zones, the TI Team modeled the occurrence of earthquakes as point sources. The details of the areal source zone characterization and staff’s review of the areal sources is provided in Section 3.1.5 of this staff assessment.

The essential logical element of the TI Team’s approach to developing SSC models is that earthquakes in transpressive tectonic environments (such as the DCPP site) often involve complex ruptures on several connected faults. This assessment was derived by the TI Team from an evaluation of the fault rupture patterns on nine historical earthquakes in regions with transpressive tectonic settings that are similar to the tectonic setting at the DCPP site. Based on these analogs, the TI Team eschewed traditional PSHA fault-source characterization of
individual faults in favor of multi-fault models that they considered to explicitly account for the inherent complexities and constraints of connected fault ruptures.

First, the TI Team developed fault geometry models to capture the range in each of the primary fault’s geometric characteristics (e.g., length, dip, down-dip width). For example, the TI Team developed three alternative fault geometry models for the Hosgri fault to account for uncertainty in fault dip, which ranged between 75 and 90 degrees. The TI Team lumped the three remaining primary faults (Los Osos, San Luis Bay, and Shoreline) into a single group of faults that were referred to as the San Luis Pismo Block (SLPB). For the SLPB, the TI Team then developed three alternative fault-geometry models (i.e., Outward Vergent, Southwest Vergent, and Northeast Vergent) to account for the alternative interpretations in how uplift of the San Luis Range occurs geologically through different combinations of thrust, reverse, and oblique strike-slip faulting on these three SLPB faults.

Second, the TI Team modeled the potential for future earthquakes by considering fault sources in terms of single or combined fault ruptures. In this approach, the TI Team considered: (1) rupture of a single fault segment; (2) rupture of two or more adjacent fault segments on the same fault; or (3) rupture of adjacent primary and/or connected fault segments. These ruptures may involve a single sense of slip (e.g., all strike-slip) on all segments or different senses of slip (e.g., reverse and strike-slip) on multiple fault segments. In the SSC SSHAC study (PG&E, 2015e), the TI Team referred to ruptures with single senses of slip as “linked” or “splay,” and the ruptures with different senses of slip as “complex.” Based on the segments for the four primary faults defined in the fault geometry models and the faulting characteristics of the connected faults, the TI Team then developed a suite of fault rupture sources as a way to capture what they consider to be the full range of possible rupture scenarios. The various combinations of rupture sources with each fault geometry model form what the TI Team referred to as a rupture model; that is, the combinations of all fault segments that can rupture together within a single fault geometry model.

Third, the TI Team assigned slip rates to the various fault rupture models by allocating the available fault slip, which is based on the measured slip rates for the individual faults, among the network of faults described in the fault geometry model. In this approach, the TI Team used the slip rate determined from evidence of fault slip from geological, geophysical, or seismological information as the available slip rate budget, which it then distributed among the various rupture sources. Thus, the slip rate allocation model created a slip rate for each rupture source such that, when the contributions from all rupture sources are summed, the combined slip rate equals the target slip rate budget for that particular fault within that rupture model.

Fourth, the TI Team developed magnitude distribution models for each rupture source to account for the minimum and maximum magnitudes and the relative frequency of earthquake magnitudes over the range from the minimum to the maximum. The TI Team derived the maximum magnitude for each rupture source using the fault-area scaling relationships of Hanks and Bakun (2014). The TI Team also selected four different probability distributions to define the magnitude frequency. For nearly all the single fault segments and shorter linked faults, the TI Team used the characteristic model of Youngs and Coppersmith (1985). For longer linked faults, including faults in which slip occurs on the full length of the Hosgri fault and a significant reach of the San Simeon and San Gregorio faults, the TI Team adopted the WAACY model.
Finally, for complex and splay ruptures, the TI Team used a simple maximum magnitude model (Wesnousky et al., 1983).

Fifth, the TI Team incorporated time dependency into the SSC model, because they determined that a growing body of seismological evidence shows that earthquake recurrence on many faults is too regular to be considered simply as a time-independent Poisson process (Biasi et al., 2002; Scharrer et al., 2010; Fitzenz, 2010). To account for a time-dependent process, the TI Team developed equivalent Poisson ratios and applied those ratios to the primary and connected fault source rates. The methodology for the TI Team's approach is described in Appendix H of the SSC SSHAC report (PG&E, 2015e).

STAFF EVALUATION

The NRC staff reviewed the TI Team's overall approach to developing the SSC model and concludes that the framework established by the TI Team provides a logical and inclusive approach to ensuring that the resulting SSC model captures the center, body, and range of technically-defensible interpretations. Although the TI Team included several new approaches to faulting characterization compared to more traditional SSC models (e.g., Pacific Northwest National Laboratory (PNNL), 2014), the staff determines that the overall SSC model developed by the TI Team contains the essential elements needed to describe the likely future occurrence of earthquakes in the vicinity of the DCPP. These essential elements are: (1) an inventory of all known seismic sources within the vicinity of the DCPP, including both fault and areal sources; (2) characterization of the seismic sources in terms of their size, location, depth, faulting style, and connectivity to other sources, including an accurate assessment of uncertainty; and (3) defensible representations of the location, magnitude, and likelihood of future earthquakes that these seismic sources produce, including an accurate assessment of uncertainty. Discussions of these hazard significant parameters are provided in Sections 3.1.4 and Section 3.1.5 of this staff assessment.

The NRC staff also reviewed the unique approach the TI Team used to develop the rupture models and to allocate the slip rate amongst the rupture sources. The detailed review the TI Team provided on a number of recent historic earthquake ruptures was instructive in pointing out the potential complexities associated with active seismicity in a transpressional tectonic setting. The NRC staff observed that many recent earthquake ruptures reviewed by the TI Team show that these earthquakes ruptured on parallel strands or along connecting faults. The NRC staff concludes that these analogs provide an acceptable technical basis to develop a more realistic representation of fault rupture associated with a fault network similar to that observed at the DCPP site. In particular, the NRC staff concludes that the approach to allocating slip among the seismic sources based on a slip rate budget is acceptable because long-term geologic fault slip rates provide the best available constraint on earthquake recurrence, in the absence of site-specific paleo-earthquake and paleo-seismic data.

Based on review of the technical literature, the NRC staff determines that a slip rate approach is reasonable for seismic hazard analyses in areas without a well-developed earthquake chronology. Finally, the NRC staff concludes that the rupture and slip allocation models developed by the TI Team appropriately capture both the natural variability in how faults deform (i.e., aleatory uncertainty) and the inherent uncertainty in how to represent the fault-deformation
processes in numerical models (i.e., epistemic uncertainty). The NRC staff concludes that the TI Team appropriately captured the uncertainty associated with the application of these faulting models, and that these models are acceptable for use in calculating seismic hazards at the DCPP site.

3.1.4 Fault Sources

As defined in the SSC SSHAC report (PG&E, 2015e), the TI Team identified several categories of fault sources that were considered as part of the SSC. These include four primary faults: Hosgri, Los Osos, Shoreline, and San Luis Bay. These four faults were shown in prior PSHA sensitivity studies (e.g., PG&E, 2011) to contribute significantly to the seismic hazard at the DCPP. The TI Team defined connected faults as faults that are potentially linked to one of the four primary faults and that could have segments that contribute to a single large rupture on a primary fault. In addition to the primary and connected faults, the TI Team also evaluated other regional faults within 320 km of the DCPP. The TI Team organized their fault characterization according to five elements: (1) fault geometry, (2) slip rate, (3) fault rupture, (4) magnitude distribution, and (5) time-dependent models. These five elements are described and evaluated in the next subsections of this staff assessment.

3.1.4.1 Fault Geometry Models

The TI Team developed fault geometry models to describe the location, dip, and physical dimensions of the primary and connected fault sources. The TI Team also used the fault geometry models to capture epistemic uncertainty in the fault sources. The TI Team’s motivation for how these fault geometry models was described previously in Section 3.1.3 of this staff assessment. The TI Team also characterized the geometry of other faults within 320 km of the DCPP. For all but five of these regional faults, the TI Team relied on the fault characterization developed in UCERF3 (Field et al., 2013). For the five regional faults sources not included in UCERF3, the TI Team relied on published information to develop simplified fault source characterizations (see Table 12-4 of PG&E, 2015e). Finally, the TI Team included the San Andreas fault, which is located approximately 80 km northeast of the DCPP.

STAFF EVALUATION

The NRC staff reviewed the information in the SSC SSHAC report (PG&E, 2015e) and determined that the TI Team’s characterization of the fault geometries of the primary, connected, and regional faults is adequate to develop a technically-defensible PSHA for the DCPP. According to the hazard sensitivity results presented at the first workshop (Wooddell, 2011), other regional faults do not contribute significantly to the DCPP seismic hazard. Based on the same sensitivity analyses, the San Andreas fault also does not contribute significantly to the seismic hazard at the DCPP, except for long period (>1 sec) ground motions. For these reasons, the NRC staff review provided in this staff assessment is only focused on the primary and connected faults that contribute significantly to seismic hazards at the DCPP.

Based on NRC staff's review of the SSC SSHAC report (PG&E, 2015e) and observations at the SSHAC workshops, the NRC staff concludes that the TI Team’s fault geometry models for the primary faults were based on an acceptable variety of geological, geophysical, and
seismological information. In particular this information includes significantly detailed seismic imagery of the primary faults in the subsurface, as documented in the CCCSIP Report (PG&E, 2014). The NRC staff notes that the geometric characterization of the Hosgri fault is especially well constrained by the offshore seismic images, in addition to the alignment of relocated hypocenter earthquake data of Hardebeck (Hardebec, 2013).

The NRC staff concludes that the conceptual designs of the fault geometry models are an adequate approach to capturing the center, body, and range of technically defensible interpretations. The NRC staff notes that the three geometry models for the Hosgri fault are straightforward and reasonably capture small differences in the interpreted dip of the fault. In contrast, the NRC staff notes that SLPB fault geometry models are appropriately complex, because these models capture the diverse range in seismotectonic interpretations of the San Luis Range that were presented by the proponents during the second workshop. As described in PG&E (2015e), the TI Team’s motivation in developing the fault geometry models, especially the variants for the SLPB faults, was to ensure that the models captured the diverse interpretations among the technical community regarding the nature and style of faults responsible for the uplift of the San Luis Range. The NRC staff also concludes that the approach taken by the TI Team to use these alternative fault geometry models was an effective method to incorporate epistemic uncertainty for these varied seismotectonic interpretations into the PSHA.

In summary, based on the NRC staff’s review of SSHAC documentation, observations made at SSHAC workshops, and knowledge of the geological and seismological characteristics of the DCPP region, the NRC staff concludes that the TI Team acceptably implemented a SSHAC Level 3 process to develop the fault geometry models.

3.1.4.2 Fault Slip Rate Models

The TI Team developed slip rates and associated uncertainties for the primary and connected faults that lie within 320 km of the DCPP based on a combination of geological and geophysical data. The emphasis of the TI Team’s evaluation was on characterizing the primary faults, especially the Hosgri fault, because the hazard sensitivity analysis presented at the first Workshop by Wooddell (2011) indicated that slip on the Hosgri fault was the dominant contributor to the seismic hazard. To estimate slip rates for the primary faults, the TI Team mainly relied on long-term average slip rates, which were based on observed offsets of geologic markers. Other geological, geophysical, and geodetic data also were used by the TI Team, primarily to check the reasonableness of the estimated slip rates determined from offset geological markers. For these estimates, the TI Team determined total net slip of an offset geologic feature and divided that offset distance by the age range during which that offset occurred, taking into account the geometric corrections needed to account for the sense of slip and dip of the fault plane. To account for uncertainty in the slip rate, the TI Team developed discrete probability distributions for both the age of the offset feature and the amount of fault offset. These probability distributions were triangular (minimum, preferred, and maximum values) or trapezoidal (minimum, range of best estimate, and maximum values). These two discrete probability distributions (age and offset) were then combined by the TI Team using a Monte Carlo method to derive a cumulative slip rate distribution and calculate the mean, median, and other fractile values of slip rate.
Much of the information used by the TI Team to derive the geologic ages of fault slip and associated uplift were derived from the detailed chronology developed by PG&E (2013c). This chronology is based on evidence of the effects of sea level changes on the geologic record that occurred in response to glacial cycles during the last several million years. In essence, sea levels fell and were low during the glacial periods, when much of Earth’s water was sequestered in glacial ice. Sea levels rose and were high during periods when the global climate warmed and these glaciers melted. The TI Team relied on this chronology in two ways. First, the TI Team used the relative vertical displacement of paleoshorelines preserved in the Irish Hills to determine uplift rates of the San Luis Range.

Second, the TI Team identified stream channels that were cut into the paleoshorelines during the lowstands (i.e., periods when sea levels were low) and were subsequently buried by sediments and preserved in the offshore sedimentary record during the next highstand (i.e., periods when sea levels were high). The TI Team was able to observe that these paleo-channels were subsequently offset by right-lateral slips on the Hosgri and Shoreline faults, where the paleo-channels crossed these two faults. The amount of offset of these paleo-channels (either best estimate or range of best estimates) was used by the TI Team to quantify the cumulative amount of fault slip since the time when the paleo-channels were first cut into the paleo-shorelines.

The TI Team developed slip rate estimates at four locations along the Hosgri fault trace (see Figure 3.1-3 of this staff assessment). These included: (1) an offset marine terrace strandline near San Simeon (referred to as the Oso Terrace), (2) offset of an approximately 11,500 year old sand spit between Morro Bay and Point San Simeon (referred to as the Cross-Hosgri slope), (3) right-lateral separation of a buried paleo-channel in Estero Bay, and (4) right-lateral separation of a buried paleo-channel near Point Sal. Median slip rates based on these four offset measurements, and ages of the offset features, ranged between 0.8 mm/yr (Point Sal) and 2.5 mm/yr (Cross-Hosgri slope), with a weighted mean from all four sites of 1.7 mm/yr ± 0.7 mm/yr (± 1 standard deviation).

For the Shoreline fault, the TI Team identified three features in San Luis Bay to constrain the slip rate; an offset terrace riser and two apparent offset paleo channels. All three features yield similar median horizontal slip rates of 0.05–0.07 mm/yr. Because all of these offset features are in San Luis Bay south of the Shoreline fault’s intersection with the San Luis Bay fault, the TI Team assumed that the Shoreline fault slip adjacent to the DCPP would be slightly larger to account for the small amount of right-lateral slip transferred from the San Luis Bay fault to the Shoreline fault north of this intersection.

For the San Luis Bay and Los Osos faults, the TI Team developed hanging wall and footwall slip rate distributions largely based on the uplift rate of the San Luis Range, which was derived from marine terrace data and from the vertical separation of fluvial deposits observed in paleoseismic trenches (Lettis and Hall, 1994). In addition, the TI Team included new data on localized subsidence in Morro Bay and considered an alternative uplift model based on a newly proposed paleo-sea level model for California terraces (e.g., Muhs et al., 2012). According to PG&E (PG&E, 2015e), these data show that the San Luis Range near the DCPP is uplifting at a rate of between 0.19 ± 0.03 mm/yr and 0.23 ± 0.02 mm/yr (Hanson et al., 1994). Based on these uplift
rates and the alternative interpretation of fault dip (Lettis and Hall, 1994), the TI Team derived the long-term slip rate of the Los Osos fault to be between 0.2–0.7 mm/yr. The San Luis Bay fault was characterized by the TI Team as a reverse fault along the southern margin of the Irish Hills, with a net slip rate of 0.08–0.20 mm/yr, based on a vertical separation rate of 0.07–0.12 mm/yr and a range in fault dip of 40–70 degrees (Lettis and Hall, 1994).

STAFF EVALUATION

The NRC staff reviewed the information provided by PG&E (2015e) and concludes that the TI Team developed an adequate technical basis to determine the fault slip rates of the primary faults. The use of geological markers to establish average slip rates is a well-established method among geologists and seismologists. The NRC staff concludes that this method was used appropriately by the TI Team to develop slip rate estimates for both onshore and offshore faults. In addition, the NRC staff notes that the sensitivity studies conducted for the prior DCPP PSHA (Wooddell, 2011) showed that the most significant contributor to the seismic hazard at the DCPP are the slip rates for the primary faults, especially the slip rate of the Hosgri fault. Based on this sensitivity, the NRC staff’s review focused on the slip rate of the Hosgri fault.

For the onshore faults, the NRC staff determined that the slip rates of the San Luis and Los Osos faults were based on the evidence for differential uplift of the Los Osos Range, which was first established during the Long-Term Seismic Program (PG&E, 1991c). These evaluations of the uplifted terraces have undergone significant technical review and reanalysis over the past 25 years, including a detailed evaluation completed by the NRC staff (NRC, 2012c). For this staff assessment, the NRC staff concludes that the TI Team’s use of uplift rates for the San Luis Range is sufficient to constrain the slip rates of the SLBP faults. For the offshore faults, the NRC staff determines that the evidence from offset stream channels in the shallow seismic stratigraphy provides a sufficient technical basis to estimate the slip rates for the Hosgri and Shoreline faults. The NRC staff also notes that the estimate of slip rate for the Hosgri fault, which is based on new seismic imaging data, is consistent with prior estimates of the fault slip rate based on other geological data (Hanson et al., 2004).

To confirm the cumulative distributions of fault slips on these primary onshore and offshore faults, the NRC staff recomputed the triangular and trapezoidal distributions for fault slip and age of fault slip based on the data in the SSC SSHAC report (PG&E, 2015e). The NRC staff recombined these distributions using a Monte Carlo method similar to the one relied on by the TI Team. The staff found that the resulting cumulative distributions were consistent with those provided by the TI Team in the SSC SSHAC report (PG&E, 2015e). Based on this independent confirmatory study, the NRC staff concludes that the TI Team adequately determined the statistical range of fault slip rate, which is an important component in fully characterizing the uncertainty associated with the best estimates of fault slip rate.

Because the slip rate on the Hosgri fault is the most significant contributor to the hazard calculation, the NRC staff also conducted an independent confirmatory analysis of fault slip based on the analysis of seismic images of an offshore half-graben (i.e., fault-bound sedimentary basin). This half-graben formed where displacement on the Hosgri fault appears to transfer slip to the San Simeon fault along a right-stepping extensional pull-apart basin. This half-graben and an associated extensional fault zone are situated a few kilometers offshore,
23 km to 40 km northwest of the DCPP. As the pull-apart basin developed, sediments accumulated in the basin, infilling the available accommodation space created by subsidence in the extensional pull apart. Growth of this sedimentary profile within the half-graben is, thus, directly related to slip on the Hosgri fault and the associated opening of its extensional pull-apart basin.

The NRC staff developed an independent estimate of the Hosgri fault slip rate by first measuring the heave (i.e., horizontal component of fault displacement) of the half-graben fault relative to a sediment profile with four age-constrained unconformities, and then relating the growth of this sediment profile to the fault geometry (McGinnis et al., 2016). The NRC staff analyzed these unconformities using seismic sections at 24 locations along the half-graben fault. Based on the geometric constraints of the fault system and the sequence of fault growth, the NRC staff observes that the slip rate on the Hosgri fault appears to increase from a rate of 0.21 mm/yr approximately 2.5 million years ago to a rate of 2.17 mm/yr approximately 20,000 years ago (McGinnis et al., 2016). Considering the analytical uncertainties in this confirmatory analysis, the NRC staff concludes that the youngest (and largest) slip rate is reasonably consistent with the slip rate distribution developed by the Ti Team (PG&E, 2015e).

In summary, based on the NRC staff's review of SSHAC documentation, observations made at SSHAC workshops, knowledge of the geological and seismological characteristics of the DCPP region, and independent confirmatory analyses the staff concludes that the TI Team acceptably implemented a SSHAC Level 3 process to develop the fault slip rate distributions for the primary faults near the DCPP site.

3.1.4.3 Fault Rupture Models

The rupture sources in the SSC rupture models are akin to fault sources in a more traditional fault source characterization. For each rupture source, the TI Team determined the size and location of future earthquakes from the geometric properties of that source (i.e., location, length, orientation, and down-dip width). The TI Team assigned a slip rate to each rupture source based on the slip rate of the associated fault. The TI Team also assigned a recurrence model to each rupture source to capture the aleatory variability in the magnitudes and rupture dimensions of possible future earthquakes on the fault. The TI Team noted that the rupture model approach differs from a more traditional PSHA fault characterization in that it accounts for potentially larger and more complex ruptures on a network of linked faults, and thus allows for these larger and more complex ruptures to be included in the SSC model.

STAFF EVALUATION

The NRC staff evaluated the TI Team's use of rupture source models and concludes that these provide a reasonable basis to ensure that the resulting SSC model captures the center, body, and range of technically defensible interpretations. The NRC staff also concludes that the TI Team's approach is an acceptable method to capture the aleatory variability and epistemic uncertainty in fault source characterization. This approach is acceptable because each rupture source accounts for multiple possible future combinations of fault rupture (i.e., aleatory variability) and includes the full distribution of each fault's slip rate. The TI Team's approach accounts for epistemic uncertainty within each rupture source, because alternative slip rates
and associated weights are assigned to each rupture source. Additionally, epistemic uncertainty is captured by the range of fault geometry models used by the TI Team, which represent a reasonable range of alternative interpretations of the seismotectonic setting. Thus, the NRC staff concludes that the TI Team's overall approach and implementation of rupture models are reasonable and adequately capture the center, body, and range of technically defensible interpretations.

In summary, based on the NRC staff's review of SSHAC documentation, observations made at SSHAC workshops, and knowledge of the geological and seismological characteristics of the DCPP region, the staff concludes that the TI Team acceptably implemented a SSHAC Level 3 process to develop the fault rupture models.

3.1.4.4 Magnitude Distribution Models

The TI Team constructed magnitude distribution models to characterize the relative frequency of earthquake magnitudes between the minimum and maximum for each rupture source using four alternative magnitude probability density functions (PDFs). The TI Team used three established and one new alternative magnitude PDFs to develop the magnitude distribution models for future earthquakes. These PDFs are the: (1) truncated exponential (Gutenberg and Richter, 1944), (2) characteristic earthquake (Youngs and Coppersmith, 1985), (3) maximum magnitude (Wesnousky, 1983), and (4) the recently developed Wooddell, Abrahamson, Acevedo-Cabrera, and Youngs (WAACY) model (Wooddell et al., 2014) distributions. The TI Team used either the truncated exponential or the WAACY model for rupture sources greater than 100 km in length with weights of 0.2 and 0.8, respectively. For ruptures less than 100 km, the TI Team used the characteristic earthquake model and distribution for linked ruptures, and the maximum magnitude model for complex and splay ruptures. The TI Team also noted that the resulting magnitude-frequency distributions for the section of each primary fault source closest to the DCPP compared favorably to the magnitude-frequency distributions used by the UCERF3 model.

The TI Team used the Hanks and Bakun (Hanks and Bakun, 2014) magnitude-area scaling relationships to determine the maximum or characteristic magnitudes of each rupture source. To determine the fault rupture area, the TI Team estimated the maximum length of the rupture and also assumed either a 12 km (SLPB) or 15 km (Hosgri) depth to the base of the seismogenic crust. From these estimated maximum rupture areas, the TI Team computed the maximum or characteristic earthquake magnitude. The TI Team initially used multiple magnitude-area scaling relationships but determined that the range of maximum magnitudes produced by the relationships was not significant.

STAFF EVALUATION

The NRC staff evaluated the TI Team's approach to developing magnitude distribution models for each of the rupture sources using four alternative magnitude PDFs and concludes that the approach used by the TI Team is sufficient to ensure that the resulting SSC model captures the center, body, and range of technically defensible interpretations. Specifically, the NRC staff reviewed the information developed by PG&E (2015e) and concludes that the TI Team appropriately used one of the four magnitude PDFs depending on the type of earthquake
rupture. The NRC staff notes that the TI Team used two alternative distributions for the longer (greater than 100 km) ruptures in order to capture the epistemic uncertainty in magnitude distribution for these relatively infrequent events. In addition, the staff notes that the TI Team’s decision to more heavily weight the WAACY model is appropriate since the WAACY distribution places higher weight on the larger magnitudes relative to the truncated exponential model. Finally, the NRC staff concludes that the Hanks and Bakun (Hanks and Bakun, 2014) magnitude-area scaling relationships provide an adequate technical basis to develop either the maximum or characteristic earthquake magnitude.

In summary, based on its review and evaluation of applicable information in (PG&E, 2015e), the NRC staff concludes that the TI Team acceptably developed magnitude distribution models for use in the SSC model.

3.1.4.5 Time Dependency Model

In most traditional PSHAs, earthquake recurrence is modeled as a time-independent Poisson process. However, in the SSC SSHAC report (PG&E, 2015e), the TI Team noted that there is emerging consensus among seismologists that fault-specific earthquake recurrence is more uniform than is implied when non-Poisson recurrence is assumed (e.g., Biasi et al., 2002; Scharer et al., 2010; Fitzenz et al., 2010). For a given fault with a characteristic return period, the likelihood of a large, characteristic event is lower in the time interval following a large event and increases through time. To account for potential time dependence, the TI Team implemented an equivalent Poisson ratio (EPR) approach based on recurrence models represented by log-normal, Weibull, and Brownian Passage Time distributions.

Within the TI Team’s approach, the EPRs depend on: (1) the long-term mean recurrence rate of moderate to large earthquakes, (2) a coefficient of variation in the model, and (3) the time since the most recent medium- to large- magnitude earthquake. The TI Team derived the mean recurrence rate from the long-term slip rates, as described and reviewed by the NRC staff in Section 3.1.4.2 of this staff assessment. To estimate the time since the last medium to large earthquake, the TI Team relied on two historical observations. According to the TI Team, historical records show that the San Luis Obispo Mission was founded in 1772, and has not experienced any significant earthquake damage since it was built. The TI Team also noted that by the early 1870s, road and rail connections were opened to the rest of California and the first newspaper in San Luis Obispo was established. Based on these observations, the TI Team set the minimum time since the last medium- to large- magnitude earthquake at 140–242 years. Considering this range in time since the last earthquake, the calculated recurrence interval for the Hosgri and SLPB faults, and a range of coefficients of variations based on values for best available paleoseismic records in California, the TI Team determined an average EPR of 1.3 for the Hosgri fault and an average EPR of 1.1 for the SLPB faults. These average EPRs and associated distributions were implemented in the SSC logic tree as the first nodes for these faults.

STAFF EVALUATION

The NRC staff reviewed the information in the SSC (PG&E, 2015e) and determined that the TI Team developed an adequate technical basis to incorporate a fault-specific, time-dependent
model into the PSHA. The TI Team’s approach appropriately reflects the emerging consensus among the seismological community that these time-dependent models are necessary to capture the center, body, and range of technically-defensible interpretations. Because of the lack of paleoseismic information to constrain the age of past earthquakes on the Hosgri or SLPB faults, the NRC staff also concludes that the TI Team’s use of historical observations is acceptable. As noted by the TI Team, the 140–242 years since the last damaging earthquake are minimum values, based on the lack of recorded earthquakes in the local historical record. Moreover, based on the formulation developed by the TI Team, as the time since the last earthquake is increased, the EPRs for the Hosgri and SLPB faults get smaller. Thus, the 140–242 year values used by the TI Team are deemed by the NRC staff to be conservative.

The NRC staff also concludes that the coefficient of variation determined from best available paleoseismic records in California is adequate because this value should represent the average value of fault behavior and these records provide a reasonable record of that behavior. Finally, to further evaluate the acceptability of using the time-dependent approach within the PSHA, the NRC staff performed a confirmatory evaluation in which the NRC staff was able to reproduce the TI Team’s EPR results.

In summary, based on the NRC staff’s review of SSHAC documentation, observations made at SSHAC workshops, and a confirmatory calculation, the staff concludes that the TI Team acceptably accounted for a time-dependent Poisson process in the SSC model.

### 3.1.5 Areal Source Zones

In addition to the fault sources (see Section 3.1.4 of this staff assessment), the SSC model developed by the TI Team accounted for potential seismicity occurring from other faults within 320 km of the DCPP site through the use of areal source zones. Areal sources include less active and less well-defined geologic fault zones, which the TI Team characterized with a defined location, crustal thickness, earthquake recurrence parameters, maximum magnitude, and magnitude frequency distribution shape. The areal source zones contain faults that are known, proposed, or unknown. However, these faults have insufficient data for modeling, and they are not sufficiently active or well-constrained to be considered as separate fault sources.

As described in Chapter 13 of the SSC (PG&E, 2015e), the TI Team developed three non-overlapping, nested areal sources zones: Regional, Vicinity, and Local. Because past hazard sensitivity analyses showed that hazard at the DCPP is dominated by ground motions caused by earthquakes occurring at close distances on the primary fault sources (PG&E, 2011; Wooddell, 2011), the TI Team used simplified approaches for modeling the areal source zones that included an increasing level of detail closer to the DCPP. The Regional and Vicinity areal source zones correspond approximately to the Site Region (i.e., 320 km) and Site Vicinity (i.e., 40 km) zones, as defined in Regulatory Guide 1.208 (NRC, 2007). The TI Team modeled the occurrence of potential earthquakes in the Regional and Vicinity areal source zones as point sources. For the Local areal source zone, the TI Team modeled earthquakes as occurring on a set of parallel virtual faults.

To develop distributions of the size and frequency of earthquakes in all three areal source zones, the TI Team evaluated the occurrence of past earthquakes from four earthquake catalogs: (1) a 2014 non-declustered relocated earthquake catalog (see Appendix F; PG&E,
(2015e); (2) a declustered catalog developed by PG&E’s Geosciences Department (see Appendix F; PG&E, 2015e) with converted moment magnitude rates; (3) the updated UCERF3 catalog (declustered); and (4) a compilation of historical earthquakes by McLaren and Savage (2001). In addition, the TI Team used the truncated exponential (Gutenberg and Richter, 1944) magnitude frequency distribution to define the recurrence relationships for future earthquakes with a- and b-value determined from the seismicity rates indicated by the four earthquake catalogs.

The TI Team used the gridded seismicity file developed as part of UCERF2 (Petersen et al., 2008) as a baseline model for the areal source zones in the SSC model. For the Regional and Vicinity areal source zones, the TI Team modeled earthquakes as a set of point sources on regularly spaced grids and applied distance adjustments. The TI Team justified use of this approach due to the greater distances from the DCPP site where less precision in earthquake location was needed, compared to the Local source zone. The rates of earthquakes in the gridded source zones were calculated based on observed and spatially smoothed seismicity rates and model predictions about $M_{\text{max}}$. For the Regional areal source zone, which is the zone furthest from the DCPP, the TI Team did not make any rate adjustments to the baseline model. For the Vicinity model, the TI Team incorporated epistemic uncertainty by scaling the seismicity rate in the baseline model based on comparison to observed rates in the earthquake catalogs.

For the Regional and Vicinity source zones, the TI Team used spatially smoothed seismicity grids to represent the spatial density of earthquake occurrences and the distribution of future earthquake recurrence. The TI team modeled $M_{\text{max}}$ for the Regional and Vicinity source zones following the UCERF3 approach for maximum off-fault magnitude (Field et al., 2013). To model the style of faulting, the TI Team included 70 percent strike-slip and 30 percent reverse-slip earthquakes, based on the relative rate of these earthquakes in the catalogs and the dominantly transpressional environment of the DCPP site.

For the Local areal source zone, the TI Team modeled 18 subparallel, 50-km-long faults striking N50°W, with a spacing of 1 km (see Figure 3.3-1 of this staff assessment). The TI Team modeled the characteristics of these virtual faults by their fault geometry (i.e., location, strike, length, down-dip width, and dip), sense of slip, and $M_{\text{max}}$, including both aleatory and epistemic uncertainty. The TI team developed these characteristics from geologic, geophysical, and seismological data, such that the resulting virtual faults are consistent with its interpretations of the overall geologic structural and seismotectonic setting of the DCPP site. The sense of slip information was derived by the TI Team from the single-event and composite focal mechanisms from Hardebeck (2010, 2014), with additional data and analysis presented at the SSHAC workshops. The TI Team determined the rates of earthquakes in this areal source zone based on observed seismicity rates and considerations of geologic rates of deformation. Similar to the Regional and Vicinity source zones, the TI Team distributed the seismicity as 70 percent strike-slip and 30 percent reverse-slip earthquakes. The TI Team estimated $M_{\text{max}}$ on the virtual faults based on the maximum dimensions of the virtual faults and applying the same magnitude-area scaling relationships used for the primary and connected fault sources.
STAFF EVALUATION

Based on its review of the information in the SSC SSHAC report (PG&E, 2015e), the NRC staff concludes that the TI Team adequately accounted for the potential seismic hazard from unrecognized faults through its development of the three areal source zones in the SSC model. The staff also concludes that the TI Team adequately characterized the uncertainty in the location, magnitude, and recurrence rate of potential earthquakes within the areal source zones by using a combination of spatially smoothed point sources for the two distant areal source zones, and virtual faults for the Local areal source zone. The size and location of the three areal source zones is deemed acceptable by the NRC staff, because the TI Team’s approach is consistent with the guidance in Regulatory Guide 1.208 (NRC, 2007).

The NRC staff concludes that the TI Team developed an acceptable record of past earthquake information for the areal source zones, as contained within the four earthquake catalogs. These catalogs have undergone extensive evaluation and review by the several government agencies, including the USGS and the California Geological Survey. As described in Appendix F of PG&E (2015e), earthquakes included in these catalogs come from two well-established seismic networks: the California Integrated Seismic Network (CISN), which is operated by the USGS, Caltech, and the University of California at Berkeley, and the Central California Seismic Network, which is operated by PG&E. In addition, many of the earthquake hypocenters in these catalogs were relocated using one of two double difference codes; the double difference tomography program of Zhang and Thurber (2003) or the HypoDD code of Waldhauser and Ellsworth (2000). The NRC staff notes that these relocations significantly improve the spatial resolution of the hypocenter data and increase the confidence in associating these earthquakes with mapped faults. The detailed development and ongoing maintenance of these earthquake catalogs provides the NRC staff with assurance that these data are sufficiently reliable to allow the TI Team to develop an acceptably accurate model of the areal source zone seismicity, which captures the center, body, and range of the technically defensible interpretations.

In addition, the NRC staff concludes that the TI Team developed technically-defensible representations of $M_{\text{max}}$ and the frequency of earthquake recurrence. The NRC staff notes that the use of the truncated exponential (Gutenberg and Richter, 1944) magnitude frequency distribution to define the recurrence relationships for future earthquakes is a standard approach that has been successfully applied to the characterization of areal source zones across the U.S., including the recent SSC model for the CEUS (NRC, 2012b). In addition, the NRC staff concludes that the values of $M_{\text{max}}$ in the SSC model are acceptable because they are based on the generally accepted UCERF3 model of maximum off-fault magnitude (Field et al., 2013), as well as a realistic consideration of the potential rupture areas of the virtual faults given the range of fault geometries in the region and the 12–15 km depth of the seismogenic crust.

Finally, the NRC staff concludes that the TI Team acceptably used and characterized the virtual faults to model the future occurrence of earthquakes inside the Local areal source zone. The NRC staff notes that this approach provides a more realistic representation of the location and distribution of future earthquakes, because it accounts for the geological and seismotectonic characteristics of the seismic sources. In addition, this approach treats the occurrence of future earthquakes as actual fault plane ruptures rather than point sources. The NRC staff also concludes that the geometric characteristics of the virtual faults are reasonably representative of
the nature and styles of the local and regional faults, because they are consistent with the primary and connected fault zones that are described and reviewed in Section 3.1.4 of this staff assessment. Further, the characteristics adopted are consistent with the observed focal mechanisms and micro-seismicity trends described in Hardebeck (2014). Finally, based on the confirmatory calculations performed by the NRC staff and documented in the Section 3.3.2 of this staff assessment, the NRC staff concludes that the contribution of the Local areal source zones to the seismic hazard at the DCPP were acceptably accounted for in the DCPP PSHA.

In summary, based on its review and evaluation of applicable information provided by PG&E (2015e), the NRC staff concludes that the TI Team acceptably developed areal source zones for use in the SSC model.

3.2 Ground Motion Characterization

The two GMC models for the DCPP PSHA, developed by the TI Team as part of the SWUS SSHAC Level 3 GMC (GeoPentech, 2015), characterize median ground motions and their associated aleatory variability (i.e., sigma): one for nearby and one for distant earthquakes. Specifically, the GMC models consist of two suites of ground motion prediction equations (GMPEs) for five percent damped horizontal spectral accelerations at 17 spectral periods between 0.01 and 10 seconds. To capture the epistemic uncertainty in both the predicted median ground motions and the aleatory variability, the TI Team developed logic trees with each branch on the tree representing an individual GMPE with an assigned weight. The GMPEs developed by the TI Team assume WUS reference baserock site conditions. The licensee subsequently adapted these median GMPEs to account for site-specific conditions at the DCPP.

3.2.1 Assessment of the SSHAC Process for GMC

To develop the GMC models, the TI Team implemented the SSHAC Level 3 process by first evaluating available data, methods, and models of relevance to the characterization of ground shaking at the DCPP site. The TI Team then used its evaluation of these data and models to construct logic trees for the median ground motions and their associated aleatory variability for the GMC models.

For the SWUS SSHAC Level 3 study, the GMC TI Team conducted three formal workshops and multiple working meetings over a three-year time period from 2012 to 2014. During the first workshop (held March 19–21, 2013), the TI Team identified the ground motion issues of highest significance for the DCPP PSHA and resource experts described the available ground motion databases and models. In particular, the TI Team discussed the need to use ground motions developed from numerical simulations in order to evaluate current GMPEs. During the second workshop (held October 22–24, 2013), several proponent experts presented their viewpoints regarding the GMPEs under consideration for the GMC. In addition, participants of the second workshop discussed the need for special consideration of near-field long-period ground motions from larger earthquakes (>M7.0). During the third workshop (held March 10–12, 2014), the TI Team described its preliminary GMC models and hazard sensitivity analyses in order to get feedback from the PPRP. Specifically, the TI Team provided a more detailed description of the Sammon’s map approach (see Section 3.2.3.1 of this staff assessment), discussed alternative
modeling approaches for complex earthquake rupture scenarios, and discussed the use of alternative distributions for the ground motion residuals.

After the third workshop, the TI Team continued to refine the GMC model and interact with the PPRP. After reviewing the preliminary SSHAC report, the PPRP provided extensive comments to the TI Team and then reviewed the TI Team's responses. In summary, the PPRP concluded in its endorsement letter (GeoPentech, 2015):

As summarized in the table above, the PPRP reviewed the TI Team's evaluations of data, models and methods on multiple occasions, and through various means, including written communications, in-person meetings, teleconferences, and review of the project report. The Panel was given adequate opportunity to question the TI Team concerning details of their analysis, and provided feedback verbally and in writing. The TI Team was responsive to the technical input from the Panel. The TI Team's responses included evaluating additional data sets suggested by the Panel, undertaking additional analyses to address specific Panel technical questions, and examining and assessing alternative technical approaches suggested by the Panel.

The PPRP therefore concludes that it has been afforded an adequate basis for technical assessment of the TI Team's evaluations and model integration and finds that the project meets the technical expectations for a SSHAC Level 3 study.

STAFF EVALUATION

Based on observations at the workshops and review of the workshop proceedings, the NRC staff concludes that the SSHAC workshops were conducted in a manner consistent with applicable NRC guidance. In addition, the NRC staff did not find significant departures from the guidance in the approach used by the TI Team to develop the GMC models. At the workshops, the staff observed that the TI Team invited and engaged with resource and proponent experts that represented a wide variety of scientific viewpoints. Based on this information, the staff concludes that the TI Team was able to focus its data collection and analysis activities in order to develop GMC models tailored specifically to the types of earthquakes that dominate the hazard for the DCPP site.

An important component of the SSHAC process is complete documentation. Based on its review, the NRC staff concludes that the SSHAC documentation (GeoPentech, 2015) provides an acceptably complete record of the approach used to develop the GMC model.

To evaluate the effectiveness of the PPRP for the GMC model development, the NRC staff examined the PPRP and TI Team correspondence, including the comment and response logs and the letters exchanged following each of the workshops. The staff also observed the open dialog between the TI Team and PPRP at each of the workshops, which included several significant comments from the PPRP that required appreciable effort from the TI Team to resolve. Based on its observations, the staff concludes that the PPRP actively participated in the workshops and provided an extensive and comprehensive review of the GMC models and
In summary, the NRC staff concludes that the PPRP was effective and engaged throughout the SSHAC Level 3 PSHA, and that there were no unresolved PPRP issues at the end of the project.

In summary, based on its review of the SSHAC documentation, observations made at the SSHAC workshops, and knowledge of GMPEs used for active tectonic regions, the NRC staff concludes that the SWUS SSHAC Level 3 study acceptably implemented the SSHAC Level 3 process.

3.2.2 Ground Motion Databases and Seed Model Selection

To develop the two GMC models, the TI Team evaluated a suite of data and models relevant to the hazard for the DCPP site. In particular, the TI Team evaluated recently developed GMPEs for shallow crustal earthquakes in active tectonic regions and regional data to assess the applicability of the GMPEs. The TI Team also created a finite-fault simulation data set to augment the regional data set. To evaluate the available GMPEs for use as inputs to the two GMC models, the TI Team developed a set of objective criteria based on its assessment of best practices in ground motion modeling and also considered the predominant earthquake source mechanisms for the region surrounding the DCPP site.

The TI Team used the Pacific Earthquake Engineering Research (PEER) Next Generation Attenuation (NGA)-West2 database (Ancheta et al., 2014) and a database of ground motions from finite-fault simulations (Maechling et al., 2015) to evaluate the existing GMPE models relevant to the DCPP site and to develop new GMPE models. The NGA-West2 database includes worldwide ground motion data recorded from shallow crustal earthquakes in active tectonic regions. To develop a dataset to evaluate the GMPEs for the local earthquake sources, the TI Team focused its selection on earthquakes with M5 that were recorded at multiple stations (more than three recordings) within 70 km (R < 70 km) of the epicenter. In addition, each of the recording sites has a V30 (i.e., travel-time-averaged shear wave velocity in the top 30 m) greater than 250 m/s. The resulting database of earthquake recordings consists of about 200 earthquakes with at least one recording. To supplement this database, the TI Team developed a database of ground motions from finite-fault simulations. The scenarios selected by the TI Team for the simulations include: (1) near-fault ground motions from larger earthquakes (> M7); (2) ground motions from complex ruptures (i.e., single rupture on multiple faults with more than one sense of slip on adjacent fault sections); and (3) ground motions from splay ruptures (i.e., a rupture source that includes overlapping faults that rupture simultaneously).

In addition to gathering and evaluating ground motion databases, the TI Team also evaluated 19 recently developed and published GMPEs for shallow crustal earthquakes in active tectonic regions. Important criteria developed by the TI Team for the selection of candidate GMPEs include:

- Selection of the most recently published GMPEs over earlier versions,
- Selection of GMPEs suitable for large magnitudes and distance ranges,
Exclusion of GMPEs developed only for small specific regions,

Exclusion of GMPEs that have not been peer reviewed or vetted by the larger scientific community, and

Exclusion of GMPEs developed as research tools rather than for engineering applications.

Based on these criteria, the TI Team selected all five of the NGA-West2 GMPEs (Abrahamson et al., 2014; Boore et al., 2014; Campbell and Bozorgnia, 2014; Chiou and Youngs, 2014; and Idriss, 2014) for use as seed models for characterizing the hazard for both the local and distant sources. For the local sources surrounding the site, the TI Team included three additional GMPEs (Akkar et al., 2014; Zhao et al., 2006; Zhao and Lu, 2011) as seed models.

STAFF EVALUATION

Based on observations at the SSHAC workshops, review of the SSHAC report and knowledge of current GMPEs developed for active tectonic regions, the NRC staff concludes that the TI Team developed an appropriate set of ground motion databases and gathered and evaluated a suitable range of candidate GMPEs. During the first workshop, the staff observed that the TI Team described the available databases in detail and appropriately considered input from the PPRP in selecting the final databases and developing the criteria for evaluating the candidate GMPEs. The staff notes that the PEER NGA-West2 ground motion database consists of several thousand earthquake records and covers a wide range of magnitudes and distances. The staff finds that the TI Team appropriately selected $>M5$ earthquakes recorded at distance within 70 km, from which the TI Team developed a database for the evaluation of the GMPEs for the local sources. In addition, the staff concludes that the TI Team appropriately augmented this local database with near-field ground motions from larger earthquake ($>M7$) simulations.

The NRC staff used its experience in developing and evaluating GMPEs to determine that the TI Team selected an appropriate set of initial candidate GMPEs and used appropriate criteria to select the final set of input GMPEs. Specifically, the staff notes that the criteria used by the TI Team resulted in a set of input GMPEs that have been formally peer reviewed, developed specifically from shallow crustal earthquakes in active tectonic regions, and that are the latest versions of the developers published GMPEs.

In summary, the NRC staff concludes that the TI Team developed suitable ground motion databases and selected an appropriate set of input GMPEs consistent with the fundamental goal of the SSHAC process to objectively evaluate and examine available data and a diverse range of candidate models.

3.2.3 Median Ground Motions

The two GMC models developed by the TI Team for the DCPP PSHA consist of two sets of median GMPEs for local and distant fault sources. Each GMPE predicts median spectral accelerations in terms of magnitude, various source-to-site distance measures, depth to the top of rupture, and fault dip angle, and fault type (i.e., strike-slip, normal, or reverse). For the
nearby fault sources, as well as the Local source zone, the TI Team developed a set of GMPEs by implementing a two-dimensional visualization process, commonly referred to as Sammon’s maps (Sammon, 1969). The purpose of the Sammon’s map approach is to develop a continuous distribution of median GMPEs that also captures alternative magnitude- and distance-scaling approaches. The GMPEs developed by the TI Team for the local sources also explicitly account for potential hanging-wall effects (i.e., increases in ground motion at short distances for sites on the hanging-wall side of the rupture). For the distant fault sources, such as the San Andreas fault, the TI Team simply used the five GMPEs developed by the NGA-West2 project (Bozorgnia et al., 2014) with additional epistemic uncertainty to capture the potential range of motions from larger magnitude (>M7) earthquakes.

3.2.3.1 Median Models for Local Sources

The objective of the TI Team for the SWUS project was to capture the center, body, and range of the continuum of ground motion space (i.e., the full range of median ground motions estimated over a broad range of magnitudes and distances). Rather than merely attaching weights to existing discrete GMPEs, the TI Team developed a suite of GMPEs that was not limited to existing GMPEs and that fully spans and efficiently samples the range of ground motion space. The TI Team recognized that the characterization and quantification of uncertainties, in particular epistemic uncertainties, is a fundamentally important element of the GMC activity. Previous practice has often consisted of representing the epistemic uncertainty in GMC through weighted branches on a logic tree, where the branches represent existing GMPEs. To develop the suite of GMPEs for the SWUS project, the TI Team followed a multi-step process that included utilization of higher-dimensional visualization tools. The steps of this process are summarized below.

First, the TI Team compiled a selection of current, well-documented candidate GMPEs and defined a subset of the candidate models based on technical defensibility and applicability for use in the DCPP region (as described in Section 3.2.2 of this staff assessment). These models were used as seed models as the initial step in the process to develop a comprehensive suite of GMPEs for the local DCPP sources. Based on an evaluation of the characteristics of the candidate seed models, the TI Team identified a common functional form for the development of new GMPEs. This common functional form is parameterized in terms of magnitude, distance, and style of faulting, and contains eleven coefficients.

Next, the TI Team assessed prior PSHA results for the DCPP site (PG&E, 2011) to determine a hazard-informed range of magnitudes and distances to be used in the development of the final suite of GMPEs. The TI Team exercised each of the eight seed GMPEs over the appropriate range of magnitudes (M5 to M7.5) and distances (up to 80 km). The common form model was then fit to the spectral acceleration results from each of the seed GMPEs, resulting in eight common-form model versions that represent the original seed models. Based on the fitted values of each of the eleven coefficients in the common form models, the TI Team calculated the mean and variance for each of the coefficients, as well as the covariance among the coefficients. Using the common form model, the mean, and the covariance structure of the coefficients, the team developed a suite of 2,000 totally new candidate GMPEs that span the ground motion space.
Although the resulting suite of 2,000 GMPEs spans the ground motion space, this large number of models is computationally impractical for use in a PSHA. Thus, the TI Team used high-dimensional visualization tools to discretize this space into a manageable number of models for the GMC. Specifically, the TI Team exercised the 2,000 GMPEs over a specified set of magnitude and distance pairs. For each GMPE, the ground motion values over this set of magnitude and distance pairs was represented by a high-dimensional vector. The TI Team then utilized principal component analysis and Sammon's mapping (Sammon, 1969) to project each of the high-dimensional ground motion vectors as a point on a two-dimensional Sammon's map.

Based on an analysis of the projected candidate GMPEs and scaled versions of the seed GMPEs, the TI Team identified a range of plausible ground motion space on the Sammon's map, which the team represented as an ellipse. The TI Team subdivided the ellipse into 31 discrete cells and specified a single representative GMPE for each cell. Using several metrics based on consistency with data (i.e., the NGA-West2 DCPP dataset) and the distribution characteristics of the common form models within each cell, the TI Team determined weights for each of the 31 GMPEs. The criteria the TI Team used resulted in a broad range of weighted GMPEs, with some receiving a weight of zero. The TI Team repeated this process for each of the spectral periods.

3.2.3.2 Median Models for Distant Sources

To develop the GMC model for the distant sources (i.e., all sources other than the local faults), the TI Team selected the five NGA-West2 GMPEs, and then added three branches to the logic tree to account for additional epistemic uncertainty in ground motions from larger magnitude (>M7) earthquakes. Even though these fault sources (e.g., the San Andreas fault) are capable of generating large-magnitude earthquakes, because of their distance from the site, the TI Team determined that they contribute less than a few percent at the $10^{-4}$ annual exceedance frequency to the long-period hazard (i.e., less than about 1 second) at DCPP. As such, the TI Team decided that the Sammon's map procedure was not needed to represent the hazard from distant sources, and instead simply assigned equal weights to the five NGA-West2 GMPEs.

STAFF EVALUATION OF MEDIAN MODELS FOR LOCAL AND DISTANT SOURCES

Based on review of the SSHAC documentation and knowledge of current GMPEs developed for active tectonic regions, the NRC staff concludes that the two GMC models developed by the SWUS TI Team provide an appropriate set of GMPEs in order to characterize the hazard for the DCPP site. The staff notes that the TI Team appropriately expanded the initial set of seed GMPEs to develop two larger sets of GMPEs for the local sources and the distant regional sources.

The staff finds that the Sammon's mapping approach used by the TI Team was appropriately applied for the local sources to address the large range of epistemic uncertainty associated with modeling near-site earthquakes. The staff also finds that a more traditional, weighted-GMPE approach was appropriately used for the distant earthquakes, where sufficient data exists to model these types of events, which have minimal impact on the hazard. Therefore, the staff concludes that these two approaches, although dissimilar, are reasonable as applied to the two distinct source types (i.e., local sources and distant regional sources). This is because both
approaches produce a broad suite of median models, each of which are appropriately adapted for the particular source types. The staff finds that these two approaches reasonably account for the epistemic uncertainty in the median ground motions for both local and distant sources.

To evaluate the distribution of median GMPEs produced by the TI Team for the local sources, the NRC staff examined the behavior of the models for multiple earthquake magnitude and source-to-site distance combinations. Figure 3.2-1(a-b) of this staff assessment shows the distribution of weighted medians produced by the set of GMPEs using the Sammon's map approach for the local sources. Specifically, Figure 3.2-1(a) shows the distribution of weighted median results from the 22 GMPEs developed for a spectral period of 0.1 s for a M6.5 earthquake for source-to-site distances ranging from 1 km to 100 km. Similarly, Figure 3.2-1(b) shows the same GMPEs for a source-to-site distance of 15 km for earthquake magnitudes ranging from M5 to M9. Shown in the inset to Figure 3.2-1(a) is the weighted distribution of median spectral accelerations for a M6.5 earthquake at a source-to-site distance of 15 km. As shown by the inset to Figure 3.2-1(a), the 22 predicted weighted medians are centered at a reasonable value (0.4g) and cover a suitably wide range of spectral accelerations (0.2g to 0.6g).

In addition, Figures 3.2-1(a) and (b) show that the 22 median GMPEs have alternative magnitude and distance scaling approaches, as demonstrated by the intersecting models.

In summary, as a result of this review, the NRC staff concludes that the two sets of GMPEs developed by the TI Team have been appropriately adapted for the seismic sources surrounding DCPP and, as a result, are suitable for use in the PSHA. The staff further concludes that the high-dimensional visualization and sampling through application of Sammon's mapping used by the TI Team for the local sources as well as the traditional approach used for the distant sources are consistent with the intent of the SSHAC guidelines of developing models that capture the center, body, and range of the technically-defensible interpretations of available data, models, and methods.

3.2.4 Ground Motion Variability

In addition to developing GMPEs that predict median ground motions, the TI Team developed models to characterize the random (i.e., aleatory) variability about the median ground motions. To develop these models, the TI Team used the ground motion databases and backbone GMPEs described in Sections 3.2.2 and 3.2.3 of this staff assessment. Because Enclosure 1 to the 50.54(f) letter (NRC, 2012a) requests that licensees perform a detailed site response analysis, the TI Team first separated the residuals between the predicted and observed ground motions into their component pieces in order to remove the repeatable effects of site response. The TI Team then combined the standard deviations for each of the remaining components of the total residuals to produce the total aleatory standard deviation, which is referred to as “single-station sigma” and denoted by \( \sigma_{SS} \). In order to use the single-station sigma approach, the TI Team captured the site-specific portion of the uncertainty by developing: (1) a set of site terms, (2) distributions for the local site response amplification factor, and (3) a distribution for the epistemic uncertainty of \( \sigma_{SS} \). The staff's review of the site term and amplification factors is provided in Section 3.4 of this staff assessment.

The single-station sigma approach starts with separating the total residuals into between-event and within-event residual components, where the between-event and the within-event residuals
have standard deviations, referred to as $\tau$ and $\phi$, respectively. The within-event residual is then further separated into a site-term component and a site- and event-corrected residual component with standard deviations, referred to as $\phi_{S2S}$ and $\phi_{SS}$, respectively. The single-station sigma approach then excludes the site term standard deviation ($\phi_{S2S}$) from the total sigma and instead evaluates $\phi_{S2S}$ as epistemic uncertainty.

To develop a model for single-station sigma ($\sigma_{SS}$) for the crustal earthquake GMPEs, the TI Team first constructed models for the between-event standard deviation $\tau$ and the single-site within-event standard deviation $\phi_{SS}$, assuming both models depend on earthquake magnitude. The TI Team developed a model for $\tau$ by averaging the $\tau$ models from four of the five NGA-West2 GMPEs along with the Zhao et al. (2006) model. For the $\phi_{SS}$ model, the TI Team used the NGA-West2 dataset along with the Taiwanese data from Lin et al. (2011). The TI Team further partitioned the NGA-West2 dataset into a California-only subset, giving this subset a higher weight (0.67) compared to the weight (0.33) for the entire NGA-West2 dataset.

In addition to developing models for each of the individual components of sigma ($\tau$ and $\phi_{SS}$), the TI Team developed epistemic uncertainty distributions for each of these components. The TI Team next combined these epistemic uncertainty distributions to develop a final continuous distribution for $\sigma_{SS}$, which it represented by three discrete points selected at the 5th, 50th, and 95th percentiles (low, central, and high values).

STAFF EVALUATION

Based on review of the SSHAC report and knowledge of current GMPEs developed for active tectonic regions, the NRC staff concludes that the TI Team developed an appropriate set of models for the ground motion variability in order to capture the full distribution of ground motions generated by the multiple sources in the DCPP SSC model. The staff finds that the TI Team appropriately separated the individual components of the residuals in order to extract the site term, which it estimated using strong-motion records recorded at the DCPP. The staff also concludes that the TI Team used reasonable approaches to model the standard deviations for the individual components of the total variability for the single-station sigma approach.

The NRC staff notes that the ground motion data sets, described in Section 3.2.2 of this staff assessment, contain thousands of earthquakes, many of which are recorded at multiple sites. The NRC staff also notes that the TI Team appropriately developed a California-only subset of the NGA-West2 ground motion dataset to develop a $\phi_{SS}$ model. In addition, the staff concludes that the TI Team used an appropriate approach to combine the standard deviations for the individual components of the residuals into a final distribution for $\sigma_{SS}$ and that this distribution is adequately represented by including three branches in the logic tree.

To evaluate the ground motion variability about the predicted median spectral accelerations, the NRC staff compared the values predicted by the TI Team’s $\tau$ and $\phi_{SS}$ models with estimates calculated from other GMPEs. Based on these comparisons, the staff concludes that the TI Team’s $\tau$ and $\phi_{SS}$ models, as well as the resulting single-station sigma model, produce reasonable estimates of the ground motion variability for each of the earthquake scenarios considered for the DCPP PSHA. Figure 3.2-2, which displays the low, central, and high values for the three components of aleatory variability ($\tau$, $\phi_{SS}$, $\sigma_{SS}$) as a function of magnitude, shows
that the values of $\sigma_{SS}$, which are used directly in the PSHA calculations, reasonably vary from about 0.6 to 0.5 for earthquake magnitudes ranging from M5 to M9.

The staff notes that for each local earthquake scenario, the GMC model consists of 20 to 30 alternative median predictions, which after combining with the three alternative sigma values, results in a total of 60 to 90 alternative ground motion distributions. Similarly, for each distant earthquake scenario, there are 15 or 45 alternative ground motion distributions, depending on the magnitude of the earthquake. The staff finds that the TI Team's use of this large number of distributions for each of the earthquake scenarios considered in the DCPP PSHA adequately captures the epistemic and aleatory uncertainty in predicted ground motions for the baserock conditions at the DCPP site.

As a result of this review, the NRC staff concludes that the TI Team appropriately modeled the aleatory variability in ground motions for the DCPP PSHA. Based on this conclusion, the staff finds that the resulting models adequately capture the center, body, and range of technically defensible interpretations.

3.3 Probabilistic Seismic Hazard Analysis

The licensee implemented the SSC and GMC models to develop baserock PSHA hazard curves for the DCPP site. For the GMC model, the TI Team selected the reference baserock condition to be a soft rock with a $V_{S30}$ value of 760 m/s. In accordance with the guidance specified in the SPID (EPRI, 2012), the licensee used a minimum M5.0 earthquake and included all seismic sources within 320 km of the site for the DCPP PSHA. The licensee developed individual PSHA hazard curves for each of the seismic sources and observed that only the sources within 15 km of the DCPP contribute significantly (at least 5 percent) to the total hazard at annual frequencies of exceedance of $10^{-5}$ or smaller.

Summary of PSHA Implementation and Results

For the SSC model, the TI Team characterized the local Hosgri, Shoreline, Los Osos, and San Luis Bay faults as primary fault sources that could potentially rupture along with adjacent or connected faults. In contrast with previous PSHAs for DCPP, the TI Team modeled several rupture combinations between the primary and connected fault sources within each of four alternative tectonic models (Hosgri, Outward Vergent, Southwest Vergent, and Northeast Vergent). These models represent alternatives in tectonic interpretations and fault source characterizations. The SSC logic tree developed by the TI Team for the primary and connected fault sources also captures alternative fault time-dependent parameters, fault geometry models, rupture models, maximum magnitudes, magnitude density functions, and the slip rate allocations for each of the rupture models. Each of these alternatives or characteristics is represented as a node in the SSC logic tree with multiple weighted branches at each node.

The TI Team developed a logic tree for each of the three areal source zones (Local, Vicinity, and Regional), which characterize potential earthquake sources whose general geometry and sense of slip are known, but are not sufficiently active or well-constrained to be considered as separate sources. The logic tree for each of the areal sources defines a unique set of parameters for future potential earthquakes, primarily based on the characteristics of known
Quaternary faults and historical seismicity within each of the source zones. To represent earthquake occurrences within the Local source zone, the TI Team constructed a set of virtual faults. The TI Team included epistemic uncertainties for the location, sense of slip, dip, and maximum magnitude for the virtual faults. For the more distant Vicinity and Regional area sources, the TI Team used a grid of point source approximations rather than virtual faults.

In addition to characterizing the local fault sources and areal source zones, the TI Team also characterized several regional fault sources based on the UCERF3 model (Field et al, 2013). Amongst the regional fault sources, the San Andreas fault, located approximately 80 km northeast of DCPP, moderately contributes to the total hazard for the DCPP. The other regional fault sources contribute less than 1 percent to the total hazard for the DCPP.

The SWUS GMC TI Team developed logic trees for the median and sigma models for both the local and regional earthquake sources. The GMC logic tree for the local earthquake sources includes multiple branches for each alternative GMPE, developed by the TI Team through implementation of the Sammon's map approach. In addition to the logic tree branches for each of the GMPEs, the TI Team included five branches to characterize alternative hanging-wall effects (i.e., increases in ground motion at short distances for sites on the hanging wall side of the rupture). The single-station sigma logic trees include nodes and branches for low, central, and high values as well as the use of either a normal distribution or a mixture model for the final distribution of ground motion residuals.

After implementing the SSC and GMC models for the DCPP PSHA, the licensee developed baserock hazard curves for each of the major fault and areal sources. For both the 1 and 10 Hz spectral acceleration hazard curves, the licensee determined that the hazard from the Hosgri Fault contributes most to the total hazard. In addition to developing hazard curves for each of the seismic sources, the licensee performed a deaggregation of the hazard for both 1 and 10 Hz spectral accelerations at $10^{-4}$ and $10^{-5}$ mean annual frequencies of exceedance. For both the 1 and 10 Hz deaggregations, the licensee determined that local moderate-to-large magnitude earthquakes on the Hosgri fault (i.e., $M_6.0$ to $M_8.0$ at distances from 0 to 10 km from the DCPP site) dominate the hazard.

STAFF EVALUATION

To evaluate the acceptability of the PSHA, the NRC staff performed a confirmatory evaluation of the seismic sources that contribute most to the hazard at the DCPP. The purpose of the staff's evaluation was to assess the reasonableness of the 1 Hz and 10 Hz mean hazard results for the most significant seismic sources and assess the impact of the most significant source and ground motion parameters on the final hazard results. For this confirmatory analysis, the NRC staff selected a subset of the SSC and GMC branches that focus on the highest weighted components of the logic tree.

The local fault sources selected by the NRC staff for its confirmatory evaluation are the Hosgri, Shoreline, Los Osos, and San Luis Bay faults (see Figure 3.3-1 of this staff assessment). For each of the fault sources, the staff primarily focused on either the Hosgri or the Outward Vergent Fault geometry model and modeled a range of earthquake ruptures on these primary faults using the characteristic earthquake distribution (Youngs and Coppersmith, 1985). Rather than
allocating the fault slip rate amongst the multiple rupture models developed by the TI Team, the staff used a more traditional approach. Specifically, the NRC staff used the 5th, 50th, and 95th percentile slip rates for each individual fault to develop baserock 1 and 10 Hz hazard curves. Figures 3.3-2(a-b) of this staff assessment show the NRC staff’s 1 and 10 Hz hazard curves for the Hosgri fault assuming the H90 fault geometry model, a maximum magnitude of 7.4, a fault length of 107 km, a width of 12 km, an equivalent Poisson’s ratio of 1.2, and fault slip rates of 0.7, 1.7, and 2.6 mm/yr. For its confirmatory evaluation, the NRC staff used all of the 1 or 10 Hz GMPEs and the central branch for single-station sigma. As shown in Figures 3.3-2(a-b), the staff’s confirmatory results assuming the median slip rate closely match the licensee’s results for both the 1 Hz and 10 Hz mean hazard curves at the $10^{-4}$ and $10^{-5}$ annual frequencies of exceedance, which are used to develop the GMRS.

Figures 3.3-3(a-b) of this staff assessment show the NRC staff’s 1 and 10 Hz hazard curves for the Shoreline fault assuming the OV-01 fault geometry model, a maximum magnitude of 6.7, a fault length of 51 km, a width of 12 km, and fault slip rates of 0.03, 0.06, and 0.16 mm/yr. As shown in Figures 3.3-3(a-b), the NRC staff’s confirmatory results encompass the licensee’s hazard results for both the 1 Hz and 10 Hz mean hazard curves. Similarly, for the Los Osos and San Luis Bay faults, the staff used the OV-07 and OV-05 Outward Vergent rupture models along with the 5th, 50th, and 95th percentile fault slip rates to develop 1 Hz and 10 Hz hazard curves. The staff’s confirmatory results for these faults are similar to the licensee’s results at the $10^{-4}$ and $10^{-5}$ annual frequencies of exceedance even though the SSC TI Team allocated only a portion of the total fault slip rates to these two rupture models. Additionally, the staff notes that these confirmatory calculations, similar to the licensee’s calculations, show that the seismic hazard at the DCPP is controlled by the Hosgri fault.

The NRC staff selected the Local source zone for its confirmatory evaluation, which, as the host source zone, contributes moderately to both the 1 and 10 Hz total mean hazard for the DCPP site. For each of the virtual faults modeled in the confirmatory analysis, the NRC staff assumed a maximum magnitude of 6.8, a fault length of 50 km, both reverse and strike-slip faulting, and a spatially uniform recurrence rate. Figure 3.3-4(a-b) of this staff assessment shows the staff’s 1 Hz and 10 Hz confirmatory hazard curves for each of the 18 virtual faults, along with the weighted mean hazard curve. As shown in Figure 3.3-4(a-b), the staff’s confirmatory results closely match the licensee’s mean hazard curves for the Local areal source zone.

In summary, the NRC staff concludes that the licensee acceptably implemented the SSC and GMC logic trees in developing the baserock hazard consistent with the guidance specified in Enclosure 1 to the 50.54(f) letter (NRC, 2012a). Through its confirmatory analyses, the NRC staff was able to confirm the licensee’s hazard results. Moreover, the staff’s review confirms the reasonableness of the licensee’s seismic source and ground motion characterizations. Therefore, the staff concludes that the resulting baserock PSHA hazard curves capture the center, body, and range of the technically defensible interpretations.

3.4 Site Response Evaluation

The DCPP is located on a relatively broad Quaternary terrace surface near the mouth of Diablo Canyon Creek. Bedrock geology of the site consists of the Miocene (5–23 million years ago) Obispo Formation, which is a 400-m thick sequence of thin-to-thickly bedded marine volcanic
and volcaniclastic deposits. The Obispo Formation rests unconformably above highly deformed bedrock, which consists primarily of the Jurassic (144–200 million years ago) Franciscan Formation. The Franciscan Formation is a chaotic mélange of basaltic volcanic rocks (many of which have been altered to greenstone), radiolarian chert, sandstone, limestone, serpentinite, shale, and high-pressure metamorphic rocks.

Attachment 1 to Enclosure 1 of the 50.54(f) letter requests that, after completing PSHA calculations for site baserock conditions, licensees provide a GMRS developed from the site-specific seismic hazard curves at the control point elevation. To develop site-specific hazard curves at the control point elevation, Attachment 1 requests that licensees perform a site response evaluation. In addition, the 50.54(f) letter specifies that the subsurface site response model, for both soil and rock sites, should extend to sufficient depth to reach the baserock conditions as defined for the GMPEs used in the PSHA. For the SWUS GMC models that are used for the DCPP PSHA, baserock conditions are defined for soft rock with a $V_{S30}$ of 760 m/s.

The purpose of the site response analysis is to determine the site amplification that occurs because of baserock ground motions propagating upward through the soil and/or rock column to the surface. The critical parameters that determine what frequencies of ground motion are affected by the upward propagation of baserock motions are the layering of soil and/or soft rock, the thicknesses of these layers, the shear-wave velocities and low-strain damping of the layers, and the degree to which the shear modulus and damping change with higher ground motion amplitudes.

The licensee used two approaches to compute control point hazard curves for the DCPP site. For its initial SHSR submittal to the NRC (PG&E, 2015a), the licensee used an empirical approach that used on-site earthquake recordings to develop a set of site terms, which are ultimately used to adjust the SWUS median GMPEs. Subsequently, in response to RAIs from the NRC staff (PG&E, 2015d), the licensee used the analytical site response approach described in Appendix B of the SPID (EPRI, 2012) to develop site amplification factors. Ultimately, the licensee used a weighted combination of the control point hazard curves from these two approaches (empirical and analytical) to develop the final GMRS for the DCPP. The staff’s review of the site data and recordings is provided in Section 3.4.1 of this staff assessment and its confirmatory reviews of the empirical and analytical approaches are described in Sections 3.4.2 and 3.4.3, respectively.

3.4.1 Site Data and Recordings

To develop a set of empirical site term adjustment factors for the median ground motion models, the licensee used on-site recordings in addition to regional recordings of the San Simeon and Parkfield earthquakes. For its analytical site response analysis, the licensee used numerous geophysical datasets and models (Fugro Consultants, 2015) to develop seismic shear wave velocity profiles for the DCPP site.

3.4.1.1 Data for Empirical Approach

The licensee used strong motion recordings from the M6.5 2003 San Simeon and the M6.0 2004 Parkfield earthquakes to develop the site term adjustment factors for the median ground
motion models. The 2003 San Simeon earthquake occurred on the central coast of California approximately 40 km NNW from the DCPP site, and the 2004 Parkfield earthquake occurred on the San Andreas fault approximately 85 km NNE from the DCPP site (see Figure 3.0-1 of this staff assessment). The San Simeon earthquake was recorded at station ESTA27, which is located to the south of the turbine building where the average shear wave velocity in the upper 30 meters (VS30) is approximately 856 m/s (see Figure 3.4-1 of this staff assessment). After the San Simeon earthquake, an additional station, ESTA28, was installed to the northeast of the turbine building, which has a VS30 of approximately 777 m/s (Figure 3.4-1). Both ESTA27 and ESTA28 recorded the 2004 Parkfield earthquake. In addition to the on-site DCPP recordings, the San Simeon and Parkfield earthquakes were recorded at numerous other strong ground motion recording sites throughout the region. The licensee used a subset of the recordings of the two earthquakes from these other regional sites to estimate the uncertainty in the event-path term for each earthquake, as discussed further in Section 3.4.2 of this staff assessment.

3.4.1.2 Data for Analytical Approach

To perform an analytical site response, the licensee used onsite data from the Power Block 3D Velocity Model (Fugro Consultants, 2015), which was derived from multiple geophysical exploration techniques, including seismic reflection, surface wave dispersion, and downhole suspension logging. The final 3D velocity model combines a high-resolution 3D compressional wave velocity model derived from joint travel time-gravity tomography with an updated 3D shear wave velocity model. This model provided the licensee with a detailed 1 km x 1 km x 600 m volume of shear wave velocity values that it used for the analytical site response.

STAFF EVALUATION OF SITE DATA

The NRG staff notes that in the empirical approach, the licensee was able to directly estimate the site response based on the availability of on-site recordings from two moderately large regional earthquakes. In contrast, more traditional site response methods rely on a simple 1D analysis. However, because this empirical approach has limited data for use in analyzing the DCPP site, the NRC staff requested that the licensee also conduct an analytical site response using available subsurface geophysical data (NRC, 2015e). Specifically, the staff noted that the final empirical site term for the DCPP site is based only on three on-site recordings of two earthquakes. In addition, the staff observed that the source-to-site paths for these two earthquakes are moderately different (NNW for San Simeon and NNE for Parkfield), whereas both of these paths differ significantly from the mainly west-to-east source-to-site paths for the primary faults that contribute the most to the hazard for the DCPP.

To evaluate the tomography model for the DCPP foundation block, the NRC staff developed a 3D velocity model of the DCPP foundation area consisted of compressional and shear-wave velocity structure based on the data compiled in Fugro Consultants (2015). In addition, the NRC staff used a digital elevation model (DEM) and the location of two seismic stations (ESTA27 and ESTA28) that were provided in PG&E (2015d) for the construction of this model. The NRC staff used Petrel software to construct the model, which is a Schlumberger product that is commonly used by the oil and gas industry for subsurface modeling. The DEM used in this analysis consisted of a regular spaced grid that was 2 m by 2 m, and the elevation range was between -57.08 and 426.29 meters above sea level. The NRC staff used a total of
151,003,108 data points to create the velocity model. The range of compressional wave velocity values from the model are 1–2.752 m/s, and the shear wave velocity values ranged from 250–5,791 m/s. The NRC staff's velocity model compares reasonably with the velocity profiles that the licensee relied on to determine the site response. Therefore, the staff concludes that the velocity data relied on by the licensee was adequate for the licensee's site response analysis.

In summary, based on the licensee's utilization of both its on-site recordings of the San Simeon and Parkfield earthquakes as well as abundant site geophysical data, the NRC staff concludes that the combined datasets provide an adequate basis for the licensee’s site response evaluation for the DCPP.

3.4.2 Empirical Site Term Approach

The licensee used the three on-site earthquake recordings of the San Simeon and Parkfield earthquakes to develop a mean site term to estimate the site-specific effects on ground motions due to the local geology underlying the DCPP. The site-specific effects are isolated by first removing the event-specific source and path effects from the GMPEs (which are termed event-corrected GMPEs). Then, the licensee computed the within-event residuals between the event-corrected GMPEs and the on-site recordings. If the within-event residuals computed for separate events are repeatable, then the site term represents the expected deviation in site response from the baserock median GMPEs. To isolate the source and path effects relative to the baserock median GMPEs, the licensee used recordings from eight stations located within 100 km of the San Simeon earthquake epicenter and recordings from sixteen stations located 50 to 150 km from the Parkfield earthquake epicenter. In addition to determining the mean site term, the licensee also estimated the epistemic uncertainty in the site term, which consists of: (1) the uncertainty in the estimated source and path terms for each earthquake; (2) the variability in the single-path within-event residuals; and (3) the variability in the $V_{S30}$ values for stations ESTA27 and ESTA28. The licensee modeled the epistemic uncertainty in the site term by using a three-point weighted distribution for the 5th, median, and 95th percentile values.

STAFF EVALUATION

To evaluate the reasonableness of the DCPP empirical site term, including its empirical uncertainty, the staff performed a confirmatory analysis using the on-site ESTA27 and ESTA28 earthquake records of the San Simeon and Parkfield earthquakes, as well as the recordings of these two earthquakes from other recording stations. As shown in Figure 3.4-2 of this staff assessment, the NRC staff's confirmatory results for the mean site term, as well as the 10 and 90 percent confidence intervals, are reasonably consistent with the licensee's results over the entire frequency range (0.1 Hz to 100 Hz). In addition, based on a comparison of the site term residuals from the San Simeon and Parkfield earthquakes, the NRC staff observes reasonably consistent behavior for the two sets of residuals above the frequency value of 2 Hz. The staff concludes that the consistency of the site term residuals from the two earthquakes demonstrates that the licensee's use of the empirical site term approach successfully identified the site effects for the DCPP. However, as shown in Figure 3.4-2, the site term residuals from the two earthquakes do not follow a consistent trend below 2 Hz. In response to the NRC staff's RAI concerning the inconsistency of the residuals below 2 Hz, the licensee stated that the site
term residuals from the two earthquakes may still contain some source and path effects in addition to the site effects (PG&E, 2015d). Furthermore, the licensee acknowledged that its use of the empirical site term approach is somewhat limited by having only three on-site recordings from two earthquakes and, as such, developed an estimate of the mean site term using an analytical approach.

Based on its review of the licensee’s RAI response and the result of the staff’s confirmatory analysis, the NRC staff concludes that the empirical approach used by the licensee provides a reasonable estimate of the local site response for frequencies greater than 2 Hz. The staff base this conclusion primarily on the consistency of the site term residuals from the two earthquakes and staff’s confirmatory analysis. In addition, the staff concludes that the licensee accurately captured the uncertainty in the site term, which is relatively large due to the small number of available on-site recordings.

3.4.3 Analytical Site Response Evaluation

Because the available dataset used by the licensee for the empirical site term approach is limited, the NRC requested (NRC, 2015c) that the licensee provide site amplification factors in accordance with Appendix B of the SPID guidance. In response to the staff’s RAI (PG&E, 2015d), the licensee developed these site amplification factors using an analytical site response approach. The licensee’s analytical site response approach provides amplification factors relative to the baserock conditions defined for the SWUS GMC models. The licensee then used these analytical site amplification factors to develop a set of control point hazard curves for the DCPP.

3.4.3.1 Site Basecase Profiles

The licensee used the geometric mean of the 3D shear wave velocity model, described in Section 3.4.1 of this staff assessment, at multiple points beneath the power block and turbine building to develop the upper part of its basecase shear wave velocity profile. The licensee’s profile consists of shear wave velocities at 0.5 m intervals from the surface to a depth of 125 m, the range over which its high resolution geophysical data are available. The licensee extended the profile to 900 m based on information provided by Fugro Consultants (2015) and then continued to a depth of 8 km using a reference velocity profiles from the NGA-West2 dataset. To capture the uncertainty in the shear wave velocity beneath the DCPP, the licensee developed lower and upper basecase velocity profiles using a factor of 1.6 times the depth-dependent natural log standard deviation, which the licensee estimated from its 3D model. For the deeper portions of the upper and lower profiles, the licensee used scale factors of 0.9 and 1.1. The licensee assigned weights of 0.6, 0.2, and 0.2, respectively, for the central, upper, and lower profiles. Figure 3.4-3(a) of this staff assessment shows the licensee’s three basecase velocity profiles for the upper 125 m and Figure 3.4-3(b) shows the licensee’s profiles to 8 km depth. In order to incorporate aleatory variability in the site response analysis, the licensee generated 30 random velocity profiles for each of its basecase profiles such that the resulting profiles capture the range of alternative 3D velocity models.
3.4.3.2 Dynamic Material Properties and Kappa

To model the potential nonlinear behavior in the upper 150 m of strata to input ground motions, the licensee used two sets of shear modulus degradation and damping curves. As recommended in the SPID (EPRI, 2012), the licensee gave equal weight to the EPRI and Peninsular Range curves and limited the amount of damping to 15 percent. In addition, the licensee added a third branch to its site response logic tree to capture the potential for linear behavior. The licensee equally weighted the linear and the two nonlinear responses over the upper 150 m of the profile, such that the linear model has a weight of 0.5 and the EPRI and Peninsular curves each have weights of 0.25. The licensee cited laboratory testing results (PG&E, 1988) of the soft rock at DCPP as a basis for the weights for the three alternative models.

The licensee used the spectral shape from its on-site recording of the Deer Canyon Earthquake (PG&E, 2011) to estimate a kappa value of 0.04 sec for its site response profile. To account for the epistemic uncertainty in kappa, the licensee evaluated the spectral shapes from its on-site recordings of the San Simeon and Parkfield earthquakes in order to constrain the range of kappa values from 0.03 sec to 0.05 sec. Weighting for the three kappa values of 0.03 sec, 0.04 sec, and 0.05 sec is 0.2, 0.6, and 0.2, respectively.

3.4.3.3 Site Amplification Factors

The licensee developed amplification factors for the DCPP profile relative to the surface response spectra for the SWUS baserock condition by using the random vibration theory (RVT) approach recommended by the SPID. To develop input ground motions for the site response analysis, the licensee used a point-source model for a M7 earthquake at a depth of 8 km for a range of source-to-site distances. After developing input motions for the site response, the licensee generated 30 random shear wave velocity profiles for each of the three basecase profiles to determine the median site amplification factor and its associated log standard deviation. The licensee limited the site amplification factors to value greater than 0.5 as recommended in the SPID (EPRI, 2012).

STAFF EVALUATION OF ANALYTICAL SITE RESPONSE EVALUATION

Based on its review of the information provided by the licensee in the SHSR (PG&E, 2015a) and the on-site data from the Power Block 3D Velocity Model (Fugro Consultants, 2015), the NRC staff concludes that the licensee's basecase shear wave velocity profiles are consistent with the available subsurface data at the DCPP site. The NRC staff also concludes that the epistemic uncertainty and aleatory variability estimated by the licensee for these profiles are consistent with the geotechnical and geophysical measurements made at the DCPP site. In addition, the NRC staff concludes that the dynamic material property curves used by the licensee are consistent with both the laboratory testing of the near-surface rock (i.e., PG&E, 1988) and the geology of the site, and that the licensee appropriately accounted for uncertainty in the potential nonlinear response by following the guidance provided in the SPID (EPRI, 2012).

To evaluate the licensee's estimate of the kappa value for the site response profile, the NRC staff calculated kappa for each of the on-site DCPP earthquake recordings. Based on these
confirmatory calculations, the NRC staff concludes that the resulting range of kappa values is reasonable. The NRC staff also concludes that the licensee acceptably implemented the point-source model to develop input ground motions, which resulted in a wide range of input motions that appropriately capture the deaggregation results from the PSHA.

The NRC staff performed a confirmatory site response analyses to assess the licensee’s site amplification factors. Because of the abundant on-site geophysical datasets developed by the licensee, the NRC staff used the licensee’s three basecase velocity profiles. In addition, following the guidance in the SPID, the NRC staff assumed both linear and nonlinear behavior for the materials beneath the DCPP site in response to a range of input motions. Figure 3.4-4 of this staff assessment shows that the NRC staff’s confirmatory amplification factors for an input peak ground accelerations of 0.2g and 1.07g closely match the licensee’s results.

In summary, based on its evaluation of the SHSR and its confirmatory analysis, the NRC staff concludes that the methods used by the licensee for its site response analysis result in a set of site amplification factors that appropriately characterize the response of the DCPP site to input ground motions.

3.4.4 Control Point Hazard Curves

The licensee used two approaches to compute control point hazard curves for the DCPP site. For its initial SHSR submittal to the NRC (PG&E, 2015a), the licensee used an empirical approach that uses on-site earthquake recordings to develop a set of site terms, which are ultimately used to adjust the SWUS median GMPEs. The licensee then performed a PSHA using these site-adjusted GMPEs to develop control point hazard curves. Subsequently, in response to RAIs from the NRC staff (PG&E, 2015d), the licensee used the analytical site response approach described in Appendix B of the SPID to develop site amplification factors. In order to develop control point hazard curves using the analytical site response amplification factors, the licensee used Approach 3, as described in Appendix B of the SPID (EPRI, 2012). The licensee’s use of Approach 3 involved computing the control point elevation hazard curves for a broad range of spectral accelerations by combining the baserock hazard curves, determined from the PSHA (reviewed in Section 3.3 of this staff assessment), and the amplification factors and their associated uncertainties, determined from the site response analysis.

Ultimately, the licensee used a weighted combination of the control point hazard curves from these two approaches (empirical and analytical) to develop the final GMRS for the DCPP. Because the recordings from the on-site stations ESTA27 and ESTA28 for the San Simeon and Parkfield earthquakes provide a direct estimate of the site response for the DCPP, the licensee used a weight of 0.67 for the control point hazard curves developed from the empirical approach. As such, the licensee used a weight of 0.33 for the control point hazard curves developed from the analytical approach.
STAFF EVALUATION

Based on its review of the site response information provided by the licensee in the revised SHSR (PG&E, 2015d) and its confirmatory analyses of the empirical and analytical approaches, the NRC staff concludes that the licensee’s final control point hazard curves provide a reasonable characterization of the seismic hazard for the DCPP site. Because the empirical approach relied on a limited amount of on-site recordings from two earthquakes, the NRC staff requested that the licensee perform an analytical site response evaluation that used its abundant on-site geophysical datasets. The NRC staff acknowledges that the analytical approach uses a simplified 1D layered model, which may not fully capture the complexity of the velocity structure beneath the DCPP. Therefore, the NRC staff concludes that the licensee’s decision to more heavily weight the empirically derived control point hazard curves is reasonable.

Figure 3.4-5 from the licensee’s revised SHSR (PG&E, 2015d) shows the $10^{-4}$ and $10^{-5}$ annual exceedance frequency uniform hazard response spectra (UHS) from the empirical and analytical approaches. The main difference between the two UHS is the site resonance near 2 Hz that is captured by the empirical approach, but not by the analytical approach. The NRC staff notes that the licensee’s decision to more heavily weight the empirical approach retains this 2 Hz amplification as part of the final GMRS for the DCPP.

In summary, based on its evaluation of the SHSR, PG&E’s RAI responses, and its confirmatory analysis, the NRC staff concludes that the methods used by the licensee for its site response analysis result in a set of control point hazard curves that appropriately characterize the seismic hazard of the DCPP site and are appropriate for use in the PSHA.

3.5 GMRS and Screening Results

3.5.1 Plant Seismic Design Basis

Enclosure 1 of the 50.54(f) letter (NRC, 2012a) requested that the licensee provide the SSE ground motion values, as well as the specification of the control point elevation(s), for comparison to the GMRS. For operating power reactors with construction permits issued before 1997, the SSE is the plant licensing basis earthquake and is characterized by: (1) a peak ground acceleration (PGA) value that anchors the response spectra at high frequencies (typically at 20 Hz to 30 Hz for the existing fleet of nuclear power plants); (2) a response spectrum shape that depicts the amplified response at all frequencies below the PGA; and (3) a control point location where the SSE is defined.

In Section 3.1 of its SHSR (PG&E, 2015a), the licensee described its seismic design bases for DCPP site. For the purposes of the 50.54(f) response, the licensee stated that the SSE for DCPP is the DDE, which is anchored at a PGA of 0.4g (PG&E, 2013a). Because the Updated Final Safety Analysis Report (UFSAR) does not explicitly define an SSE control point (PG&E, 2013b), the licensee used information from seismic analysis in the UFSAR to determine that the control point is at finished grade level for the major structures at DCPP. This control point corresponds to an elevation of 26 m mean sea level, which the licensee used in its site response evaluations.
The NRC staff reviewed the licensee's description of the SSE in the SHSR for the DCPP site. Based on review of the licensing basis contained in the UFSAR for DCPP (PG&E, 2013b), the NRC staff confirms that the licensee's SSE is a 5 percent damped response spectrum anchored at 0.4g, which is represented by the DDE. Finally, based on review of the SHSR and the UFSAR, the NRC staff confirms that the licensee's control point elevation for the DCPP SSE is consistent with the guidance provided in the SPID (EPRI, 2012).

3.5.2 Screening Comparison

The GMRS is used to represent the free-field seismic hazard at the control point elevation. To calculate the GMRS, the licensee first used site-specific rock hazard curves from the PSHA (reviewed in Section 3.3 of this staff assessment) and the site term adjustment factors (reviewed in Section 3.4) to calculate control point hazard curves. The licensee then used these curves to develop $10^{-4}$ and $10^{-5}$ (mean annual frequency of exceedance) uniform hazard response spectra, and then computed the GMRS using the criteria in Regulatory Guide 1.208 (NRC, 2007). In response to RAls, the licensee updated the GMRS initially submitted in PG&E (2015a) to incorporate additional information in the DCPP site response (PG&E, 2015d). The licensee's initial and updated horizontal GMRS for the DCPP site are shown in Figure 3.5-1 of this staff assessment.

To review the licensee's GMRS, the staff relied on the results of the reviews documented in Sections 3.1 to 3.4 of this staff assessment. Based on the result of its review, the staff determined that the licensee developed acceptable site-specific rock hazard curves that represented a reasonable implementation of the SSC and GMC models in the PSHA. The staff also determined in Section 3.4 that the licensee developed acceptable site term adjustment factors, which it then used to calculate control point hazard curves. In particular, the staff determined that the licensee used an acceptable approach to update the initially submitted GMRS in response to additional information. The staff also determined that the licensee used appropriate criteria in RG 1.208 to calculate the GMRS.

Based on the assessment of the licensee's SHSR and the responses to RAls, the staff confirms that the licensee used present-day guidance and methodologies outlined in Regulatory Guide 1.208 and the SPID to calculate the horizontal GMRS, as requested in the 50.54(f) letter. Based on the results of its review, the NRC staff concludes that the GMRS determined by the licensee adequately characterizes the reevaluated seismic hazard for the DCPP site. Therefore, this GMRS is suitable for use in subsequent evaluations and confirmations, as needed, for the response to the 50.54(f) letter (NRC, 2012a).

4.0 CONCLUSION

The NRC staff reviewed the information provided by the licensee for the reevaluated seismic hazard for the DCPP site. Based on this review, the NRC staff concludes that the licensee conducted the seismic hazard reevaluation using present-day methodologies and regulatory guidance, it appropriately characterized the DCPP site given the information available, and met the intent of the guidance for determining the reevaluated seismic hazard. Based upon the preceding analysis, the NRC staff concludes that the licensee's SHSR provided an acceptable
response to Requested Information Items (1) – (3) and (5) – (7), and the comparison portion to Item (4), identified in Enclosure 1 of the 50.54(f) letter.

In reaching this conclusion, the NRC staff confirmed the licensee's conclusion that the licensee's GMRS exceeds the SSE at the DCPP site. As such, the licensee will perform a seismic risk evaluation, SFP evaluation, and high frequency confirmation, consistent with the schedule in the NRC screening and hazard results for the WUS sites (NRC, 2015a). The NRC staff's review and acceptance of PG&E's plant seismic risk evaluation, including the high frequency confirmation, and SFP evaluation (i.e., Items (4), (8), and (9)) for the DCPP site will complete the seismic hazard reevaluation identified in Enclosure 1 of the 50.54(f) letter (NRC, 2012a).
5.0 REFERENCES


U.S. Nuclear Regulatory Commission Documents and Publications


NRC, 2011d, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," Commission Paper SECY-11-0137, October 3, 2011, ADAMS Accession No. ML11272A111.


NRC, 2012b, "Central and Eastern United States Seismic Source Characterization for Nuclear Facilities," NUREG-2115, ADAMS stores the NUREG as multiple ADAMS documents, which are accessed through the webpage http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2115/.

NRC, 2012c, "Research Information Letter 12-01, Confirmatory Analysis of Seismic Hazard at the Diablo Canyon Power Plant from the Shoreline Fault Zone," ADAMS Accession No. ML121230035.


NRG, 2015a, Letter from W. M. Dean (NRG) to Licensees of the Columbia Generating Station, Diablo Canyon Power Plant and Palo Verde Nuclear Generating Station, Screening and Prioritization Results for the Western United States sites Regarding Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Seismic Hazard Reevaluations for Recommendations 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, May 13, 2015, ADAMS Accession No. ML151138344.


NRG, 2015f, Email from N. DiFrancesco (NRG) to P. Soenen (DCPP), Subject: Information Request Related to Diablo Canyon Regulatory Audit of the Reevaluated Seismic Hazard, November 13, 2015, ADAMS Accession No. ML15323A200.

Other References


CSUMB (California State University, Monterey Bay, Sea Floor Mapping Lab), 2012, “Multibeam echo sounder (MBES) data for the California Central Coast,” available at http://seafloor.csumb.edu/SFMLwebDATA_c.htm


PG&E, 2013a, Letter from Barry Allen, Site Vice President, to U. S. Nuclear Regulatory Commission, Diablo Canyon Units 1 and 2 Docket Nos. 50-275 and 50-323, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Seismic Aspects of Recommendations 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, April 29, 2013, ADAMS Accession No. ML13120A275.


PG&E, 2015a, Letter from Barry Allen, Vice President, Nuclear Services, to the NRC, Diablo Canyon Units 1 and 2 Docket Nos. 50-275 and 50-323, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident: Seismic Hazard and Screening Report, March 11, 2015, ADAMS Accession No. ML15071A046.
PG&E, 2015b, Letter from Barry Allen, Vice President, Nuclear Services, to the NRC, Diablo Canyon, Units 1 and 2, “Response to NRC Request for Additional Information Regarding Recommendation 2.1 of the Near-Term Task Force Seismic Hazard and Screening Report,” August 12, 2015, ADAMS Accession No. ML15224B575.


Figure 3.0-1. Seismicity patterns and focal mechanisms of the DCPP region based on Hardebeck (2010) for events between 1987 and 2008. Redrafted from Figure 5-24 of PG&E (2015e).
Figure 3.0-2. Regional seismicity patterns from 1987 to 2013 relative to the mapped traces of known faults, redrafted from Figure 5-16 of PG&E (2015e).
Figure 3.1-1. Locations where slip rates for the Hosgri fault were determined, including the trace of the Half Graben Fault. Modified From Figure 1.2-1 of PG&E (2014), in McGinnis et al. (2016).
Figure 3.2-1. (a) Distribution of weighted medians produced from the 22 GMPEs using the Sammon’s map approach for the local sources, for a spectral period of 0.1 seconds for a M6.5 earthquake for source-to-site distances ranging from 1 to 100 km. Inset shows the weighted distribution of median spectral accelerations for a M6.5 earthquake at a source-to-site distance of 15 km. (b) The same GMPEs for a source-to-site distance of 15 km for earthquake magnitudes ranging from M5 to M9.
Figure 3.2-2. Low, central, and high values for the three components of aleatory variability [$\tau$ (red), $\phi_{ss}$ (blue), $\sigma_{ss}$ (black)] as a function of magnitude. Solid lines represent the median variability and dashed lines represent the upper and lower bounds.
Figure 3.3-1. Four local faults (black lines) and virtual faults (yellow lines) used in the NRC staff's confirmatory analyses.
Figure 3.3-2. Results of the NRC staff's 1 Hz (a) and 10 Hz (b) confirmatory analysis for the Hosgri fault, assuming the H90 fault geometry model, a maximum magnitude of 7.4, a fault length of 107 km, a width of 12 km, an equivalent Poisson's ratio of 1.2, and fault slip rates of 0.7, 1.7, and 2.6 mm/yr. Individual analyses, assuming median slip rate, for each GMPE shown by thin light blue lines, staff mean confirmatory results for three fault slip rates shown by dashed blue lines, licensee's mean result in orange line, and the licensee's total mean result for 1 Hz (a) and 10 Hz (b) shown by the red line.
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Figure 3.3-4. Results of the NRC staff's 1 Hz (a) and 10 Hz (b) confirmatory analysis for the virtual faults (yellow lines in Figure 3.3-1). Mean hazard curves for each of the virtual faults shown by thin light blue lines, overall mean result shown by dashed blue line, licensee's mean result by green line, and the licensee's total mean result for 1 Hz (a) and 10 Hz (b) shown by the red line.
Figure 3.4-1. Aerial view of the DCPP site location, basemap from Google Maps. Red squares indicate location of ESTA 27 (south of Turbine Building) and ESTA 28 (north of the Turbine Building).
Figure 3.4-2. Empirical site term for the DCPP, showing the results of NRC staff’s confirmatory analyses (red lines) and the licensee’s analyses in PG&E (2015b).
Figure 3.4-3. (a) Shear wave velocity profiles (colored lines) beneath the DCPP power block and turbine building region. Heavy black curves show the central, upper, and lower profiles. From Figure 2-2 of PG&E (2015d). (b) Comparison of the host $V_s$ profile (labeled Reference 760) and the central, upper, and lower profiles for the target, from Figure 2.3 of PG&E (2015d).
Figure 3.4-4. Comparison of analytical site terms for SWUS reference rock (760 m/s) with peak ground accelerations of 0.2g and 1.07g.
Figure 3.4-5. Licensee's sensitivity analysis of the Uniform Hazard Spectra to the site term approach, from PG&E (2015d).
Figure 3.5-1. Initial Ground Motion Response Spectrum (GMRS; black dashed line) and Double Design Earthquake (i.e., SSE; green dashed line) from SHSR for DCPP (PG&E, 2015a). Revised GMRS (red solid line) from PG&E (2015d).
If you have any questions, please contact me at (301) 415-1617 or at Frankie.Vega@nrc.gov.

Sincerely,

/RA/

Frankie Vega, Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:
Staff Assessment of Seismic Hazard Evaluation and Screening Report

cc w/encl: Distribution via Listserv

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*via email
Mr. Richard Ayres  
Attorney for Friends of the Earth  
Ayres Law Group, LLP  
1707 L Street, NW, Suite 850  
Washington, DC 20036

Dear Mr. Ayres:

On August 26, 2014, you filed, on behalf of Friends of the Earth (FOE), a Petition to Intervene and Request for Hearing (Petition) concerning Diablo Canyon Power Plant, Units 1 and 2 (DCPP). Within this Petition, FOE asserted concerns about DCPP's operational safety and ability to safely shut down in the event of a nearby earthquake. In Commission Memorandum and Order (CLI-15-14) dated May 21, 2015, the Commission referred those concerns to the U.S. Nuclear Regulatory Commission's (NRC's) Executive Director for Operations for consideration under the regulations of Title 10 of the Code of Federal Regulations (10 CFR) Section 2.206, "Request for Action Under this Subpart." The Executive Director for Operations then referred these concerns to the NRC's Office of Nuclear Reactor Regulation for consideration under 10 CFR 2.206. Your 10 CFR 2.206 petition and its supplements are in the NRC's Agencywide Documents Access and Management System (ADAMS) in a package under Accession No. ML17108A630.

In your petition, you requested that the NRC take enforcement actions to ensure that DCPP can operate safely and demonstrate its ability to safely shut down in the event of an earthquake caused by nearby faults. As the basis for the request, you stated that the "NRC staff's determination that the new seismic information, including the Shoreline earthquake and its effect on the San Luis Bay and Los Osos faults, is a lesser-included case within the Hosgri earthquake is insufficient to insure that Diablo Canyon is operating safely with an adequate margin of safety."

By letters dated September 30, 2015, and February 8, 2016, you provided the NRC with supplemental information on behalf of FOE in lieu of meeting with the Petition Review Board. The NRC staff considered these submittals during its evaluation. On April 12, 2016, the NRC staff acknowledged receiving your petition and stated pursuant to 10 CFR 2.206 that your petition was being referred to me for action and that it would be acted upon within a reasonable time. By letter dated February 28, 2017, the NRC staff requested Pacific Gas and Electric Company (PG&E, the licensee for DCPP) to provide information related to the petition. PG&E did not provide any additional information.

The NRC staff sent a copy of the proposed director's decision to you and to PG&E for comment on February 28, 2017. The staff did not receive any comments from you or PG&E.
The NRC will file a copy of the Director's Decision (DD-17-02) with the Secretary of the Commission for the Commission to review in accordance with 10 CFR 2.206(c). As provided for by this regulation, the decision will constitute the final action of the Commission 25 days after the date of the decision unless the Commission, on its own motion, institutes a review of the decision within that time. The documents cited in the enclosed decision are available in ADAMS for inspection at the Commission's Public Document Room, located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland, and online in the NRC Library at http://www.nrc.gov/reading-rm.html.

I have also enclosed a copy of the notice of "Issuance of Director's Decision under 10 CFR 2.208" that the NRC has filed with the Office of the Federal Register for publication.

Please feel free to contact the Petition Managers, Margaret Watford by telephone at (301) 415-1233 or Lisa Regner by telephone at (301) 415-1906, to discuss any questions related to this petition.

Sincerely,

[Signature]

William M. Dean, Director
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosures:
1. Director's Decision DD-17-02
2. Federal Register Notice

cc: Listserv

Mr. Edward D. Halpin
Senior Vice President, Generation
and Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 56, Mail Code 104/6
Avila Beach, CA 93424
ENCLOSURE 1

DIRECTOR'S DECISION DD-17-02

ADAMS ACCESSION NO. ML17090A182
UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  

William M. Dean, Director  

In the Matter of  
Pacific Gas and Electric Company  
Diablo Canyon Power Plant  
Units 1 and 2  

) Docket Nos. 50-275 and 50-323  
) License Nos. DPR-80 and DPR-82  

DIRECTOR'S DECISION UNDER 10 CFR 2.206  

I. Introduction  

On August 26, 2014, Friends of the Earth (FOE or the petitioner) filed a Petition to  
Intervene and Request for Hearing (Petition)\(^1\) concerning Diablo Canyon Power Plant, Units 1 and 2 (DCPP). In this Petition, FOE claims that DCPP is violating its licensing basis, and therefore the plant’s operational safety and its ability to safely shut down in the event of an earthquake caused by nearby faults is in question. The petitioner requested that the U.S. Nuclear Regulatory Commission (NRC or Commission) take enforcement actions to ensure that DCPP can operate safely and demonstrate its ability to safely shut down in the event of an earthquake caused by nearby faults. As the basis for the request, the petitioner states that the “NRC staff’s determination that the new seismic information, including the Shoreline earthquake and its effect on the San Luis Bay and Los Osos faults, is a lesser-included case within the  

\(^1\) Agencywide Documents Access and Management System (ADAMS) Accession No. ML14254A231.
Hosgri earthquake is insufficient to insure that Diablo Canyon is operating safely with an adequate margin of safety.\textsuperscript{2}

The Commission, by a memorandum and order (CLI-15-14) dated May 21, 2015,\textsuperscript{3} referred those concerns to the NRC's Executive Director for Operations (EDO) for consideration under Title 10 of the \textit{Code of Federal Regulations} (10 CFR) Section 2.206, "Requests for action under this subpart." Therefore, the NRC staff treated these concerns in FOE's hearing request as a petition for enforcement action pursuant to 10 CFR 2.206.

On two occasions, the NRC offered FOE opportunities to address the Petition Review Board (PRB), which was established to review FOE's enforcement concerns. In response, on September 30, 2015, and February 8, 2016,\textsuperscript{4} FOE provided written submissions to the PRB in lieu of addressing the PRB in person or by telephone. The NRC staff considered these submittals during its evaluation.

In a letter dated April 12, 2016,\textsuperscript{5} the NRC informed FOE that its concerns met the criteria for acceptance for consideration provided in Management Directive (MD) 8.11, "Review Process for 10 CFR 2.206 Petitions," dated October 25, 2000,\textsuperscript{6} and that the NRC had referred the petition to the Office of Nuclear Reactor Regulation and the Office of New Reactors for appropriate action.

By letters to the petitioner and the Pacific Gas and Electric Company (PG&E, the licensee) dated February 28, 2017\textsuperscript{7}, the NRC issued the proposed Director's Decision\textsuperscript{8} for comment. The NRC staff did not receive comments from the petitioner or the licensee.

\textsuperscript{2} Page 47 of the Petition.
\textsuperscript{3} ADAMS Accession No. ML15141A084.
\textsuperscript{4} ADAMS Accession Nos. ML15274A054 and ML16040A221, respectively.
\textsuperscript{5} ADAMS Accession No. ML16084A717.
\textsuperscript{6} ADAMS Accession No. ML041770328.
\textsuperscript{7} ADAMS Accession Nos. ML17011A205 and ML17011A206, respectively
\textsuperscript{8} ADAMS Accession No. ML17011A204
II. Discussion

Under 10 CFR 2.206(b), the director of the NRC office with responsibility for the subject matter shall either institute the requested proceeding to modify, suspend, or revoke a license, or advise the person who made the request in writing that no proceeding will be instituted, in whole or in part, with respect to the request and the reason for the decision. The petitioner raised concerns about violations of DCP's licensing basis, operational safety, and ability to safely shut down in the event of an earthquake associated with the Shoreline, San Luis Bay, or Los Osos faults.

At the time that FOE submitted this Petition in August 2014, the NRC staff had dispositioned a Differing Professional Opinion (DPO) on seismic concerns at DCP. A publicly available Case File, DPO-2013-002, provides the concerns submitted by an NRC employee and former resident inspector, Dr. Michael Peck, on the topic of DCP seismic issues; the deliberations of an independent, three-person NRC panel assigned to assess the DPO (referred to as the DPO Panel); the initial NRC management decision based on the independent DPO Panel; the NRC employee's appeal of the initial management decision; and the review and final disposition of the appeal by the NRC's EDO. The bases for the concerns in the DPO are similar to those submitted in the Petition. In fact, the DPO submittal is used as the basis for several of the petitioner's assertions. However, as the Commission noted in CLI-15-14, the issues raised in the DPO and in FOE's Petition are not identical, and seismic reevaluation is ongoing at the DCP.

The NRC staff analyzed FOE's enforcement concerns and the results of those analyses are discussed below. Results of the ongoing seismic reevaluation at DCP are also discussed.
below. The decision of the Director of the Office of Nuclear Reactor Regulation is provided with respect to each of these concerns.

Concern 1: The Hosgri Evaluation (HE) and the associated Long Term Seismic Plan (LTSP) is a weaker seismic evaluation method than the NRC’s recommended method and is inadequate to demonstrate that DCPP can safely shut down following an earthquake caused by the Shoreline, San Luis Bay, or Los Osos faults.\textsuperscript{11}

The petitioner states that the NRC “...treated the Hosgri Evaluation as a ‘special case,’ permitting the seismic evaluation under the LTSP to use materially weaker assumptions than in the NRC standard method,” and that the NRC’s comparison of “...the updated ground motion levels from the three faults to the ground motion levels of the [HE] is not a sufficient basis for concluding that the plant may continue to operate with an adequate margin of safety.”\textsuperscript{12} FOE contends that “projected ground motion at the plant site caused by an earthquake on one of the three faults is equal to or greater than potential ground motion caused by a Hosgri earthquake.”\textsuperscript{13}

The DCPP Updated Final Safety Analysis Report (UFSAR) states that there are three design basis earthquakes for DCPP: (1) the design earthquake (DE, 0.2 g gravity) peak ground acceleration (PGA)), (2) the double design earthquake (DDE, 0.4 g PGA), and (3) the Hosgri Evaluation (0.75 g PGA).\textsuperscript{14} These design earthquakes were analyzed as the design basis for seismic impacts to structures, systems, and components (SSCs) at DCPP important to safety, and have been well established as the seismic design basis for DCPP since the initial operating licenses for this plant were issued. FOE’s concern that the HE is not part of the

\textsuperscript{11} Page 54 of the Petition.
\textsuperscript{12} Pages 9 and 49 of the Petition, respectively.
\textsuperscript{13} Page 6 of the Petition.
\textsuperscript{14} UFSAR, Section 3.7, “Seismic Design,” on page 3.7-1 (ADAMS Accession No. ML16004A126).
DCPP licensing basis is not supported by DCPP licensing basis documents. This concern is discussed further in Concern 5 below.

FOE states that PG&E’s analyses for the LTSP and HE use materially weaker assumptions and show that the potential ground motion of an earthquake on the Shoreline, San Luis Bay, or Los Osos Faults could cause ground motion at DCPP that exceeds the HE. Thus, FOE states the HE is inadequate and not a valid basis for comparison for the Shoreline fault.\footnote{Pages 6 and 20 of the Petition, page 4 of FOE’s supplement dated September 30, 2015, and page 2-3 of FOE’s supplement dated February 8, 2016; see also pages 20-24 of FOE’s Reply to NRC Staff’s and PG&E’s Answers and Proposed Amicus Curiae Nuclear Energy Institute’s Brief in Response to Petition (ADAMS Accession No. ML14287A788).}

The NRC staff disagrees that the analyses used by PG&E for the LTSP and HE are inadequate for comparison to the new seismic data in the Shoreline fault because licensees are permitted to show seismic compliance using different methods of technical assessment and evaluation. Alternate evaluation methodologies to show compliance are reviewed on a case-by-case basis by the NRC staff and a determination is made as to the acceptability of the alternate methodologies and the results. FOE’s assertion is similar to Dr. Peck’s DPO concern that “PG&E’s operability evaluation following the development of the new seismic information was inadequate, because the new seismic information was not compared correctly to the plant’s licensing basis.”\footnote{DPO Panel Report, Section 3, “Statements of Concerns,” starting on Adobe portable document format (PDF) page 56 of the DPO Case File.} The DPO Panel evaluating Dr. Peck’s concern recognized that different methodologies and assumptions were used in the evaluations of the DE, DDE, HE, and LTSP.\footnote{DPO Panel Report, Section 2.1, “Use of Seismic Ground Motions in Safety Analyses,” starting on PDF page 54 of the DPO Case File.} The NRC found the use of an alternate methodology acceptable in the Shoreline analyses, as alternative approaches were used previously in the UFSAR and LTSP to analyze potential ground motions. The DPO Panel also stated that use of alternate methodologies are technically
acceptable and consistent, as summarized in DPO Panel Report, Section 4.2, “Evaluation of Specific DPO Concerns.”

The DPO Panel identified that certain comparisons between the Shoreline evaluation\textsuperscript{18} and information in the DCPP UFSAR\textsuperscript{19} did not take into account the differences in assumptions for the two analyses.\textsuperscript{20} The DPO Panel also recognized the challenge of comparing new seismic information and existing information, and questioned whether it was appropriate to compare the two since the ground motions are different relative to the use of free-field response spectra and damping values.\textsuperscript{21}

Ultimately, the DPO Panel concluded that the NRC properly evaluated the licensee’s determination of operability as presented in Prompt Operability Assessment of October 21, 2011.\textsuperscript{22} However, the DPO Panel also determined that additional information from the licensee would be useful to allow a direct comparison of potential ground motions in the Shoreline report to the ground motions used in the UFSAR analyses.\textsuperscript{23} PG&E agreed to conduct additional analyses of the new ground motions, so that the results of these analyses would be directly comparable to the inputs used in the UFSAR analyses.\textsuperscript{24} The Panel reviewed the additional calculations that were developed by PG&E and found that potential ground motions from the Shoreline report generally do not exceed the levels of in-structure acceleration already considered during the design and licensing of DCPP.\textsuperscript{25} The DPO Panel acknowledged that

\textsuperscript{18} Chapter 6.0, “Seismic Hazards Analysis,” starting on page 6-1 (ADAMS Package Accession No. ML110140431).
\textsuperscript{19} UFSAR, Section 3.7, “Seismic Design” on page 3.7-1.
\textsuperscript{20} DPO Panel Report, Section 4.2.1, “Technical Assessment of the Potential for Seismic Loads on SSCs to Exceed Previously Analyzed Conditions,” on starting on PDF page 60 of the DPO Case File.
\textsuperscript{21} Id.
\textsuperscript{22} DPO Panel Report, Section 4.2, “Evaluation of Specific DPO Concerns,” on PDF page 58 of the DPO Case File.
\textsuperscript{23} DPO Panel Report, Section 4.2.1, on PDF page 61 of the DPO Case File.
\textsuperscript{24} Id.
\textsuperscript{25} Id.
using the ergodic evaluation method resulted in some SSCs’ "...response spectra met or slightly
(<10%) exceeded the DDE+HE spectrum at spectral frequencies of 30-50 Hz [Hertz]. This
small high-frequency exceedance would not be expected to significantly affect the performance
of these types of SSCs. In addition, most of the slight exceedances occurred for SSCs that
PG&E had selected a conservative damping value (i.e., lower than used for HE analyses)." [26]
Thus, the HE is considered the bounding seismic licensing basis because the exceedances are
small and within the acceptable range considering the conservative margins inherent in the
DCPP analysis. Therefore, the NRC staff determined that the HE is appropriate as the
bounding seismic design basis evaluation and, thus, DCPP is safe to continue operating.

In summary, the DPO Panel acknowledged that different methodologies were used
when new seismic information came to light to demonstrate that DCPP is safe to operate, but
that these alternate methodologies are adequate and acceptable for demonstrating that DCPP
is safe to operate. The DPO Panel took additional action by requesting information from PG&E
to directly compare the potential ground motions from the faults – Shoreline, San Luis Bay and
Los Osos – with the seismic licensing basis (DE, DDE, and HE). The DPO Panel ultimately
found that the potential ground motions from the Shoreline report generally do not exceed the
levels previously considered. Thus, FOE’s concern about the adequacy of the LTSP and HE
has been reviewed and dispositioned by the NRC staff through the DPO process. Moreover,
FOE’s concern that the use of the HE is inadequate for comparison with the Shoreline report
has been resolved by the NRC staff through the DPO process. Finally, FOE’s concern about
the operability of DCPP’s SSCs considering the exceedances of the Shoreline report over the
HE have been reviewed and resolved by the NRC staff through the DPO process.

[26] DPO Panel Report, Section 4.2.1, on PDF page 62 of the DPO Case File.
For the reasons set forth above, the NRC staff determines that DCPP is safe to continue operating and is able to safely shut down following an earthquake caused by the Shoreline, San Luis Bay, or Los Osos faults. Therefore, the NRC staff does not have a basis for expanding its current level of regulatory oversight in accordance with the NRC’s Reactor Oversight Process and the Enforcement Policy, or otherwise taking the petitioner’s requested enforcement actions against the licensee.

**Concern 2: The NRC’s own policy does not permit PG&E to determine that the plant is safe to continue operating based on the probabilistic risk assessment ordered by the NRC.**

The petition states that “[i]n response to the [Near Term] Task Force’s [NTTF] recommendations, the NRC Staff requested that PG&E develop new probabilistic ground motion models. The results of these models were then to be compared to DCPP’s existing SSE [safe-shutdown earthquake (SSE), equivalent to DDE], which is deterministic in nature. But given that Diablo Canyon’s design bases are deterministic in nature, a probabilistic risk assessment cannot be used to determine compliance with the plant’s design bases.”

As a result of the NTTF review of insights from the Fukushima Dai-ichi accident, the Commission instructed the NRC staff, in Staff Requirements Memoranda associated with SECY-11-0124 and SECY-11-0137, to issue a letter instructing licensees to perform seismic hazard reevaluations at each site against present-day NRC requirements and guidance. As the state of knowledge of natural phenomena hazards has evolved significantly since the licensing

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27 Page 58 of the Petition.
28 NTTF is a task force established by the NRC in response to the 2011 accident at the Fukushima Dai-ichi nuclear power plant in Japan.
29 Page 58 of the Petition.
30 ADAMS Accession No. ML111861807.
31 ADAMS Package Accession Nos. ML11245A158 and ML11272A111, respectively.
of many of the nuclear power plants within the U.S., and given the demonstrated consequences from Fukushima, the Commission determined that it was necessary to confirm the appropriateness of the hazards assumed for U.S. plants and each plant's ability to protect against them.

In response to these instructions, the NRC staff issued a request for information pursuant to 10 CFR 50.54(f) (referred to as the 10 CFR 50.54(f) letter), dated March 12, 2012,\(^2\) to all nuclear power plant licensees to allow the NRC staff to determine whether additional regulatory action was needed in the areas of seismic and flooding design and emergency preparedness. The 50.54(f) letter included a specific request associated with NTTF Recommendation 2.1 for seismic hazard reevaluations.\(^3\) The 50.54(f) letter specified a two-phase implementation for the seismic hazard: (1) request all operating reactor licensees to reevaluate the seismic hazard at their sites using updated seismic hazard information and present-day regulatory guidance and methodologies and, if necessary, to perform a risk evaluation, and (2) if necessary, based upon the results of Phase 1, NRC staff determined whether additional regulatory actions are necessary (e.g., update the design basis and SSCs important to safety) to protect against the updated hazards.\(^4\)

As discussed in Enclosure 1 to the 50.54(f) letter, the NRC staff recognized that the design bases for nuclear power plants were either developed in accordance with, or meet the intent of, 10 CFR Part 50 Appendix A, General Design Criterion (GDC) 2, "Design bases for protection against natural phenomena," and 10 CFR Part 100, Appendix A, "Seismic and Geologic Criteria for Nuclear Power Plants."\(^5\) Although the regulatory requirements in 10 CFR Part 100, Appendix A are fundamentally deterministic, the NRC process for determining the

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\(^2\) ADAMS Accession No. ML12053A340.
\(^3\) 50.54(f) letter, Enclosure 1, "Recommendation 2.1: Seismic."
\(^4\) 50.54(f) letter, Enclosure 1, on page 4.
\(^5\) Id.
seismic design basis ground motions for new reactor applications on or after January 10, 1997, as described in 10 CFR 100.23, "Geological and Seismic Siting Criteria," uses a probabilistic seismic hazard analysis. All currently operating U.S. nuclear power plants, including DCPP, used deterministic criteria for their seismic design; that is, licensees used historical seismic activity known at the time at the site and surrounding area. The design bases used the most severe seismic activity historically reported with margin to account for the limited accuracy.

As part of the 50.54(f) letter, the NRC staff communicated that the state of knowledge of seismic hazards has evolved and the level of conservatism in the assessment of the original deterministic seismic design bases needed to be reexamined.\textsuperscript{36} The NRC staff further stated that licensees need to use a probabilistic approach in order to develop a risk-informed performance-based ground motion response spectrum (GMRS) for the site, as provided in Regulatory Guide (RG) 1.208, "A Performance-Based Approach to Define the Site-Specific Earthquake Ground Motion," dated March 2007.\textsuperscript{37} The probabilistic assessment approach represents the state-of-the-art hazard determination and provides a comprehensive approach for estimating earthquake hazards. Thus, the NRC staff recognized and endorsed the use of the more modern and advanced methods of seismic hazard assessments using risk. The NRC staff held over 15 public meetings over a 9-month period with stakeholders to develop the guidance that the industry would use to compare risk and deterministic information. The NRC staff addressed the comparison of the risk-based reevaluation to the deterministic-based seismic design, and used its expertise to develop a logical, systematic, and conservative process\textsuperscript{38} to ensure the industry could make these comparisons appropriately and consistently.

\textsuperscript{36} 50.54(f) letter, Enclosure 1 on pages 1-2.
\textsuperscript{37} ADAMS Accession No. ML070310619.
\textsuperscript{38} All licensees committed to follow the guidance of the Electric Power Research Institute (EPRI) Report, "Seismic Evaluation Guidance: Screening, Prioritization and Implementation Details for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic," dated November 2012, found at
As a result, the NRC developed guidance for the nuclear power industry to apply consistently in comparing the new seismic hazard based on risk to the existing deterministic seismic design basis.

In response to the 10 CFR 50.54(f) letter, NRC staff reviewed the new seismic hazard analyses completed by all the sites and made determinations as to the acceptability of these comparisons.\textsuperscript{39} PG&E provided its new seismic hazard analyses, called the Seismic Hazard and Screening Report, for the DCPP site by letter dated March 11, 2015.\textsuperscript{40} The licensee’s report concluded that the GMRS exceeds the DDE (i.e., the SSE) within the frequency range of 1 Hz to 10 Hz.\textsuperscript{41} Therefore, in accordance with Phase 1 of the 10 CFR 50.54(f) letter, PG&E needed to perform a seismic probabilistic risk evaluation. In addition, the licensee needed to complete a high frequency confirmation because the GMRS also exceeds the SSE above 10 Hz. While PG&E needed to perform additional analyses, the NRC stated that PG&E demonstrated that the seismic margins are supportive of continued plant operation while additional risk evaluations are conducted.\textsuperscript{42}

As a result, PG&E is in the process of conducting its seismic probabilistic risk evaluation for DCPP. The NRC staff currently expects to receive the results of this evaluation by September 30, 2017. Upon receipt, the NRC will review PG&E’s seismic risk evaluation to

\textsuperscript{39} On May 13 and October 27, 2015 (ADAMS Accession Nos. ML15113B344 and ML15194A015, respectively), the NRC staff issued letters providing the outcome of its screening and prioritization evaluation for Western United States (WUS) plants (WUS screening letters). As indicated in the letters, the NRC staff confirmed the licensees’ screening results and examined key parameters to prioritize plants for completion of the seismic risk evaluations. In a letter to PG&E dated December 21, 2016 (ADAMS Accession No. ML16341C057), the NRC staff concluded that “the licensee [PG&E] conducted the seismic hazard reevaluation using present-day methodologies and regulatory guidance, it appropriately characterized the DCPP site given the information available, and met the intent of the guidance for determining the reevaluated seismic hazard.”

\textsuperscript{40} ADAMS Package Accession No. ML15071A046.

\textsuperscript{41} PG&E’s Seismic Hazard and Screening Report, Enclosure 1 on page 46.

\textsuperscript{42} Page 2 of WUS screening letter dated May 13, 2015.
determine whether key plant systems and components can withstand the higher ground motions associated with the reevaluated hazard at DCPP. If it is determined that the plant systems and components cannot adequately withstand the higher ground motion, the NRC will take additional regulatory action, in accordance with Phase 2 of the 50.54(f) letter.

The petitioner's concern also involves the relationship between plant operability and the reevaluated hazards.\(^{43}\) The NRC issued a letter dated February 20, 2014,\(^{44}\) to all power reactor licensees, which included supplemental information regarding the seismic hazard reevaluations associated with the 50.54(f) letter. The NRC staff clarified that the seismic hazard reevaluations being performed pursuant to the 50.54(f) letter are distinct from the current design or licensing basis of operating plants.\(^{45}\) Consequently, the results of the analysis performed using present-day regulatory guidance, methodologies, and information would not generally be expected to call into question the operability or functionality of SSCs. However, as with any new information that may arise at a plant, licensees are responsible for evaluating and making determinations related to operability. If at any time during completion of these seismic reevaluations, the NRC determines that new seismic information reveals vulnerabilities in the current seismic design basis, it will take appropriate additional regulatory action. In this case, the NRC determined DCPP acted appropriately and within the guidance endorsed by the NRC staff in evaluating the new seismic information at DCPP. Further, the NRC staff reviewed the DCPP hazard information and made an independent assessment that the evaluation was adequate and that DCPP is safe to continue operating.

The petitioner also raises a concern regarding the guidelines used for analyzing newly discovered seismic data at DCPP. Specifically, the petitioner states that "Diablo Canyon's

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\(^{43}\) Pages 58 and 59 of the Petition.

\(^{44}\) ADAMS Accession No. ML14030A046.

\(^{45}\) Page 2 of the letter dated February 20, 2014.
operating license contains no clear direction or guidelines regarding how PG&E is required to analyze newly discovered seismic data." Similarly, Dr. Peck raised a concern in his DPO about his perceived lack of direction for PG&E in assessing the new seismic data at DPP. The DPO Panel determined that the ongoing efforts to address lessons learned from the Fukushima Dai-ichi accident provide the appropriate regulatory framework to address this concern, as discussed in Section 4.2 of the DPO Panel Report.

As part of these ongoing efforts, the NRC staff has enhanced its current processes for addressing changes in external hazard information. The Fukushima lessons-learned efforts also led to installing additional safety enhancements to bolster plants' ability to withstand extreme natural events beyond the facilities' current design basis. Specifically, the NRC staff is in the process of codifying, through rulemaking, a requirement that licensees provide capabilities to mitigate the beyond-design-basis flood and seismic events identified through the hazard reevaluations. As contemplated in the draft final rule, operating power reactor licensees would be required to maintain this capability in a manner similar to other beyond-design-basis events (e.g., station blackout, and loss of large areas of the plant caused by explosions or fire) to ensure added assurance of protections against severe natural events such as earthquakes. The NRC staff provided the draft final rule to the Commission in SECY-16-0142, "Draft Final Rule-Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)." While this proposed regulation is still in the midst of NRC's rulemaking process, and thus does not constitute a final agency action, the NRC staff and the Commission have nevertheless determined that all U.S. nuclear power plants, including DPP, are currently safe to operate.

46 Page 9 of the Petition and as discussed in supplements dated September 30, 2015, and February 8, 2016.
47 Summarized on PDF page 56 of the DPO Case File.
48 ADAMS Package Accession No. ML16301A005.
In summary, PG&E acted appropriately and within the parameters specified by the NRC staff in its 50.54(f) letter when evaluating the new seismic hazards at the DCPP. The NRC staff completed a thorough and in-depth evaluation of DCPP’s reevaluated seismic hazard information it has received to date (discussed in more detail in Concern 3 below) in response to the 50.54(f) letter, and it has determined that DCPP is safe to continue operating and is able to safely shut down if it experiences a seismic event. Additionally, the NRC staff has taken appropriate actions to address the new information that resulted from seismic hazard reevaluations performed by licensees in response to the 50.54(f) letter. Therefore, the NRC staff does not have a basis for expanding its current level of regulatory oversight in accordance with the NRS’s Reactor Oversight Process and the Enforcement Policy, or otherwise taking the petitioner’s requested enforcement actions against the licensee.

Concern 3: The U.S. Geological Survey (USGS) geophysicist who discovered the Shoreline fault has published research concluding that the NRC staff underestimated the capability of the Shoreline fault and the risk it poses to DCPP.\textsuperscript{50}

The petitioner states that according to USGS geophysicist Dr. Jeanne Hardebeck, “the Shoreline and Hosgri faults are connected, and that a rupture on one fault could travel to the other, leading to a much larger earthquake than would be possible on a single, independent fault.”\textsuperscript{51} FOE quotes Dr. Hardebeck’s conclusions that “PG&E and NRC would be wrong to rule out the possibility of a joint rupture…” that “... could extend the rupture length an additional ~100 km [kilometers]” and that “[t]his hypothetical earthquake would have a moment magnitude

\textsuperscript{50} Page 59 of the Petition.
\textsuperscript{51} Pages 59-60 of the Petition; see also pages 19-20 of FOE’s Reply to NRC Staff’s and PG&E’s Answers and Proposed Amicus Curiae Nuclear Energy Institute’s Brief in Response to Petition.
of 7.2-7.5..."52 FOE further states that the "existing study of the Shoreline Fault is not sufficient to estimate the probability of a Shoreline earthquake occurring" and quotes Dr. Hardebeck as stating that this is because the Shoreline fault "slip rate is unknown."53

On January 7, 2011, PG&E transmitted to the NRC a report updating the local seismology in the vicinity of DCPP, titled "Report on the Analysis of the Shoreline Fault Zone, Central Coast California."54 This report included new deterministic evaluations for the Shoreline, Los Osos, and San Luis Bay earthquake faults. The licensee concluded that each of these faults was capable of producing between 0.6 g and 0.7 g PGA at DCPP. As noted under Concern 2 of this document on March 11, 2015, PG&E submitted a Seismic Hazard Screening Report for DCPP in response to NRC staff's 50.54(f) letter, which requested that PG&E reevaluate the seismic hazard at the DCPP site using updated seismic information and present-day regulatory guidance and methodologies. PG&E's report provided the results of a seismic hazard reevaluation using a probabilistic seismic hazard analysis as specified in 10 CFR 100.23(d) in order to develop a plant-specific GMRS for screening purposes.

By letter dated September 19, 2012, "Research Information Letter [RIL] 12-01, Confirmatory Analysis of Seismic Hazard at the Diablo Canyon Power Plant from the Shoreline Fault Zone,"55 the NRC staff determined that "[t]he NRC's conservative estimates for the potential ground motions from the Shoreline fault are at or below the ground motions for which the DCPP has been evaluated previously and demonstrated to have reasonable assurance of safety...."56 RIL 12-01 evaluated the potential hazard from the Shoreline fault using traditional deterministic approaches, which generally focus on faults individually rather than consider less

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52 Page 60 of the Petition.
53 Id.
54 ADAMS Accession No. ML110404000.
55 ADAMS Accession No. ML121230035.
56 Page xii of RIL 12-01.
likely earthquake rupture scenarios on linked faults. However, for its response to the 10 CFR 50.54(f) letter, PG&E developed seismic source models that considered multiple alternative earthquake rupture scenarios that involve the primary faults surrounding the DCPP site.\textsuperscript{57} One of these source models specifically captures the potential for a linked rupture starting at the northernmost end of the San Andreas fault, continuing onto the San Gregorio and San Simeon faults, and then onto the Hosgri and Shoreline faults. For this rupture model, PG&E considered three maximum moment magnitudes of 7.7, 8.1, and 8.4, which correspond to theoretical earthquake rupture lengths of 221 km, 461 km, and 802 km, respectively. PG&E also developed a seismic source model that captures the potential for a simultaneous rupture of the entire Hosgri-San Simeon-San Gregorio-San Andreas fault system together with the Shoreline fault. PG&E combined these two hypothetical seismic source rupture models with multiple other source models to develop seismic hazard curves and ultimately a GMRS.\textsuperscript{58}

In addition to developing multiple seismic source models, PG&E characterized the slip rates of the Hosgri, Shoreline, Los Osos, and San Luis Bay faults with emphasis on the slip rate uncertainties for the portions of these faults nearest to the DCPP site. To estimate slip rates for the primary faults, PG&E mainly relied on observed offsets of geologic features, which were developed from the extensive offshore two-dimensional and three-dimensional seismic datasets collected within the past decade. PG&E used other geological, geophysical, and geodetic data to check the reasonableness of these estimated slip rates. In particular, to estimate the slip rate for the Shoreline fault, PG&E used three geologic offset features in the San Luis Obispo Bay.\textsuperscript{59}

The NRC staff reviewed the analysis developed by PG&E, and concluded in a letter dated December 21, 2016,\textsuperscript{60} that the licensee used present-day guidance and methodologies to

\textsuperscript{57} See generally PG&E's Seismic Hazard and Screening Report.

\textsuperscript{58} \textit{Id.}

\textsuperscript{59} \textit{Id.}

\textsuperscript{60} Pages 44-45 of NRC letter dated December 21, 2016 (ADAMS Accession No. ML16341C057).
calculate the GMRS, as requested in the 50.54(f) letter. In particular, the NRC staff concluded that the licensee reasonably captured multiple possible combinations for each of the fault rupture sources using a wide range of estimated slip rates for each of the faults near DCPP, including multiple combined Shoreline/Hosgri rupture scenarios. FOE claims that as new faults have been discovered, PG&E has modified its Ground Motion Prediction Equations to obtain a desired result that reduces the margin of safety. The NRC staff disagrees because it has reviewed PG&E's analyses and determined that PG&E has consistently used the latest available peer-reviewed equations developed specifically for the WUS plants to analyze the hazard potential at DCPP from the Hosgri, Shoreline, and other nearby faults.\textsuperscript{61} As such, the NRC staff concluded that "the GMRS determined by the licensee adequately characterizes the reevaluated seismic hazard for the DCPP site" and that "this GMRS is suitable for use in subsequent evaluations and confirmations, as needed, for the response to the 50.54(f) letter" and other actions associated with NTTF recommendations.\textsuperscript{62} As stated in the WUS screening letter dated May 13, 2015, "the NRC staff review of WUS reports found that licensees have demonstrated seismic margins supportive of continued plant operation while additional risk evaluations are conducted."\textsuperscript{63} The NRC concluded in the Seismic Hazard Screening Report that while DCPP is conducting a seismic risk evaluation, the plant is safe to continue operation. This, in combination with the conclusion from RIL 12-01 discussed above, confirms that DCPP is safe to continue operation and is capable of safe shutdown.

In summary, NRC staff concluded in a letter dated December 21, 2016, that PG&E reasonably captured multiple possible combinations for each of the fault rupture sources using a wide range of estimated slip rates for each of the faults near DCPP, including multiple combined

\textsuperscript{61} Pages 44-45 of NRC letter dated December 21, 2016.
\textsuperscript{62} Id.
\textsuperscript{63} Page 2 of the WUS screening letter (ADAMS Accession No. ML15113B344).
Shoreline/Hosgri rupture scenarios. Thus, the NRC staff does not have a basis for expanding its current level of regulatory oversight in accordance with the NRC's Reactor Oversight Process and the Enforcement Policy, or otherwise taking the petitioner's requested enforcement actions against the licensee.

**Concern 4: Former NRC senior resident inspector Dr. Peck's DPO demonstrates how use of the Hosgri earthquake as a safety metric to analyze the Shoreline Fault is not sufficient to insure DCPP's seismic safety.**

In the Petition, the petitioner states that Dr. Peck's DPO provides examples of how the "NRC's proposed method of evaluating the Shoreline fault and other new seismic information is insufficient to insure plant safety." Specifically, the petitioner states, "Dr. Peck explains that the LTSP is inadequate as an evaluation method to insure that Diablo Canyon can safely shut down."

As discussed in Concern 1, the disposition of Dr. Peck's DPO is available to the public in Case File DPO-2013-002. This Case File includes Dr. Peck's June 2014 appeal of the DPO Panel Report and a June 2014 Appeal Decision from NRC's EDO. Dr. Peck's primary concerns were the definition of the licensing basis for DCPP, the need for a license amendment, and the requirement for enforcement action due to inappropriate actions taken by the licensee. In his appeal, Dr. Peck stated that he agreed with the DPO Panel's conclusion with respect to the safety significance of the concerns he raised, stating, in part, "that issues raised in the DPO did not result in a significant or immediate safety concern." Further, Dr. Peck agreed that "the

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64 Page 61 of the Petition.  
65 Id.  
66 Page 62 of the Petition.  
67 ADAMS Accession No. ML14252A743.  
68 PDF page 162 of the DPO Case File.  
69 PDF page 87 of the DPO Case File.
potential ground motions from the nearby faults [Shoreline fault zone] would not exceed the levels of ground motion considered during licensing of the plant. In the Appeal Decision, the EDO agreed that the issues raised in the DPO did not result in a significant or immediate safety concern. The EDO noted that Dr. Peck raised concerns with NRC's licensing process, but was unable to agree with Dr. Peck's conclusions. The DCPP seismic licensing basis topic is discussed in more detail in Concern 5 of this document.

Because the issues raised by the petitioner under this concern have been considered and resolved by the NRC staff through the DPO process, as set forth above, the NRC staff does not have a basis for expanding its current level of regulatory oversight in accordance with the NRC's Reactor Oversight Process and the Enforcement Policy, or otherwise taking the petitioner's requested enforcement actions against the licensee.

**Concern 5: The HE and the associated LTSP are not part of DCPP's licensing basis and were intended to be a one-time exception to the current licensing basis.**

The petitioner states that "[i]n approving the LTSP and its Hosgri Evaluation in the 1990s as a method to evaluate the Hosgri Fault, the NRC declined to make the LTSP part of Diablo Canyon's licensing basis, or to designate the Hosgri Evaluation as Diablo Canyon's bounding seismic analysis." The seismic design basis for DCPP is the DE, DDE, and HE. Throughout the UFSAR, both the DDE and Hosgri earthquake are used to design and qualify SSCs that are important to safety. This basis has been well established from the time of the issuance of the operating

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70 Id.
71 PDF Page 163 of the DPO Case File.
72 PDF Page 64 of the Petition.
73 Page 69 of the Petition; see also page 5 of FOE's Reply to NRC Staff's and PG&E's Answers and Proposed Amicus Curiae Nuclear Energy Institute's Brief in Response to Petition.
license, through the LTSP evaluation, and is still the seismic design basis today as discussed in the DPO Panel Report, Section 4.1.2, "Unique Diablo Canyon Seismic Design Basis."

As stated under Concern 2 of this document, the NRC staff's requirements for the seismic design and licensing bases for currently operating power reactors are described in 10 CFR Part 50, Appendix A, GDC 2 and 10 CFR Part 100, Appendix A. In particular, 10 CFR Part 100, Appendix A, defines the licensing bases concepts of the Operating Basis Earthquake (OBE) and SSE. However, when the construction permits for DCPP were issued in 1968 and 1970, the design bases described in 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," and 10 CFR Part 100, Appendix A, were not fully implemented in their current form. As such, the Atomic Energy Commission (AEC, the NRC's regulatory predecessor) issued the DCPP construction permit with earthquake design bases of a peak horizontal ground acceleration of 0.2 g for operational-related structures (called the DE) and 0.4 g for safety-related structures (called the DDE). These seismic design criteria were based on consideration of two design-basis earthquakes: (1) a magnitude 7.25 earthquake on the Nacimiento fault 20 miles from the site, and (2) a magnitude 6.75 aftershock at the site associated with a large earthquake on the San Andreas fault. It was also concluded that there was no surface displacement hazard in the site vicinity. This conclusion was based on the absence of any displacement of the 80,000 year-old and 105,000 year-old marine terraces underlying the site area. Effectively, the DE and DDE are the DCPP functional equivalents to the OBE and SSE, respectively, as described in the current 10 CFR Part 100, Appendix A. PG&E was required to show that all equipment necessary for continued operation without undue risk to the health and safety of the public would withstand the DE/OBE (i.e., remain functional), and that all safety-related equipment needed to safely shut the plant down and maintain a safe shutdown condition would withstand the DDE/SSE.
Subsequently, during the construction phase in 1971, PG&E became aware of the Hosgri fault offshore from DCPP (based on data gathered offshore by a petroleum company), and began an evaluation of the potential hazard posed by the fault. The fault was studied in detail as part of a collaborative research program between PG&E and the USGS. The AEC, and then the NRC, worked with the USGS office to ensure that the seismic hazard was properly characterized. This effort determined that the Hosgri fault could produce up to 0.75 g ground acceleration at the DCPP site (called the HE). However, the frequency of such a large earthquake was far smaller than what is considered under the SSE requirements (i.e., unlikely to occur during the life of the plant), thus, it was categorized as an extreme event that was beyond the intent of the SSE requirements. During this study, in 1973, the AEC issued Regulatory Guide (RG) 1.61, "Damping Values for Seismic Design of Nuclear Power Plants," dated October 1973. RG 1.61 allowed more damping to be used in seismic evaluations than had previously been used in the evaluations of the DE and DDE. The licensee used the RG 1.61 values in the HE, but was not required to revise the dampening values it used for the DE or DDE with the differing dampening values. However, the NRC did not grant authorization to operate the plant until the additional external hazard presented by the Hosgri fault was adequately addressed. PG&E addressed the issue by demonstrating that the plant equipment needed to safely shut down the plant and maintain a safe shutdown condition could also withstand 0.75 g HE ground acceleration. This effort required reevaluation, testing, and plant modifications beyond the approved DDE seismic design bases, and provided additional margin.  

74 ADAMS Accession No. ML003740213.  
75 The NRC staff reviewed and accepted PG&E’s revised seismic analysis in the Supplement to Safety Evaluation Report 7 (SSER 7) in 1978. This is found at ADAMS Accession No. ML14279A129.
This aspect of the design and licensing basis is unique to DCPP, in that the station has three design-basis earthquakes (as opposed to only two) associated with its design, licensing and construction—DE/ OBE, DDE/SSE, and HE—as described in the operating license for Unit 1 when it was issued in 1984. As stated in NUREG-0675, “Safety Evaluation Report related to the operation of Diablo Canyon Nuclear Power Plant, Units 1 and 2,” Supplement No. 34 (SSER 34), Section 1.4, “Summary of Staff Conclusions,” dated June 1991,76 the [NRC] staff notes that the seismic qualification basis for Diablo Canyon will continue to be the original design basis [DE/OBE and DDE/SSE] plus the Hosgri evaluation basis, along with the associated analytical methods, initial conditions, etc.”

By letter dated July 14, 1978,77 the Advisory Committee on Reactor Safeguards (ACRS) completed its review of the application of PG&E for authorization to operate DCPP and recommended “that the seismic design of Diablo Canyon be reevaluated in about 10 years taking into account applicable new information.” As a result of the ACRS’s recommendation, the significant advances in geology, seismology, and geophysics that occurred after the beginning of the site review, and the substantial amount of offshore exploration of hydrocarbons, the NRC imposed License Condition 2.C.(7) of Facility Operating License DPR-80, which required PG&E to “update the geological, seismological, and ground-motion information, reevaluate the magnitude of the earthquake used to determine the Diablo Canyon seismic design basis, reevaluate ground motion expected at the site, reassess engineering and equipment response, and perform a seismic probabilistic risk assessment (PRA) and deterministic studies, as necessary,” as discussed in SSER 34, Section 1.1, “Background.” By

76 ADAMS Accession No. ML14279A130.
letter dated January 30, 1985, PG&E responded to the license condition by submitting a
program plan for the extensive seismic design-basis reevaluation, called the LTSP, and NRC
approved the plan by letter dated July 31, 1985.78 By letters dated April 17, 1991, and May 29,
1991, PG&E committed to continue to study seismic issues and perform periodic seismic
reviews of DCPP.79 Specifically, in the letter dated April 17, 1991, PG&E outlined the framework
for using LTSP in the future operation of DCPP, including maintaining a comprehensive data
base of seismic information and providing a focus for addressing future seismic issues related to
DCPP. This commitment to ongoing research and review led to the development of the PG&E-
USGS Cooperative Research and Development Agreement Program, which identified the
Shoreline fault. SSER 34 concluded that PG&E essentially satisfied all of the four elements of
the license condition that led to the LTSP, subject to resolution of one confirmatory item, which
was resolved in a letter dated April 17, 1991.

As discussed previously, the Case File for DPO-2013-002 associated with Dr. Peck's
DPO includes an appeal to the EDO as well as the EDO's decision on Dr. Peck's appeal, which
provide additional background on the NRC's review and approval of the unique seismic design
and licensing bases for DCPP. In particular, the EDO decision notes: "The operating license
for Unit 1, issued in 1984, was based on review of the Final Safety Analysis Report Update
which included two different seismic methodologies, the DDE and the Hosgri evaluation, as
documented in NUREG-0675, 'Safety Evaluation Report Related to the Operation of Diablo
Canyon Power Plant, Units 1 and 2,' Supplement No. 7, dated May 1978. Given expected
advances in the science of seismic evaluation, the license was also conditioned to require a
confirmatory seismic study over the first 10 years of operation, referred to as the Long Term
Seismic Plan (LTSP). The NRC's review and acceptance of PG&E's report on the LTSP are

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78 ADAMS Legacy Library Accession Nos. 8502130385 and 8506200683, respectively.
79 ADAMS Legacy Library Accession Nos. 9104300250 and 9105070210, respectively.

In summary, the seismic design basis for DCPP included only the DE/OBE and DDE/SSE when the AEC issued the construction permit to PG&E in 1968. However, prior to issuing the operating license in 1984, the AEC/NRC required the licensee to thoroughly evaluate, test, and complete modifications to the DCPP units to demonstrate they could also withstand ground acceleration associated with the Hosgri fault. Subsequently, the NRC staff's evaluations of PG&E's revised seismic analysis documented in SSER 7 and SSER 34 established three design-basis earthquakes (as opposed to only two) associated with DCPP's design, licensing and construction – the DE/OBE, DDE/SSE, and HE. Further, in accordance with its initial license condition (i.e., LTSP), and consistent with its regulatory commitment to the NRC, PG&E has continued to maintain a comprehensive database of seismic information and to conduct ongoing research to address current and future seismic issues related to DCPP. As set forth above, the NRC staff has considered and resolved the issues raised by the petitioner under this concern. Therefore, the NRC staff does not have a basis for expanding its current level of regulatory oversight in accordance with the NRS's Reactor Oversight Process and the Enforcement Policy, or otherwise taking the petitioner's requested enforcement actions against the licensee.

\(^{80}\) PDF pages 159-160 of the DPO Case File.
III. Conclusion

The NRC does not have a basis for taking the petitioner's requested enforcement actions against the licensee. The NRC evaluated FOE's concerns, which the Commission referred to the EDO in CLI-15-14. The Commission determined in CLI-15-14 that there was no basis for immediate suspension of plant operations. During the NRC staff's review of the issues referred to the EDO, it did not find that the continued operation of DCP would adversely affect public health and safety. Therefore, the NRC denies the petitioner's requested enforcement actions against the licensee.

As provided in 10 CFR 2.206(c), the NRC staff will file a copy of this director's decision with the Secretary of the Commission for the Commission to review. As provided for by this regulation, the decision will constitute the final action of the Commission 25 days after the date of the decision unless the Commission, on its own motion, institutes a review of the decision within that time.

Dated at Rockville, Maryland, this 21st day of April, 2017.

For the Nuclear Regulatory Commission.

[Signature]

William M. Dean, Director, Office of Nuclear Reactor Regulation.
NUCLEAR REGULATORY COMMISSION
[Docket Nos. 50-275 and 50-323; NRC-2016-0080]
Pacific Gas and Electric Company

AGENCY: Nuclear Regulatory Commission.

ACTION: Director's decision under 10 CFR 2.206; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC or the Commission) has issued a director's decision with regard to a Petition to Intervene and Request for Hearing concerning Diablo Canyon Power Plant (DCPP) dated August 26, 2014, filed by Friends of the Earth (FOE or petitioner), asserting, in part, its concerns about DCPP's operational safety and ability to safely shut down in the event of a nearby earthquake. The petitioner's requests and the director's decision are included in the SUPPLEMENTARY INFORMATION section of this document.

ADDRESSES: Please refer to Docket ID NRC-2016-0080 when contacting the NRC about the availability of information regarding this document. You may obtain publicly-available information related to this document using any of the following methods:

- Federal Rulemaking Web Site: Go to http://www.regulations.gov and search for Docket ID NRC-2016-0080. Address questions about NRC dockets to Carol Gallagher:
telephone: 301-415-3463; e-mail: Carol.Gallagher@nrc.gov. For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **NRC’s Agencywide Documents Access and Management System (ADAMS):**
You may obtain publicly-available documents online in the ADAMS Public Documents collection at [http://www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html). To begin the search, select “ADAMS Public Documents” and then select “Begin Web-based ADAMS Search.” For problems with ADAMS, please contact the NRC’s Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. For the convenience of the reader, the ADAMS accession numbers are provided in a table in the “Availability of Documents” section of this document.

- **NRC’s PDR:** You may examine and purchase copies of public documents at the NRC’s PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

**FOR FURTHER INFORMATION CONTACT:** Margaret Watford, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001; telephone: 301-415-1233, e-mail: Margaret.Watford@nrc.gov.

**SUPPLEMENTARY INFORMATION:**

Notice is hereby given that the Director, Office of Nuclear Reactor Regulation, has issued a director’s decision on a Petition to Intervene and Request for Hearing, filed by the FOE on August 26, 2014, which the Commission referred to the NRC’s EDO for consideration under the regulations of section 2.206 of title 10 of the Code of Federal Regulations (10 CFR) in Commission Memorandum and Order (CLI-15-14) dated May 21, 2015. The EDO then referred
these concerns to the NRC’s Office of Nuclear Reactor Regulation for consideration under 10 CFR 2.206. The petition was supplemented by letters dated September 30, 2015, and February 8, 2016.

The petitioner requested that the NRC take enforcement actions to ensure that DCPP can operate safely and demonstrate its ability to safely shut down in the event of an earthquake caused by nearby faults. As the basis of the request, the petitioner states that the “NRC staff’s determination that the new seismic information, including the Shoreline earthquake and its effect on the San Luis Bay and Los Osos faults, is a lesser-included case within the Hosgri earthquake is insufficient to insure that Diablo Canyon is operating safely with an adequate margin of safety.”

On two occasions, the NRC offered FOE opportunities to address the Petition Review Board (PRB), which was established to review FOE’s enforcement concerns. In response, on September 30, 2015, and February 8, 2016, FOE provided written submissions to the PRB in lieu of addressing the PRB in person or by telephone. The NRC staff considered these submittals during its evaluation.

The NRC sent a copy of the proposed director’s decision to the petitioner and the Pacific Gas and Electric Company (the licensee) for comment on February 28, 2017. The petitioner and the licensee were asked to provide comments by March 16, 2017, on any part of the proposed director’s decision that was considered to be erroneous or any issues in the petition that were not addressed. The NRC staff did not receive any comments on the proposed director’s decision.

The Director of the Office of Nuclear Reactor Regulation has determined that the request to take enforcement actions to ensure that DCPP can operate safely and demonstrate its ability to safely shut down in the event of an earthquake caused by nearby faults be denied. The
reasons for this decision are explained in the director’s decision DD-17-02 pursuant to section 2.206 of 10 CFR of the Commission’s regulations.

The NRC will file a copy of the director’s decision with the Secretary of the Commission for the Commission’s review in accordance with 10 CFR 2.206. As provided by this regulation, the director’s decision will constitute the final action of the Commission 25 days after the date of the decision unless the Commission, on its own motion, institutes a review of the director’s decision in that time.

I. AVAILABILITY OF DOCUMENTS:

The documents identified in the following table are available for public inspection through the NRC’s Agencywide Documents Access and Management System (ADAMS).

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<td>Petition to Intervene and Request for Hearing By Friends Of The Earth</td>
<td>8/26/2014</td>
<td>ML14254A231</td>
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<td>Commission Memorandum and Order CLI-15-14</td>
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<td>ML15141A084</td>
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<td>Friends of the Earth, E-mail, Supplemental Information Regarding Request Pursuant to 10 CFR 2.206 for Suspension of Operations and Enforcement of Nuclear Regulatory Commission Regulations to Ensure Seismic Safety of Diablo Canyon Power Plant</td>
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SRM-M150521A-2, Petitioner Letter Re: Friends of the Earth 2.206 Petition Based on Commission Memorandum and Order CLI-15-14 (CAC Nos. MF6443 and MF6444)


Dated at Rockville, Maryland, this 21st day of April 2017.

For the Nuclear Regulatory Commission.

[Signature]

William M. Dean, Director
Office of Nuclear Reactor Regulation

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RidsOpaMail Resource

ADAMS Accession Nos.: Package ML17108A630;
LTR: ML17095A932;
2.206 Final DD: ML17090A182;
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OFFICIAL RECORD COPY
DCISC Public Meeting on Thursday, May 14, 2015 10:00 A.M. (PDT) for consideration of approval of an Agreement with Structural Integrity Associates, Inc. for Dr. Robert T. Sewell’s services to review and provide a report setting forth his technical opinion, assessment, and evaluation concerning the hazard at the Diablo Canyon Power Plant site and environs from tsunamis.

Present:

Robert J. Budnitz, Committee Member
Per F. Peterson, Committee Chair
Robert Rathie, Legal Counsel

Public Meeting Location: The Hotel Durant Board Room Conference Facility 2600 Durant Avenue, Berkeley, CA
A Hazard and Risk Analysis Perspective on:

Tsunami Safety Evaluation for the Diablo Canyon Power Plant

Public Meeting of the Diablo Canyon Independent Safety Committee (DCISC)
June 21, 2016
Avila Beach, CA
Presentation Contents

- Some Background
- Perspective on Recent PG&E Studies
- Some Relevant Fallacies
- Updated Recommendation and Discussion

Appendix: Additional (Back Up) Slides
Background
USGS Open-File Report; Bartlett Data

"In this seismically active area earthquake induced ground motion remains the likely candidate to supply the initial energy necessary for failure."

Revealed past slides, including a geologically “recent”* “large” slide (125 km²), believed to be progressive, in offshore Santa Maria Basin

- “The slope of the failure zone or surface is about 1.2°. Slumps and slides occur on similar gentle slopes in Eel River Basin, ...”
- “The cause of the slide in the offshore Santa Maria Basin is not known. No samples of the slide material have been collected, thus the mechanical properties of the sediment are not known.”

- Creates a favorable structure for slide activation by seismic and/or gas hydrate initiator

*Note: “… sliding was sufficiently recent that sedimentation and/or erosion has not had time to mask the slide topography” … which can be interpreted as likely order [~O()] of 100’s to perhaps even some few 1000’s years recent; or possibly, progressively active through that time, at low dynamics, up to and including current time.
Charleston Earthquake Issue

- A new state of the art in hazard and uncertainty assessment for critical facilities began to emerge from EPRI and LLNL PSHA studies:
  - Multiple experts evaluating credible competing hypotheses held by the expert community
  - Large events must be considered with suitable likelihood/weights where they cannot be systematically and conclusively ruled out by the expert community
    - Now, assessments/hypothesis of maximum magnitude (M Max) values for the central and eastern US (CEUS) range from about M 5.4 to M 8.2, depending on the specific region under consideration
  - Focus is on assessing not just central estimates of hazard, but the full uncertainty distribution of the hazard – the center, body and range (CBR)
  - Results of hazard analysis are compatible with probabilistic risk assessment (PRA)

- **Implications to Tsunami Hazard Assessment:**
  - Multi-expert, multi-disciplinary effort that must represent the expert community
  - Large source events considered where they can’t be conclusively ruled out by the ITC
  - Aim must be to develop the entire uncertainty distribution (i.e., CBR of hazard)
  - Critical Value of SSHAC Methodology
Charleston Earthquake Issue

- Trend over time has gone to increased recognition among the ITC of larger $M_{\text{max}}$ values (often, also larger hazard).

- Prior $M_{\text{max}}$ distributions, which are based on global $M_{\text{max}}$ data, are generally evaluated and given some weight.

- Analogous to appropriate treatment of maximum parameters (e.g., maximum SMF volumes) in PTHA.

Source: USGS, 1996

Source: CEUS Model, 2015; EPRI 3002005684
Charleston Earthquake Issue

- Example Site-Specific PSHA Result from EPRI Study (1989)
  - Hazard curves are “tails” of a complementary cumulative probability distribution
  - Tsunami hazard results can be similarly conveyed

Hazard measured as annual exceedance probability

Hazard curves extend to $10^{-7}$/yr

“The Papua New Guinea (PNG) tsunami of July 1998 was a seminal event because it demonstrated that relatively small and relatively deepwater Submarine Mass Failures (SMFs) can cause devastating local tsunamis that strike without warning.”

– Tappin, Watts and Grilli, 2008

- SMF was a slump having width of $\sim 4.2$ km, a length of $\sim 4.5$ km, and a thickness of $\sim 750$ m. The slump volume is estimated to be around $6.4$ km$^3$.
- Observation suggests at least $15$ m ($\sim 50$ ft) peak run-up.
- Model estimates of potential peak run-up are at nearly $22$ m ($\sim 72$ ft).
1998 Papua New Guinea Earthquake and Landslide Tsunami

- In relation to size descriptions of submarine landslides / SMFs, note that Tappin, Watts and Grilli (2008) describe the 6.4 km$^3$ PNG SMF as “relatively small”.
  - The recent Goleta SMF (with significant slide and tsunami generation occurring as recently as 1812) in the Santa Barbara Channels was much less, at 1.51 km$^3$.

- Some past single-event SMFs are known to be as large as many 1000’s of km$^3$, and past event complexes have size up to about 20,000 km$^3$ [Agulhas Slide, SE Africa]
1998 Papua New Guinea Earthquake and Landslide Tsunami

- The PNG tsunami was also pivotal within the Tsunami ITC because it was controversial and eventually drew much greater attention to SMFs / submarine landslides as an important tsunami generating mechanism, and the possibility to numerically model such scenarios.

- The validity of this type of scenario was clarified, as well as the need to study the potential and effects of SMF scenarios in tsunami hazard assessment, up to the maximum scenarios supported by geological conditions.

- In relation to SMF scenario development in Sewell (2003): the following comparison (albeit simplified) – of peak-wave run-ups from 1998 PNG and reported peak wave amplitudes [Table 2; Sewell (2003)] at the DCPP site – is made:

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Volume (km³)</th>
<th>Peak Wave Amplitude (m)</th>
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<tr>
<td>1998 PNG</td>
<td>6.4</td>
<td>15 to 22</td>
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<tr>
<td>Scenario 1</td>
<td>7.6</td>
<td>21.5 to 25.4</td>
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<td>Scenario 2</td>
<td>3.2</td>
<td>9.4 to 11.3</td>
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<tr>
<td>Scenario 10</td>
<td>1.9</td>
<td>10.0 to 11.6</td>
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<tr>
<td>Scenario 12</td>
<td>15.6</td>
<td>36.7 to 45.2</td>
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Although this is an “after the fact” comparison, Sewell performed various “sanity checks” (during the 2003 study) that parameters and results were within the range of physical observation or inference from the literature. Note that significant error bounds always apply to (and should be understood to exist for) estimated parametric relationships (such as the plot above), even if not yet quantified or illustrated.
Sewell (2002-2003) Work with Southwest Research Institute (SwRI) on DCPP ISFSI SER for Tsunamis

  - Conducted while Sewell was an independent nuclear safety consultant working with SwRI; not with Structural Integrity at the time.
Sewell (2003):
What the Report Was and What it Wasn’t

- It was, and continues to be:
  - A preliminary draft conveying valid and sufficient basis for discussion and motivation toward suitably improving the tsunami design basis assessment for the DCPP site (including, but not limited to, the treatment of submarine landslides), involving a suitable representation of the ITC
  - A credible work / contribution (in terms of hypothesized potential scenarios and effects – some of which are expected to be ruled in, and similarly, others that may be ruled out by the relevant ITC) that substantiates and conveys valid and useful recommendations
  - An intended helpful basis for better understanding DCPP tsunami hazard and risk
Sewell (2003): What the Report Was and What it Wasn’t

- It was not, and continues to not be:
  - Itself, the full and robust, state-of-the-art study of tsunami hazard by the ITC – which it was rather intended to motivate
  - A sufficient or complete basis for characterizing DCPP tsunami hazard or for yet drawing conclusions about tsunami risk / safety of DCPP
Frequency of small, medium, large events and why Sewell (2003) evaluated comparatively rare events

- M5 earthquakes occur more frequently than M6 earthquakes, and in turn, M6 earthquakes more frequently than M7 events, etc.; yet, M5, M6, M7, etc., events (as can be justified in seismic source models) are all significant events for seismic hazard evaluation.
  - A hazard study does not focus just on relatively small (e.g., M5) events.

- Similarly, for tsunamis, Sewell (2003) did not focus on just small, medium or large SMFs, but a (fairly uniform) range of significant events, from small, moderate, large up to SMF volumes that Sewell judged to be close to a regional physical maximum, SMF Vol_{max}.

- Note: Sewell (2003) did not make (nor claim to make) a definitive assessment of SMF volume occurrence frequencies, as doing so requires the more extensive evaluation, resources and ITC involvement that Sewell was in fact recommending.
Expected reaction and use of the Sewell (2003) preliminary draft versus what actually happened

- Sewell expected that NRC would have questions on the study, and would hold a meeting with Sewell to discuss in detail the approach, implications and recommendations of the study, as well as a resolution plan.
  - Sewell expected the resolution plan to include finalizing the report; holding further discussions; and presenting the findings to PG&E.
  - Sewell also expected a broader involvement / interface with NRC to discuss and pursue follow-up on the other study recommendations
- Formalization of tsunami hazard analysis methodology and implementation of multi-expert hazard studies (according to a SSHAC or modified-SSHAC approach).
Expected reaction and use of the Sewell (2003) preliminary draft versus what actually happened

- In contrast to expectations, there was no follow-up even on Sewell’s first recommendation to have a meeting to discuss the report together, and Sewell had no direct feedback or visibility as to NRC’s use or disposition of the report.
Key points from Sewell (2003) preliminary draft report

- In considering the Sewell (2003) report in 2016, Sewell believes the report and study remain clear and suitable for the intended objectives of presenting a credible basis for following up on the principal study recommendations and key points – and that the validity of the recommendations (i.e., need to address them) and the supporting key points in the text largely persist.
What Sewell would (perhaps) do differently today

• Programmatic:
  – Seek to facilitate a strengthened program, if possible: More clearly (and earlier) communicate the importance and implications of the work, and indicate it to be only an *initial phase* of what should be followed-up with a larger multi-phase, state-of-the-art effort; also, seek to strengthen stakeholder engagement, suitable funding, and facilitation of broader collaboration, where possible.
  
• Requires stakeholder cooperation
What Sewell would (perhaps) do differently today

• Technical (for what was intended as an *initial phase*):
  – Update to use of more advanced (now-available) and diverse numerical modeling codes (for generation, propagation and run-up); if possible, apply additional code(s); quantify estimates of aleatory error in models, as possible.
  – Fine-tune scenarios, as may be possible / credible, based on new information and additional discussions with marine geologists.
  – Assess and apply a broader range of headwall scarp configurations, and evaluate related sensitivities.

• The headscarps developed for the Sewell (2003) SMF scenarios were within a credible range, but owing to the limited number of scenarios that could be analyzed, they emphasized configurations comparable to significant observed headscarps.
Recent PG&E Studies
Sewell’s Assessment of PTHA study; PG&E 2015 study / FHR work

- Analyses of Goleta and Big Sur proxies by PG&E 2015 serve as interesting and useful points of reference that further illustrate the potential for application of numerical modeling to tsunami hazard assessment for DCPP
  - Performed by a highly qualified tsunami modeler
  - Employed a well-acknowledged wave modeling code
  - Further demonstrated the insights of tsunami model animations, particularly in near-site evaluations
While illustrative and useful, the analyses do not well reflect state-of-the-art for tsunami hazard study for safety analysis

- Not convincing or justified as a conservative basis (e.g., “deterministic maximum credible event” [D-MCE*]) for landslide tsunami scenarios for DCPP
  - The size of the Goleta proxy slide (which controls over the Big Sur proxy) is rather minuscule in comparison to a largest physically realizable SMF
  - The headscarp geometries and other parameters for the proxies do not appear to be conservatively chosen (e.g., at a level defining a D-MCE)
- Likelihoods (and their uncertainties) for the proxy scenarios are not estimated
Sewell’s Assessment of PTHA study; PG&E 2015 study / FHR work

- The scenarios lack confirmation by the ITC
- The extent to which the scenarios are physically realizable and consistent with assessed / hypothesized SMF sources is not adequately elucidated
  - Goleta proxy SMF is highly artificial, idealized.
  - Location of the Goleta proxy is not well correlated with occurrence of past sliding

Sewell’s Assessment of PTHA study; PG&E 2015 study / FHR work

• Whereas nuclear plant design bases should be established based on very remote annual probabilities, the maximum wave heights developed by PG&E 2015 for the Goleta Proxy (i.e., controlling event) scenario analyses are apparently only at levels comparable to those shown in local inundation maps (which conventionally, and in accordance with policy, are keyed [whether explicitly or implicitly] to higher probability events)
• There is an apparent need to involve the experts within the ITC who perform analyses for the local tsunami inundation maps, and potentially others (those producing tsunami hazard results for State and local programs/policy, etc.), in order to help ascertain whether the scenarios modeled by PG&E 2015 are applicable to the very low annual probabilities associated with nuclear plant design and risk, or may be more applicable to higher annual probability events.
Sewell’s Assessment of PTHA study; PG&E 2015 study / FHR work; etc.

- PG&E’s PTHA (PEER Study of 2010) is a valuable work, but:
  - Considers only a limited hypothesis (relative to the broader credible array) of SMF source zones that is restrictive (relative to existing slide features and what is physically realizable) as to possible SMF sizes and potencies
  - Does not address the ITC and associated uncertainties needed for obtaining the CBR of the hazard.
Some Relevant Fallacies
Some Fallacies

- **Fallacy 1:** Sewell believes, or believed, that DCPP is unsafe for tsunamis
  
  - Sewell’s concerns have always been about having a proper safety evaluation and a robust basis for suitable action and decisions for safety management, including the appropriate studies based on state-of-the-art methodology and confirmation by the ITC.
  
  - Sewell’s 2003 study came at a time when: (a) a new state of the art and new recognitions about the general threat of tsunamis and SMFs had emerged; and (b) Sewell had been working intently with the tsunami science community and clients to help improve the state of the art in hazard assessment and implement the improvements in practice.
Some Fallacies

- **Fallacy 2:** Establishing consistency with the Tsunami ITC can be side-stepped
  - Not properly considering the ITC and not assessing epistemic variations has generally led to, and will continue to lead to, unstable safety decisions

- **Fallacy 3:** Coordinating with tsunami inundation mapping programs and other programs is unimportant
  - Hierarchical consistency in safety policy applies
  - Critical facility design basis similar to conventional protection raises questions about consistency in evaluation and/or policy
Some Fallacies

- **Fallacy 4**: $10^{-4}$/yr is too remote of a concern, and there is no need to consider such annual probability levels, or lower
  - Over 500 nuclear power reactor units globally; each must be held to tight safety standards

- **Fallacy 5**: Significant SMFs are not possible on shallow slopes
  - SMFs have occurred on slopes as slight as 1%

- **Fallacy 6**: Major events are not possible for our facilities or at our location of interest
  - Recall lessons from Columbia Shuttle; Fukushima; Katrina; Sandy; etc.; (situations where problems were foreseen before the event)
Some Fallacies

• **Fallacy 7**: Strike slip faulting is ineffective as a SMF tsunami generator
  
  – Some of the largest historically observed SMFs and landslide tsunamis are verified as being triggered by earthquakes (of faulting style that is not subduction), and the largest paleo slides are believed to be triggered by earthquakes that were not subduction events.

  – Recent publications on the Haiti earthquake and tsunami not only state the relation of strike-slip faulting and tsunami generation for that event, but discuss the implications for strike-slip-triggered SMFs offshore California.
Some Fallacies

- **Fallacy 8:** It is clearly known that there is a sharp transition in SMF-generated tsunami hazard at Mendocino Triple Junction (MTJ), with the landslide tsunami threat diminishing markedly for latitudes below MTJ.

- **Fallacy 9:** We know that offshore Central California is more stable compared to other coastlines that have experienced large SMFs and/or we know that only comparatively small SMFs can occur offshore Central California within annual probability levels of interest.
Some Fallacies

• **Fallacy 10:** Implications of Bartlett and other data are clear at this time and constrain the landslide tsunami hazard to a low level.

• **Fallacy 11:** When formulating and evaluating hypotheses as to SMF source potential, paleo-data and sedimentation rates provide a more valid and sufficient basis for assessment of the hazard from future tsunamis, versus understanding the underlying geotechnical properties (i.e., engineering mechanics properties of soil and rock) and considering slope stability analyses.
Some Fallacies

**Fallacy 12:** Regardless of the hazard, the risk at DCPP from tsunamis less than 85 ft is now known to be clearly negligible

- 85 ft level of DCPP power block does provide good siting-based protection
- However, induced failures, random failures on demand (in relation to safety relevant SSCs), access/response problems and operator errors are yet possible for tsunamis lower than the power block
- CCDPs for various cases are non-zero, can be determined, and should be included (for all tsunami levels) as part of a complete tsunami risk (PRA) study
- For a nominal 85-ft tsunami wave, occurrence of significant wave and debris splash-up and spray (i.e., real physical phenomena not included in nominal amplitude assessments) can be expected to occur. Although the splash-up does not carry the same impact and flooding potential of the full-momentum in the nominal wave level, local adverse impact effects and flooding are still possible
Some Fallacies

- **Fallacy 13:** We have clear understanding as to the possible bounds (upper limits) of tsunamis and the range of tsunami characteristics that need to be considered
  - Upper bounds are established based on physical maximums (e.g., now well-established studies examine maximum ground motion from earthquakes, as well as maximum magnitudes), which are often poorly understood
  - For a hazard study to be complete (particularly for critical facilities), and most useful for PRA, it must assess hazard and its uncertainty to about 10\(^{-7}\)/yr mean annual probability levels, explicitly and quantitatively explaining physical possibilities and likelihoods even to very extreme levels
Recommendations and Discussion
Main Theme

• Implement tsunami hazard, risk assessment methods established as suitably robust for use in decision making (>SSHAC Level 2, for critical facilities)
  ➢ Consult the multiple relevant disciplines
  ➢ Identify and involve members of the Tsunami ITC, and suitably train them to overcome inexperience in:
    ▪ Quantifying hazard to extremely low annual probabilities (10\(^{-6}\)/yr mean; 10\(^{-7}\)/yr median) relevant to decision making for critical facilities
    ▪ Explicitly quantifying aleatory variations (random error) in their models
    ▪ Explicitly quantifying epistemic variations (knowledge variations in the face of imperfect data) and associated uncertainties
    ▪ Moderating proponent biases through well-structured elicitation and evaluation of all credible, competing hypotheses
  ➢ Related Notes:
    ▪ Technical debate has limited utility outside the preceding context
    ▪ This theme was initiated and reinforced in Sewell (2003)
Appendix: Back-Up Slides
(Original Slide Report)
Contents

• Introduction
• Perspective On:
  – Pre-2003 Background
  – 2003 Event and Insights
  – 2004 Event
  – Post-2004 Developments
  – 2011 Events
  – State of the Art
  – Fallacies and Evaluation Gaps
• 2016 Insights and Updated Conclusions
Introduction: Theme and Coverage

• High-Level Theme:
  T Implement tsunami hazard, risk assessment methods established as suitably robust for use in decision making for critical facilities
    ➢ Consult the multiple relevant disciplines
    ➢ Identify and involve members of the tsunami Informed Technical Community (ITC), and suitably train them to overcome inexperience in:
      ▪ Quantifying hazard to the extremely low annual probabilities (10^{-6}/yr mean; 10^{-7}/yr median) relevant to decision making for critical facilities
      ▪ Explicitly quantifying aleatory variations (random error) in their models
      ▪ Explicitly quantifying epistemic variations (knowledge variations in the face of imperfect data) and associated uncertainties
      ▪ Moderating proponent biases through well-structured elicitation and evaluation of all credible, competing hypotheses
    ❖ Technical debate has limited utility outside the preceding context
    ❖ This theme was initiated and reinforced in Sewell (2003)
Introduction: Theme and Coverage

- Coverage:
  - Timeline of Some Key Developments
    - Background Influencing the Sewell (2003) study
  - Updated View on Sewell (2003)
  - Opinion on Progress / Advancements Since 2003
    - Specific high-level comments on PG&E’s 2015 submittal
  - State of the Art, Fallacies and Evaluation Gaps
  - Suggested Future Steps
Pre-2003 Background
Topics

- USGS Open-File Report on USNS Bartlett Cruise Data
- Charleston Earthquake Issue and USGS Letter to NRC
- Developments Toward Robust Seismic Hazard and Risk Assessment
- 1998 Papua New Guinea Earthquake and Landslide Tsunami
- Exposition of Probabilistic Tsunami Hazard Assessment (PTHA), Tsunami Probabilistic Risk Assessment (PRA) and Related Uncertainty Assessment to the Tsunami Science Community
- Critical Value of PRA: Some Illustrations
USGS Open-File 80-1095 Report Including Bartlett Data

“The 1972 USNS Bartlett cruise (Greene and others, 1975) was part of a reconnaissance exploration of the central and southern California continental shelf using a deep penetration 160 Kilojoules (kJ) sparker system and satellite controlled navigation.”

• Complete set of Bartlett cruise data was not reported by USGS (1980); most data are not generally available.

• Unique and valuable data set that yet remains in 2016 to be fully considered by the Tsunami ITC.
Revealed past slides, including a geologically “recent”* “large” slide (125 km²), believed to be progressive, in offshore Santa Maria Basin

- “The slope of the failure zone or surface is about 1.2°. Slumps and slides occur on similar gentle slopes in Eel River Basin, ...”
- “The cause of the slide in the offshore Santa Maria Basin is not known. No samples of the slide material have been collected, thus the mechanical properties of the sediment are not known.”

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*Note: “… sliding was sufficiently recent that sedimentation and/or erosion has not had time to mask the slide topography” … which can be interpreted as likely order [\(\sim O(\bullet)\)] of 100’s to perhaps even some few 1000’s years recent; or possibly, progressively active through that time, at low dynamics, up to and including current time.

Perspective on Tsunami Safety Evaluation of DCPP  SLIDE 48
USGS Open-File Report; Bartlett Data

• Little Discussion on Relationship of Submarine Slides to Tsunami Hazard
• Only a Small Portion of Bartlett Data Was Reported; Focus on Offshore Santa Maria Basin
• Implications to the Steeper Continental Slope Not Well Exposited
• Major Message Is that Significant Slides (Even Within Gentle Sloping Shelf Areas) Occur Offshore Central California
• Deeper Disturbances Are Found Along Some Areas of the Slope
USGS (1982) to NRC:

“Because the **geologic and tectonic features of the Charleston region are similar to those in other regions of the eastern seaboard**, we conclude that although there is no recent or historical evidence that other regions have experienced strong earthquakes, the historical **record is not, of itself, sufficient ground for ruling out** the occurrence in these regions of strong seismic ground motions similar to those experienced near Charleston in **1886**. Although the probability of strong ground motions due to an earthquake in any given year at a particular location in the eastern seaboard may be very low, deterministic and **probabilistic evaluations of the seismic hazard should be made for individual sites in the eastern seaboard to establish the seismic engineering parameters for critical facilities.”
Charleston Earthquake Issue

• “Charleston Earthquake Issue”:
  [EPRI NP-6395-D by McGuire et al. (1989); EPRI TR-103126 by Sewell et al. (1993)]
  – Explicit recognition that large earthquakes of 1886 Charleston Earthquake size (~ M 6.5) and larger have some small probability of occurring where favorable geologic conditions may exist
  – Probabilistic seismic hazard methodology (PSHA) is appropriate to quantify the associated ground-motion hazard and its uncertainty

• EPRI and LLNL PSHA studies – involving several experts from multiple disciplines, addressing competing hypotheses and uncertainties – were undertaken in the 1980’s, with both studies reporting results in 1989

• Planning of subsequent seismic margin and probabilistic risk assessment (PRA) studies – for the Independent Plant Evaluation of External Events (IPEEE) program – was based on results of the EPRI and LLNL PSHA studies.
Charleston Earthquake Issue

- A new state of the art in hazard and uncertainty assessment for critical facilities began to emerge from the EPRI and LLNL PSHA studies:
  - Multiple experts proposing and addressing the possible array of credible competing hypotheses held within the expert community
  - Large events must be considered with suitable likelihood/weights where they cannot be systematically and conclusively ruled out by the expert community
  - Now, assessments/hypothesis of maximum magnitude (M Max) values for the central and eastern US (CEUS) range from about M 5.4 to M 8.2, depending on the specific region under consideration
  - Focus is on assessing not just central estimates of hazard, but the full uncertainty distribution of the hazard – the center, body and range (CBR)
  - Results of hazard analysis are compatible with probabilistic risk assessment (PRA)

- Implications to Tsunami Hazard Assessment:
  - Multi-expert, multi-disciplinary effort that must represent the expert community
  - Large source events considered where they can’t be conclusively ruled out by the ITC
  - Aim must be to develop the entire uncertainty distribution (i.e., CBR of hazard)
  - Although tsunami hazard community is about 30 years behind the development of the seismic hazard community, lessons from PSHA can greatly accelerate needed progress in tsunami hazard assessment for critical facilities
Charleston Earthquake Issue

- Trend over time has gone to increased recognition among the ITC of larger Mmax values (often, also larger hazard).
- Prior Mmax distributions, which are based on global Mmax data, are generally evaluated and given some weight.
- Analogous to appropriate treatment of maximum parameters (e.g., maximum SMF volumes) in PTHA.

Source: USGS, 1996

Source: CEUS Model, 2015; EPRI 3002005684
Charleston Earthquake Issue

- Example Site-Specific PSHA Result from EPRI Study (1989)
  - Hazard curves are "tails" of a complementary cumulative probability distribution
  - Tsunami hazard results can be similarly conveyed

Hazard measured as annual exceedance probability

Hazard curves extend to $10^{-7}$/yr

Further Developments Toward Robust Seismic Hazard and Risk Assessment

- SSHAC (Senior Seismic Hazard Analysis Committee) Approach: [NUREG/CR-6372 by Budnitz et al. (1997)]
  - Lessons / insights from EPRI, LLNL, Revised LLNL and other studies
  - Structured elicitation of experts and explicit uncertainty assessment based on CBR of the informed technical community (ITC)
  - Level 1 to 4 analysis framework that incorporates proponent views while aiming to manage/eliminate “proponent bias” and other sources of bias
  - State of the art for hazard analyses involving the earth sciences
  - Has been applied to studies of seismic hazard and volcano hazard
  - Several SSHAC studies (at Level 2 to 4) have been performed to date
    - Sewell has participated on review panels for three Level-4 studies (Yucca Mountain, Swiss PEGASOS, and Swiss PRP)
    - A SSHAC study generally produces hazard results that are fully compatible (as inputs) to probabilistic risk assessment (PRA) studies
Further Developments Toward Robust Seismic Hazard and Risk Assessment

- Advances Continue in the Application of SSHAC PSHA Studies and Seismic PRA Continue (e.g., Recent Studies for CEUS NPPs and DCPP)

- Implications to Tsunami Hazard Assessment
  - “Tsunami ITC” is in a situation largely dominated by reliance on strong proponent views / biases, as was the Seismic ITC during the 1980’s.
  - To produce robust tsunami hazard estimates and their uncertainties, the Tsunami ITC of tsunami hazard assessment is in need of training and actual experience in structured elicitation and the SSHAC approach.
  - Since 1998, Sewell has worked closely with experts among the Tsunami ITC, and has evaluated the situation of inadequate uncertainty (epistemic) analysis, predominantly proponent viewpoints, and inadequate random (aleatory) error analysis in applied methods, models and data.
    - Sewell has explained and promoted to the Tsunami ITC increased understanding of the SSHAC approach, as well as methodology for probabilistic tsunami hazard assessment (PTHA) and its value for tsunami probabilistic risk analysis (PRA) of critical facilities.
The Papua New Guinea (PNG) tsunami of July 1998 was a seminal event because it demonstrated that relatively small and relatively deepwater Submarine Mass Failures (SMFs) can cause devastating local tsunamis that strike without warning.”

- Tappin, Watts and Grilli, 2008

- SMF was a slump having width of ∼4.2 km, a length of ∼4.5 km, and a thickness of ∼750 m. The slump volume is estimated to be around 6.4 km³.
- Observation suggests at least 15 m (∼50 ft) peak run-up.
- Model estimates of potential peak run-up are at nearly 22 m (∼72 ft)

![Diagram of the tsunami event in Papua New Guinea](image)
1998 Papua New Guinea Earthquake and Landslide Tsunami

- In relation to size descriptions of submarine landslides / SMFs, note that Tappin, Watts and Grilli (2008) describe the 6.4 km$^3$ PNG SMF as “relatively small”, whereas the recent Goleta SMF (with significant slide and tsunami generation occurring as recently as 1812) in the Santa Barbara Channels was 1.51 km$^3$. By comparison, Sewell (2003) describes SMFs of 3.18 km$^3$ and 1.88 km$^3$ (Scenarios 2 and 10) as “moderately small” and a SMF of 7.56 km$^3$ (Scenario 1) as “moderate-size”.

Although the Goleta SMF was a significant event, common descriptions suggest that it would not be generally considered by the Tsunami ITC as a “large” SMF – e.g., relative to the size of other past SMFs.

Some past single-event SMFs are known to be as large as many 1000’s of km$^3$, and past event complexes have size up to about 20,000 km$^3$ [Agulhas Slide, SE Africa; age Pliocene to 2500 ya; as reported by Dingle (1977), and cited by Uenzelmann-Neben and Huhn (2009) and others.]
The PNG tsunami was also pivotal within the Tsunami ITC because it was controversial and eventually drew much greater attention to SMFs/submarine landslides as an important tsunami generating mechanism, and the possibility to numerically model such scenarios.

- For strike-slip faulting, similar insights were revealed from the 2010 event in Haiti.

In light of occurrence and subsequent scientific study of the PNG tsunami – which is an event resulting in significant empirical data collection and application/testing/advancement of modeling tools – the implications became clear as to validity of this type of scenario and the need to study the potential and effects of SMF scenarios, up to the maximum scenarios supported by geological conditions, at other coastal locations.

The PNG event occurred just before Sewell started working closely with the Tsunami ITC and, with Dr. Charles L. Mader (LANL; Mader Consulting), in performing a detailed tsunami hazard study for a LNG plant in West Papua.
1998 Papua New Guinea Earthquake and Landslide Tsunami

- In relation to SMF scenario development in Sewell (2003): the following comparison (albeit simplified) – of peak-wave run-ups from 1998 PNG and reported peak wave amplitudes [Table 2; Sewell (2003)] at the DCPP site – is made:

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Volume (km³)</th>
<th>Peak Wave Amplitude (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998 PNG</td>
<td>6.4</td>
<td>15 to 22</td>
</tr>
<tr>
<td>Scenario 1</td>
<td>7.6</td>
<td>21.5 to 25.4</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>3.2</td>
<td>9.4 to 11.3</td>
</tr>
<tr>
<td>Scenario 10</td>
<td>1.9</td>
<td>10.0 to 11.6</td>
</tr>
<tr>
<td>Scenario 12</td>
<td>15.6</td>
<td>36.7 to 45.2</td>
</tr>
</tbody>
</table>

Although this is an “after the fact” comparison, Sewell performed various “sanity checks” (during the 2003 study) that parameters and results were within the range of physical observation or inference from the literature. Note that significant error bounds always apply to (and should be understood to exist for) estimated parametric relationships (such as the plot above), even if not yet quantified or illustrated.
Exposition of PTHA, Tsunami PRA and Related Uncertainty Assessment to the Tsunami ITC

• During 1998-1999, Sewell worked with Mader on tsunami scenario-based hazard assessment (numerical model study) for the Tangguh LNG development in West Papua (details are proprietary and documented in consulting reports.)
Exposition of PTHA, Tsunami PRA and Related Uncertainty Assessment to the Tsunami ITC

- Sewell extended the initial Tangguh tsunami scenario study to incorporate estimates of scenario likelihoods based on the well-established, robust Cornell (1968) hazard methodology.
- In a consulting report to BP-AMOCO completed about 2001 / 2002, Sewell developed and explained formulation for probabilistic tsunami hazard assessment (PTHA) based on extension of the Cornell approach to various tsunami generating mechanisms.
  - To Sewell’s knowledge, this was the first development of PTHA formulation, and the Tangguh LNG project is the first case where PTHA was applied, adapting the Cornell and employing numerical modeling of tsunamis.
- Sewell’s work also explained treatment of both aleatory (random) and epistemic (expert-knowledge) variations in PTHA.
Exposition of PTHA, Tsunami PRA and Related Uncertainty Assessment to the Tsunami ITC

- In May 2002, Sewell was invited by Dr. C.L. Mader and the International Tsunami Society to present on the topic of probabilistic tsunami hazard and risk assessment

Well-established approaches for probabilistic seismic hazard analysis (PSHA) are adapted to the problem of probabilistic quantification of tsunami hazards. Whereas the PSHA approaches result in estimates of annual exceedance frequencies (or, equivalently, return periods) of earthquake ground motions, their adaptation to probabilistic tsunami hazard analysis (PTHA) result in estimates of annual exceedance frequencies (or return periods) of tsunami wave heights, run-up elevations, or other wave characteristics of scientific and engineering interest. The methodological adaptation is sufficiently general to address all tsunamigenic sources, not just earthquakes. As for PSHA, the format of PTHA results is particularly compatible for use in the development of appropriate zoning criteria and other input for codified siting and design of buildings, and has applications (among others) in design of harbor facilities, offshore structures, and other important facilities often located on coasts (e.g., nuclear power plants, natural gas plants, etc.). Logic-free methodology, which is useful to formally account for multiple expert opinions in evaluating confidence bounds on probabilistic hazard results - and which has been successfully applied on extensive basis for conveying the scientific uncertainty in PSHA results for important projects - is also presented and adapted to probabilistic tsunami hazard evaluation. The framework for incorporating PTHA results (and related scientific uncertainties) in to overall risk assessment/management and related safety decision-making is also discussed.
Exposition of PTHA, Tsunami PRA and Related Uncertainty Assessment to the Tsunami ITC

• Since 2002, Sewell has presented and published at various meetings of the Tsunami ITC and of other earth-science groups, and initiated discussions with a number of tsunami experts (Mader, Watts, Grilli, Pararas-Carayannis, Power, Geist and others) promoting the methodology, value and advancement of:
  – PTHA and assessment of aleatory variations
  – Engineering characterization of tsunamis
  – Tsunami PRA
  – Application of the SSHAC methodology for uncertainty / epistemic assessment in representing the CBR of the ITC

• Geist and Parsons (2006; *Natural Hazards*), as well as González (2009 & 2011; *NRC/USGS Workshop on Landslide Tsunami Probability*) and others, have since taken up authorship on adaptation of the Cornell and SSHAC approaches to PTHA, although with some needed fixes, improvements and increased applicability for critical facilities.
Exposition of PTHA, Tsunami PRA and Related Uncertainty Assessment to the Tsunami ITC

• In agreement with Sewell’s advice since 1998, Geist & Parsons (2006) note:
  – “Determining the likelihood of a disaster is a key component of any comprehensive hazard assessment. This is particularly true for tsunamis, even though most tsunami hazard assessments have in the past relied on scenario or deterministic type models.”
  – “… methods commonly used in PSHA can be modified for use in PTHA”

• This progress clarifies that application of Cornell-based PTHA within a SSHAC (or SSHAC-type of multi-expert) framework, for developing robust aleatory and epistemic analyses – producing results that suitably represent the CBR of the ITC – is now both an expectable and implementable state of practice for existing and future tsunami hazard studies and dependent safety evaluations (risk assessment, inundation studies, etc.)
  – First applied and explained over 15 years ago; reported in peer-reviewed literature over 10 years ago.
Despite this progress, the Tsunami ITC has yet low experience in application of robust hazard methods for critical facilities, and in particular, a lack of practical experience with the SSHAC approach (similar to the inexperience of the Seismic ITC in the mid-1980’s).

- The Tsunami ITC additionally has limited experience in nuclear safety / risk assessment, including the need to evaluate the CBR of tsunami hazard results for extremely low annual probabilities.
- The Tsunami ITC is dominated by proponent views of individual experts, with limited (to no) background quantifying aleatory error in their models or in evaluating the epistemic variations / uncertainties among the ITC.

Overcoming these issues requires suitable training, as is typically conducted with efficiency in the early stages of a SSHAC study.
The situation is somewhat ameliorated as members of the Seismic ITC – who possess greater practical experience in the Cornell hazard methodology and SSHAC approach (as applied to PSHA) – are (particularly since the 2004 Indian Ocean and 2011 Japan / Tohōku Tsunami) demonstrating increased interest and involvement in tsunami hazard studies. However, the Seismic ITC generally lacks the same depth of background and understanding of tsunami physics and behavior that is possessed by the Tsunami ITC.
Exposition of PTHA, Tsunami PRA and Related Uncertainty Assessment to the Tsunami ITC

- In addition to (widely known) regional tsunami warning systems, some special-purpose local tsunami warning systems have been proposed, illustrating that employing a local warning system can be considered as a candidate risk management strategy for critical facilities and operations.
  - In 2002 work for BP, Sewell & Mader developed the conceptual design for a risk-based tsunami warning system to protect the Tangguh LNG plant and tanker loading operations against local tsunamis, including cases where short (but yet useful) warning lead time may apply.
  - Local tsunami warning system concepts have been proposed for potential risk mitigation for cruise ships near/at port.

- More generally, tsunami probabilistic risk assessment (PRA) is an important tool for decision making concerning risk reduction and optimal risk management.
  - Cornell-based PTHA within a SSHAC framework is most compatible with PRA implementation.
Critical Value of Probabilistic Risk Assessment (PRA): Some Illustrations

- Paté-Cornell and Fischbeck Reported in 1994 on Their 1990 PRA Study of Space Shuttle Tiles
- Identified Foam Debris Striking Space Shuttle Tiles as a Dominant Shuttle Risk, and Developed Specific Technical and Organizational Fixes that Were Largely Unheeded
  - 13 Years Prior to Columbia Disaster
Risk Insights Existing from 13 Years Earlier (1990 Study, Published in February 1994)

This Type of Shuttle Failure Was Specifically Called Out and Identified as Important Through Probabilistic Risk Assessment (PRA), Even Though Such Type of Shuttle Failure Had Never Before Occurred.

“We recommended that NASA inspect the bond of the most risk critical tiles and reinforce the insulation of the external systems (external tank and solid rocket boosters) that could damage the high-risk tiles if it debonds at take-off. We computed that such improvements of the maintenance procedures could reduce the probability of shuttle accident attributable to tile failure by about 70 percent.” – Paté-Cornell and Fischbeck, 1994.
Risk Insights Existing from 13 Years Earlier

The PRA Study Identified Not Only Technical Factors, but Also Management Organization and Decision Factors

“NASA seems to have grown from a can-do organization to a large bureaucracy in which the influence of the scientists has markedly decreased ... Soon after the shuttle's introduction, the agency shifted from a conservative attitude of "launch if proven safe" to an attitude of ‘launch unless proven unsafe.’ This optimism was more common among managers than among engineers and scientists ... [Feynman 1988] ...

To some extent, these same organizational factors affected the processing of the tiles and, in particular, their maintenance between flights, which often took place under tight schedule constraints...

NASA must find new ways of being cost-effective because it simply cannot afford financially or politically to lose another orbiter.— Paté-Cornell and Fischbeck, 1994.

2003 Event and Insights
Topics

- Columbia Disaster (Feb. 2003) and Accident Investigation
  - Pate-Cornell and Fischbeck (1994) Revisited
  - Lessons Learned for Safety Management
- NSF Landslide Tsunami Workshop, University of Hawai`i at Mānoa; May 30-31, 2003
- Sewell (2002-2003) Work with Southwest Research Institute (SwRI) on DCPP ISFSI SER for Tsunamis
  - Sewell (2003): what the report is and what it isn’t
  - Frequency of small, medium, large events and why Sewell (2003) evaluated comparatively rare events
  - Expected reaction and use of the Sewell (2003) preliminary draft versus what actually happened
  - Key points from Sewell (2003) preliminary draft report
  - What Sewell would do differently today, and why
• February 2003
• Technical Root Cause

*Columbia Accident Investigation Report, August 2003*
August 2003: Columbia Accident Investigation Report

“Two years after the conclusion of that study, NASA wrote to Paté-Cornell and Fishback describing the importance of their work, and stated that it was developing a long-term effort to use probabilistic risk assessment and related disciplines to improve programmatic decisions. Though NASA has taken some measures to invest in probabilistic risk assessment as a tool, it is the Board’s view that NASA has not fully exploited the insights that Paté-Cornell’s and Fishback’s work offered.”

- Although the problems had been recognized in advance and the technologies, tools and solutions existed to respond, the follow-through was inadequate.
- What similar barriers exist in applying tools for tsunami risk management?
Organizational Root Cause and Safety Culture Issues

“The Shuttle Program’s complex structure erected barriers to effective communication and its safety culture no longer asks enough hard questions about risk. (Safety culture refers to an organization’s characteristics and attitudes – promoted by its leaders and internalized by its members – that serve to make safety the top priority.)”

“Unfortunately, NASA’s views of its safety culture … did not reflect reality. Shuttle Program safety personnel failed to adequately assess anomalies and frequently accepted critical risks without qualitative or quantitative support, even when the tools to provide more comprehensive assessments were available.”

“The intellectual curiosity and skepticism that a solid safety culture requires was almost entirely absent. Shuttle managers did not embrace safety-conscious attitudes. Instead, their attitudes were shaped and reinforced by an organization that, in this instance, was incapable of stepping back and gauging its biases. Bureaucracy and process trumped thoroughness and reason.”

“NASA and the Space Shuttle Program must be committed to a strong safety culture, a view that serious accidents can be prevented, a willingness to learn from mistakes, from technology, and from others, and a realistic training program that empowers employees to know when to decentralize or centralize problem-solving. The Shuttle Program cannot afford the mindset that accidents are inevitable because it may lead to unnecessarily accepting known and preventable risks.”
• Similar Cases Where Lessons Can Be Learned

• Other compelling cases with lessons learned for safety management and potential value of PRA
  – Hurricane Katrina, 2005 (Inundation, Extreme Wind & Waves)
  – Fukushima, 2011 (Earthquake & Tsunami [with possible SMF])
  – Hurricane Sandy, 2012 (Inundation, Extreme Wind & Waves)

• Safety management should seek valuable “take-aways” from such cases in order to help avoid future disasters
  – Avoid an attitude that similar events won’t happen in our case
  – Avoid an attitude that lessons can be realized only if the past case is exactly / highly similar to our case
  – Rather, seek reasonable insights that can be beneficial even if the case is not perfectly applicable to ours
NSF Landslide Tsunami Workshop, University of Hawaii at Manoa; May 30-31, 2003

- NSF Landslide Tsunami Workshop: “Model Benchmarking”, University of Hawai`i at Mānoa; May 30-31, 2003
  - Organized by Grilli, Kirby et al.
  - At this workshop, Sewell presented on similar topics as for the 2002 Tsunami Symposium
  - Sewell’s discussion also incorporated recommendations on landslide tsunami model benchmarking and validation to meet the particular aleatory and epistemic analysis requirements in PTHA
- Sewell and SwRI colleagues (2015; ANS PSA-2015) more recently published on the unique considerations and aspects of methodology for tsunami model benchmarking for PTHA
Sewell (2002-2003) Work with Southwest Research Institute (SwRI) on DCPP ISFSI SER for Tsunamis


- Conducted while Sewell was an independent nuclear safety consultant working with SwRI; not with Structural Integrity at the time.
Sewell (2003): What the Report Was and What it Wasn’t

• It was, and continues to be:
  – A preliminary draft conveying valid and sufficient basis for discussion and motivation toward suitably improving the tsunami design basis assessment for the DCPP site (including, but not limited to, the treatment of submarine landslides), involving a suitable representation of the ITC
  – A credible work / contribution (in terms of hypothesized potential scenarios and effects – some of which are expected to be ruled in, and similarly, others that may be ruled out by the relevant ITC) that substantiates and conveys valid and useful recommendations
  – An intended-helpful segue for better understanding DCPP tsunami hazard and risk

• It was not, and continues to not be:
  – Itself, the comprehensive and robust, state-of-the-art study of tsunami hazard by the ITC – which it was rather intended to motivate
  – A sufficient or complete basis for characterizing DCPP tsunami hazard or for yet drawing conclusions about tsunami risk / safety of DCPP
Frequency of small, medium, large events and why Sewell (2003) evaluated comparatively rare events

- M5 earthquakes occur more frequently than M6 earthquakes, and in turn, M6 earthquakes more frequently than M7 events, etc.; yet, M5, M6, M7, etc., events (as can be justified in seismic source models) are all significant events for seismic hazard evaluation.
  - A seismic hazard study does not focus just on relatively small (M5) events, but depending on factors such as location, may examine the potential and/or effects of significant events of M5, M6, M7, etc., up to Mmax. Ultimately in a full PSHA, all potentially significant scenarios must be considered and weighted by their respective frequencies of occurrence.

- Similarly, for tsunamis, Sewell (2003) did not focus on just small, medium or large SMFs, but a range of significant events, from small, moderate, large up to SMF volumes that Sewell judged to be close to a regional physical maximum, SMF $Vol_{\text{max}}$.
  - Note: Sewell (2003) did not make (nor claim to make) a definitive assessment of SMF volume occurrence frequencies, as doing so requires the more extensive evaluation, resources and ITC involvement that Sewell was in fact recommending.
Expected reaction and use of the Sewell (2003) preliminary draft versus what actually happened

• Sewell expected that NRC would have questions on the study, and would hold a meeting with Sewell to discuss in detail the approach, implications and recommendations of the study, as well as a resolution plan.
  – Sewell expected the resolution plan to include finalizing the report; holding further internal discussions; and presenting the final study to PG&E.
  – Sewell also expected a broader involvement / interface with NRC to discuss and pursue follow-up on the other study recommendations, including formalization of tsunami hazard analysis methodology and likely implementation of multi-expert hazard studies (according to a SSHAC or modified-SSHAC approach).

• In contrast, there was no follow-up even on Sewell’s first recommendation to have a meeting to discuss the report together, and Sewell had no direct feedback or visibility as to NRC’s use or disposition of the report.
Key points from Sewell (2003) preliminary draft report

- In considering the Sewell (2003) report in 2016, Sewell believes the report and study remain clear and suitable for the intended objectives of presenting a credible basis for following up on the principal study recommendations and key points – and that the validity of the recommendations (i.e., need to address them) and supporting key points in the text largely persists.
What Sewell would do differently today, and why

• Programmatic:
  – Seek to facilitate a strengthened program, if possible: More clearly (and earlier) communicate the importance and implications of the work, and indicate it to be only an *initial phase* of what should be followed-up with a larger multi-phase, state-of-the-art effort; also, seek to strengthen stakeholder engagement, suitable funding, and facilitation of broader collaboration, where possible.

  • Requires stakeholder cooperation
What Sewell would do differently today, and why

- Technical (for what was intended as an *initial phase*):
  - Update to use of more advanced (now-available) and diverse numerical modeling codes (for generation, propagation and run-up); if possible, apply additional code(s); quantify estimates of aleatory error in models, as possible.
  - Fine-tune scenarios, as may be possible / credible, based on new information and additional discussions with marine geologists.
  - Assess and apply a broader range of headwall scarp configurations, and evaluate related sensitivities.
    - The headscarsps developed for the Sewell (2003) SMF scenarios were within a credible range, but owing to the limited number of scenarios that could be analyzed, they emphasized configurations comparable to significant observed headscarsps.
  - **Note:** Sewell continued (and still continues) with relevant technical studies, including research and proposals with SwRI and NC State aimed at improvements in PTHA and Tsunami PRA, and continued (and still continues) having active involvement with the Tsunami ITC, the Seismic ITC and the risk assessment field.
2004 Event
Topics

- 2004 Indian Ocean Tsunami
- Sewell Post-Event Reconnaissance to Thailand, Malaysia, Singapore, Australia
  - Risk-based warning system
- Sewell Presentation to Association of Engineering Geologists (AEG) Workshop at UC Davis on Hazard Assessment, Including Tsunami Hazard Assessment and Animations for Central California Submarine Landslide Tsunamis
Post-2004 Developments
Topics

• Progress by NRC, NOAA, IAEA
• Progress by PG&E for DCPP
  – Sewell’s assessment of PTHA study; PG&E 2015 study / FHR work; etc.
• Progress vis-à-vis the Earlier Recommendations of Sewell (2003)
• Related Work By Sewell
  – Tsunami science community involvement
  – Research with SwRI
  – Tsunami Society International
Sewell’s Assessment of PTHA study; PG&E 2015 study / FHR work

- Analyses of Goleta and Big Sur proxies by PG&E 2015 serve as interesting and useful points of reference that further illustrate the potential for application of numerical modeling to tsunami hazard assessment for DCPP
  - Performed by a highly qualified tsunami modeler
  - Employed a well-acknowledged wave modeling code
  - Further demonstrated the insights of tsunami model animations, particularly in near-site evaluations

- While illustrative and somewhat informative, the analyses do not well reflect state-of-the-art for tsunami hazard study for safety analysis
  - Not convincing or justified as a conservative basis (e.g., “deterministic maximum credible event” [D-MCE*]) for landslide tsunami scenarios for DCPP
    - The size of the Goleta proxy slide (which controls over the Big Sur proxy) is rather minuscule in comparison to a largest physically realizable SMF
    - The headscarp geometries and other parameters for the proxies do not appear to be conservatively chosen (e.g., at a level defining a D-MCE)
      - Likelihoods (and their uncertainties) for the proxy scenarios are not estimated

*Note: Sewell does not endorse a D-MCE approach for safety analysis, as it leaves event likelihoods and safety level unknown. Sewell believes a state-of-the-art PTHA at SSHAC Level>2 is needed, as well as Tsunami PRA if tsunamis cannot be convincingly screened out as having mean CDF contribution <10^{-6}.
The scenarios lack confirmation by the ITC as valid, suitably conservative or most relevant to DCPP tsunami hazard and design basis.

The extent to which the scenarios are physically (un)realizable and (in)consistent with assessed / hypothesized SMF sources is not adequately elucidated:

- Simple (elliptical) geometry of Goleta proxy SMF is highly idealized / artificial and does not give attention to local bathymetry and gradients in determining the shape / configuration of the likely failure surface.
- Location of the Goleta proxy is not well correlated with occurrence of past sliding.
- Although the Goleta proxy is located somewhat near a known recent slide zone (which USGS indicates is a feature that can be mobilized / triggered by a future earthquake) as seen in Slide No. 8, the Goleta proxy apparently has much smaller areal extent (61.4 km² vs. 125 km²). The recent past slide cannot itself be designated as a D-MCE SMF size.

Sewell’s Assessment of PTHA study; PG&E 2015 study / FHR work

- Whereas nuclear plant design bases should be established based on very remote annual probabilities, the maximum wave heights developed by PG&E 2015 for the Goleta Proxy (i.e., controlling event) scenario analyses are apparently only at levels comparable to those shown in local inundation maps (which conventionally, and in accordance with policy, are keyed [whether explicitly or implicitly] to higher probability events).

- There is an apparent need to involve the experts within the ITC who perform analyses for the local tsunami inundation maps, and potentially others (those producing tsunami hazard results for State and local programs/policy, etc.), in order to help ascertain whether the scenarios modeled by PG&E 2015 are applicable to the very low annual probabilities associated with nuclear plant design and risk, or may be more applicable to higher annual probability events.
Sewell’s Assessment of PTHA study; PG&E 2015 study / FHR work; etc.

- PG&E’s PTHA (PEER Study of 2010) is a valuable work, but: (a) considers only a limited hypothesis (relative to the broader credible array) of SMF source zones that is restrictive (relative to existing slide features and what is physically realizable) as to possible SMF sizes and potencies; and hence, appears to represent a potentially optimistic-tending interpretation among the various possible credible hypotheses that define the uncertainty range; and (b) does not address the ITC and associated uncertainties needed for obtaining the CBR of the hazard.

  - In considering the 2010 report, Sewell believes the resulting hazard curves (e.g., for landslide tsunamis and total hazard) are apt to be found as low relative to a best estimate of the ITC. However, even if one assumes that the hazard curves represent best estimates (e.g., median values): by applying representative uncertainty bounds on the results, the mean tsunami hazard, and the hazard associated with high confidence limits, at the DCPP site would appear as being more significant than the PG&E 2010 hazard curves.
2011 Events
Topics

- Fukushima
- Space Shuttle Program (STS) Retired
- Decision in Some Countries to End of Life Their NPPs
  - Observation: Past risk studies have determined the societal risk from nuclear power to be within background levels. From the view of collective public perception / “climate” favorable for a long-term surviving and thriving industry, additional de facto criteria seem to apply. A strong future for the nuclear power industry (as a meaningful part of society’s overall energy “portfolio”) appears to depend on cost-effectively managing risk such that the frequency of a core-damage event occurring anywhere worldwide is consistently very remote – e.g., that significant core-damage events with radiological release occur less than once in a person’s typical/average lifetime (implying that the mean repeat time of a core damage event anywhere globally should be no less than about 80 years [i.e., \( \sim O(100) \) years]).
State of the Art
Topics

- IAEA Guidance and El 50 m (~150 ft) Siting
- PTHA Methodology
  - Cornell-based probabilistic approach for aleatory evaluation
    - Total probability theorem, synthesizing all possible scenarios and their likelihoods
  - SSHAC (Senior Seismic Hazard Analysis Committee) approach for evaluating the center, body and range (CBR) of the informed Technical Community (ITC) based on structured Uncertainty Analysis, Logic Trees
    - SSHAC document establishes the critical importance of assessing CBR of ITC
  - Address all credible competing hypotheses
Topics

• Use and Limitations of Methods and Data
  – Tsunami modeling and animations
  – The need to explicitly measure the error (aleatory variation) in models of the ITC
  – Importance of slope stability analysis (and other justified approaches) as a competing hypothesis
  – Paleo data; and uncertainties in adjustment and interpretation (Ref. Bartlett data, and need to expose the data to broad ITC interpretation)
  – Use of empirical and historical data

• Why $10^{-4}$/yr to $10^{-6}$/yr Hazard Level Matters (in General) for NPP Safety Management

• Tsunami PRA Methodology, Safety Policy, and Value of PRA to the Public and Industry
Fallacies and Evaluation Gaps
Topics

- Potential Improvements and Advances in Regulatory and Industry Programs
- Potential Improvements and Advances in PG&E Studies for DCPP
- Importance of Improvements
- Poorly Understood Context of Central CA Tsunami Hazard (particularly for Long Return Periods); and the Role of Data Collection and Appropriate Study
Some Fallacies

Fallacy 1: Sewell believes, or believed, that DCPP is unsafe for tsunamis

- Sewell’s concerns have always been about proper safety evaluation and having a robust basis for suitable action and decisions for safety management, including the appropriate studies based on state-of-the-art methodology and confirmation by the ITC.

- Sewell’s 2003 study came at a time when: (a) a new state of the art and new recognitions about the general threat of tsunamis and SMFs had emerged; and (b) Sewell had been working intently with the tsunami science community and clients to improve the state of the art in hazard assessment and implement the improvements in practice.

- Sewell recognizes that it rightly takes some time for new methods and data to be digested into a revision of the state of the art, and sometimes longer, for practical implementation.

- Sewell’s concern for suitable tsunami hazard evaluation was properly heightened following the Tohoku tsunami and ensuing Fukushima event.

- Sewell, or others, cannot have a rational basis for comment on DCPP tsunami safety until the appropriate studies are performed.

- Sewell does not yet know with high confidence what the outcome of proper studies will be, but anticipates that proper tsunami investigation, including hazard and PRA study, can reveal the actions, if any are needed, for achieving targeted (risk-consistent) tsunami safety of DCPP.
Some Fallacies

• **Fallacy 2:** Establishing consistency with the Tsunami ITC can be side-stepped
  - Not properly considering the ITC and not assessing epistemic variations has generally led to, and will continue to lead to, unstable safety decisions
  - Sewell has proposed decision making based on “control charting” [Deming (1975)]; Shewart (1939)] of hazard and risk results – within well-assessed epistemic bounds – as a means for stabilizing safety management
    • Measure process stability, and keep process and process variation within acceptable limits
    • Avoiding expense of re-analysis and retrofits at an undue level
    • Explicitly account for costs of a threat as well as uncertainty about the threat

• **Fallacy 3:** Coordinating with tsunami inundation mapping programs and other programs is unimportant
  - Hierarchical consistency in safety policy applies
Some Fallacies

- **Fallacy 4**: $10^{-4}$/yr is too remote of a concern, and there is no need to consider such annual probability levels, or lower
- **Fallacy 5**: Significant SMFs are not possible on shallow slopes
- **Fallacy 6**: Major events are not possible at our location of interest
  - Recall Cases of Columbia Shuttle; Fukushima; Katrina; Sandy; Etc.
- **Fallacy 7**: Strike slip faulting is ineffective as a SMF tsunami generator
  - Some of the largest historically observed SMFs and landslide tsunamis are verified as being triggered by earthquakes (of faulting style that is not subduction), and the largest paleo slides are believed to be triggered by earthquakes that were not subduction events.
  - Recent publications on the Haiti earthquake and tsunami not only state the relation of strike-slip faulting and tsunami generation for that event, but discuss the implications for strike-slip-triggered SMFs offshore California.
Some Fallacies

- **Fallacy 8:** It is clearly known that there is a sharp transition in SMF-generated tsunami hazard at Mendocino Triple Junction (MTJ), with the landslide tsunami threat diminishing markedly for latitudes below MTJ.

- **Fallacy 9:** We know that offshore Central California is more stable compared to other coastlines that have experienced large SMFs and/or we know that only comparatively small SMFs can occur offshore Central California within annual probability levels of interest.
Some Fallacies

- **Fallacy 10:** Implications of Bartlett and other data are clear at this time and constrain the landslide tsunami hazard to a low level.

- **Fallacy 11:** When formulating and evaluating hypotheses as to SMF source potential, paleo-data provide a more valid and sufficient basis for assessment of the hazard from future tsunamis, versus geotechnical properties (i.e., engineering mechanics properties of soil and rock) and slope stability analyses.
Some Fallacies

- **Fallacy 12:** Regardless of the hazard, the risk at DCPP from tsunamis less than 85 ft is now known to be clearly negligible
  - 85 ft level of DCPP power block does provide good siting-based protection
  - However, induced failures, random failures on demand (in relation to safety relevant SSCs), access/response problems and operator errors are yet possible for tsunamis lower than the power block
  - CCDPs for various cases are non-zero, can be determined, and should be included (for all tsunami levels) as part of a complete tsunami risk study
  - For a nominal 85-ft tsunami wave, occurrence of significant wave and debris splash-up and spray (i.e., real physical phenomena not included in nominal amplitude assessments) can be expected to occur. Although the splash-up does not carry the same impact and flooding potential of the full-momentum in the nominal wave level, local adverse impact effects and flooding are still possible
    - In the case of Fukushima, the nominal wave height was about 14 m (~50 ft) whereas the height of the wave splash-up as it impacted leading power structures was approximately three times that level (~42 m, or ~150 ft)
    - Consideration of splash-up and spray effects are requirements of risk evaluation included in the most recent draft revision of the ASME-ANS JCNRM PRA Standard
Some Fallacies

- **Fallacy 13**: We have clear understanding as to the possible bounds (upper limits) of tsunamis and the range of tsunami characteristics that need to be considered
  
  - Upper bounds are established based on physical maximums (e.g., now well-established studies examine maximum ground motion from earthquakes, as well as maximum magnitudes), which are often poorly understood.
  
  - Although we must assess upper bounds in probabilistic hazard analysis, when considering hazard results in safety management, for apparent reasons, we are typically not concerned with extinction level events (ELEs), which are \(~O(10^{-8})/yr\) annual probability [equivalently, \(~O(10^8)\) yr return period] events.
  
  - For a hazard study to be complete (particularly for critical facilities), and most useful for PRA, it must assess hazard and its uncertainty to about \(10^{-7}/yr\) mean annual probability levels, explicitly and quantitatively explaining physical possibilities and likelihoods even to very extreme levels.

- Viewed differently: consider any and all tsunami run-up levels \(X\) of interest at a given site, but suppose as one instance we examine \(X=100\) ft. The ITC should seek to hypothesize potential scenarios of wave run-up at this level, and if it cannot rule out such scenarios as clearly being physically impossible, then such scenarios and estimates of their likelihoods must be made. Once a proper synthesis of all possible scenarios for all levels is made according to detailed PTHA formulation, then the scenarios at any level \(X\) of interest, and above, can be discounted as negligibly important only if the annual frequency of exceeding \(X\), up to high confidence level (e.g., 95%) is found to be less than \(10^{-7}\).
2016 Insights and Updated Conclusions

- General Summary
- Sewell (2003) revisited – What remains valid; what perhaps does not (i.e., How should we use it, and move on to further progress?)
- Revisit of Lessons Learned and Value of PRA
- Update of Principal Recommendations and Conclusions for Use by DCISC and Stakeholders
4 April 2017

Garry Maurath, PhD, PG, CHG
California Energy Commission
Siting, Transmission and Environmental Protection Division
1516 9th Street, MS-46
Sacramento, CA 95814
garry.maurath@energy.ca.gov

Reference: Your e-mail of 26 August 2016 with subject “Question on your tsunami risk presentation regarding Diablo Canyon Power Plant”.

Dear Dr. Maurath:

I am writing to document our communications concerning my response to your above-referenced question in relation to my presentation on 21 June 2016 in Avila Beach, CA at the public meeting of the Diablo Canyon Independent Safety Committee (DCISC). For convenience, your question and associated background are included as attachment to this letter. Formally, DCISC has asked me to respond to your question; however, my response and related communications are my own, and are not intended as a response of the DCISC.

On 6 February 2017, I sent you an e-mail intended as a preliminary and informal reply to your question and a basis for starting a dialog in case there were additional, follow-on facets to your question that I could also answer. Some of the principal points conveyed in my e-mail included the following:

- My 21 June 2016 presentation to DCISC was provided, in part, to explain the motivation and basis for my earlier tsunami analyses, my 2003 draft report and my associated recommendations at the time. The 125 sq km source mentioned in your question was included in my presentation not because I viewed it or evaluated it in any way as the primary source of concern, but rather, because it was an example of a still-to-be-clarified observation raised in a relevant earlier report by USGS (and hence, was just one of several factors justifying, in my mind, further attention to the landslide tsunami threat offshore Central California).

- Largely through the efforts of DCISC, the Alliance for Nuclear Responsibility (A4NR) and media attention, my 2003 draft report became publicly available in late 2014. The report is now available on the Internet at https://www.nrc.gov/docs/ML1429/ML14293A559.pdf. It describes various scenarios for which I had performed numerical landslide tsunami simulations – a number of which are for slides along the continental slope and could be potentially of greater significance than the 125 sq km feature discussed by the USGS. The scenarios (and related sources) in my 2003 draft report were not (nor were they intended to be) comprehensive or weighted by frequency of occurrence, so as to enable an assessment of the sources and scenarios that contribute the most to the tsunami hazard at the Diablo Canyon Power Plant (DCPP) site. Indeed, a principal aspect of my 2003 draft report was to provide recommendations for further work to be done for better understanding the tsunami threat, including the primary (hazard-dominant) sources.

- I mostly concur with your observation that my presentation and 2003 report did not seek to provide information on the physical properties (grain size, angularity, etc.) of the material incorporated in debris
flows, and we generally don’t well know what will be the character of future flows (slumps, debris flows, turbidity flows, rock falls). To my knowledge, the various candidate data are not available, thus resulting in significant uncertainty concerning potential slide characteristics. The USGS report cited in my presentation itself provides various interpretations of the indicated slide feature and its potential slide significance (which is naturally coupled with the earthquake hazard). Undertaking further data collection and/or expert-based uncertainty analysis of relevant geotechnical / geological parameters and their potential impacts have been consistent recommendations of mine, as reinforced in my 2003 report and my 21 June 2016 presentation.

- Considering a paper by Harbitz et al. (2006), you noted that regardless of the type of flow, the initial acceleration and maximum velocity of material are critical elements relating to the velocity and size of the tsunami generated. You also noted from that paper that one can expect a rapid damping effect due to the nature of radial spreading of energy from a “localized source”. Additionally, based on a 1.2 degree slope for a slide on the continental shelf, you indicated that the submarine landslide will be a sub-critical landslide (Froude number <1). I do not contend with these observations, but note that in my view they reinforce the need for the recommended further data collection, expert evaluation and uncertainty analysis. In the analyses for my 2003 report, rather than focusing on theoretical considerations, I primarily gave attention to empirical data/studies in my research concerning representative slide velocities and debris flow characteristics. Calculations of damping and flow criticality for failures along offshore Central California would require additional data and investigation, and would certainly be useful (I have recommended slope stability investigations and related analyses) – although, I believe, there are many additional elements of the overall tsunami hazard issue for DCP to be yet effectively vetted by a suitable body of experts (e.g., according to, say, a SSHAC Level-3 type of approach), as I have previously recommended.

I also agree with your observation that the orientation of many of the possible submarine landslides will lead to slide movement predominantly away from the coastline. For the particular submarine landslide scenario you noted (125 sq km feature moving along a 1.2-degree scope of the continental shelf) and many other –but clearly not all – possible landslide scenarios of interest offshore Central California, the momentum of the slide (which is aligned with the direction of mass flow of the landslide) and the resulting tsunami will be oriented away from DCP. Principal direction of tsunami momentum has been observed as an important factor, but most especially for tsunami effects at distance. In the local vicinity of a landslide source, the slide interacts in a complex manner with the surrounding fluid; although the net momentum of a tsunami may be directed away from the coastline, the tsunami propagates outward in all directions from the source and has various important local effects (drawdown, run-up, debris-load transport, etc.) and energy dissipation that are generally capable of producing damage or adverse effects along the nearby coast.

- Concerning the Harbitz et al. (2006) paper, it also notes that one of the most important determinants of the significance of a landslide induced tsunami is the size of the landslide. Consistent with this (empirically and theoretically justified) observation, in my 2003 report, I considered features offshore Central California that could support a variety of slide sizes. The range of sizes I considered is well within the range of submarine landslides that have been known to occur.

In response to your principal question about the significance of the threat that may be posed from past mass movement of a 125 sq km source / feature on a 1.2 degree slope, I do believe the tsunamigenic implications of the feature are deserving of further investigation. My concern would certainly not be limited to, or focused on, just that scenario / feature. The threat posed by potentially larger events on the continental slope, as well as potential slides on the shelf that would be directed toward DCP, should also be considered, as should the likelihood of event occurrences, in an overall tsunami hazard.
To: Garry Maurath, PhD, PG, CHG
Ref: E-mail of 26 August 2016: “Question on your tsunami risk presentation regarding Diablo Canyon Power Plant”
Date: 4 April 2017

Some level of additional field exploration to obtain sufficient geotechnical data may be justified to demonstrate, disprove – or at least better judge – the existence of the hazard. Additionally, I believe that improved resolution of the issue can be achieved through the application of numerical modeling based on realistic estimates of parameters and their uncertainties; the numerical models should be tested on a consistent basis for hazard and risk applications, including error estimation and demonstrated as suitably representative of the center, body and range (CBR) of views of the informed technical community.

On 8 March 2016, we had a phone discussion concerning your initial question and the preceding points, as well as related questions. The main purpose of that discussion was to insure that my preliminary response sufficiently represented, and responded to, your scope of questions related to my presentation. My understanding from our discussion was that you found the explanations and discussion to be satisfactory and sufficient. I also made note of the following points from our conversation:

- There is an apparent need for tsunami hazard investigations and associated numerical modeling also for the non-nuclear coastal power plants in Central and Southern California.

- There is interest in how DCISC and PG&E may be pursuing the idea of further tsunami hazard study, as such work/study could be valuable also in relation to investigation for these other (non-nuclear) coastal power plants.

Considering these points from our discussion, I made the suggestion to the DCISC to update you and the California Energy Commission (coincident with submittal of this letter) regarding the status of its related activities, decisions, plans and associated recommendations to PG&E, State of California agencies, and/or potential others, concerning any further investigation of the tsunami hazard and risk at DCPP.

Should you have any additional questions concerning my presentation, or on my summary of response provided in this letter, please do not hesitate to contact me.

Sincerely yours,

[Signature]

R.T. Sewell Associates
Robert T. Sewell, PhD, PMP

cc: Dr. Peter Lam, DCISC Committee Chairperson
Attachment
To: Garry Maurath, PhD, PG, CHG
Ref: E-mail of 26 August 2016: “Question on your tsunami risk presentation regarding Diablo Canyon Power Plant”
Date: 4 April 2017

Attachment

The primary source that Dr. Sewell is considering for generation of a Tsunami is a large (125 sq km – I did not see an estimate of the actual volume of material, but I would think it on the order of <2-3 cu km) submarine landslide that occurs on a slope of 1.2 degrees. While slurry flows can occur at such a low angle of repose (for very fine grained material), no information on the physical properties (grain size, angularity, etc.) of the material incorporated in the debris flow was presented by Dr. Sewell. Thus, we don’t know if the mass movement was a slump, debris flow, or turbidity flow.

A concern of mine is that regardless of the type of flow, the initial acceleration and maximum velocity of material are critical elements relating to the velocity and size of the tsunami generated. There will also be a rapid damping effect due to the nature of radial spreading of energy from a “localized source” (Harbitz, 2006). Additionally, based on the 1.2 degree slope reported by Dr. Sewell, it is assumed that the submarine landslide will be a sub-critical landslide (Froude number <1). Models of sub-critical landslides suggest that the propagation of the tsunami will be away from the direction of landslide flow, which in the case presented by Dr. Sewell, would be away from the Diablo Canyon Power Plant. Unfortunately there is no data presented (available?) providing the necessary details regarding slide propagation and velocity.

Hence my question:

Is there sufficient data to demonstrate that past mass movement on a 1.2 degree slope represents a credible threat, possibly requiring additional field exploration to obtain sufficient geotechnical data to demonstrate/disprove the existence of the geologic hazard, or can this issue be resolved through the application of numerical modeling based on conservative estimates of geotechnical parameters?

September 5, 2013

Mr. Jonathan Bishop
Chief Deputy Director
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, California 95814

Re: Diablo Canyon Independent Safety Committee’s Evaluation of Safety Issues for Several Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling System for the Diablo Canyon Nuclear Power Plant

Dear Mr. Bishop,

In early 2011, the California State Water Resources Control Board appointed a “Review Committee to Oversee Special Studies for the Nuclear-Fueled Power Plants Using Once-through Cooling” (the “Review Committee”) to assist it in evaluating various technical options that might be used to replace once-through cooling at the two nuclear power plants then operating along California’s Pacific coast, Diablo Canyon and San Onofre. Subsequently, guided by input from the Review Committee, Pacific Gas and Electric Company and Southern California Edison Company, the operators of the two nuclear plants, jointly entered into a contract with Bechtel Power Corporation (“Bechtel”) to perform certain studies related to the technical topics at issue.

Bechtel, again guided by input from the Review Committee, undertook a series of technical studies. Based on their work, Bechtel published a preliminary study in November 2012 (Ref. 1), and then a few weeks ago, in mid-August 2013, published a follow-up technical study (Ref. 2) that extends their earlier work in much more detail on the safety issues, and that provides a technical evaluation of the safety issues with each alternative option.
During its meeting in Sacramento on August 13, 2013, the Review Committee requested the Diablo Canyon Independent Safety Committee (DCISC) to provide its own independent safety evaluation of the various alternative options, which as a practical matter means, in part, carrying out a technical evaluation of Bechtel’s safety analyses and conclusions in their second report. This letter provides that safety evaluation. The DCISC’s evaluation has also relied in part on the earlier (November 2012) Bechtel study, because it provides important background information and analyses.

Following the DCISC’s receipt of the Review Committee request, the three individual DCISC members each performed his own review of the relevant technical information. The DCISC had the benefit of a previous briefing from PG&E about some of the technical issues at its Public Meeting on February 15-16, 2011, and one of our members (Dr. Budnitz) had attended an earlier Review Committee meeting in August 2012, during which the Bechtel team made a technical presentation concerning some of that team’s early work. The DCISC is pleased to be able to meet the requirement to provide its evaluation to the Review Committee on or before September 5, 2013.

The DCISC developed a draft response, which was modified, and then unanimously approved by the membership at the DCISC’s public meeting held on September 4, 2013. That response is attached to this letter as Exhibit “A”, representing the collective concurrence of all three DCISC members concerning their “Evaluation of Safety Issues for Several Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling System for the Diablo Canyon Nuclear Power Plant.” The public meeting was videotaped and the comments on the draft response by the DCISC members and technical consultants, as well as from several members of the public, are available for your review. The video should be available beginning today (September 5) and can be viewed by accessing the “Meeting Videos” link located on the DCISC’s homepage at www.dcisc.org. Members of the public making comments on the report at this meeting were supportive of the DCISC’s conclusions and findings.

Because additional information concerning this issue is still being developed by Bechtel, and further design and analysis work will be developed in the future either by Bechtel or by PG&E, it is possible that the Committee may, after review of the additional information, modify its evaluation. In continuing to fulfill its charge from the California Public Utilities Commission to review Diablo Canyon operations for purposes of assessing the safety of operations and suggesting any recommendations for safe operations, the DCISC commits to remaining technically involved, in particular to be alert to any new information that might lead the DCISC to modify its conclusions about safety as set forth in Exhibit A. If anything new arises, the DCISC will keep the Governor, the Attorney General, the Energy Commission, the SWRCB, and the CPUC fully informed in a timely manner. Accordingly, please provide written acknowledgment of your receipt of this letter together with information concerning the Review Committee’s plans for continuing the process of evaluating alternative cooling methods and the Review Committee’s disposition of the DCISC’s evaluation, findings, conclusions and recommendation.
Letter to Mr. Jonathan Bishop
September 5, 2013
Page 3.

On behalf of myself and the other members of the Diablo Canyon Independent Safety Committee, please accept our thanks for this opportunity to review the Bechtel report and to contribute to the SWRCB’s assessment of these important issues and their potential to affect the future safety of the Diablo Canyon Nuclear Power Plant. Should you have any questions or concerns about the substance or nature of the DCISC’s evaluation or the findings, conclusions or recommendation therein, please do not hesitate to communicate with us.

Very truly yours,

[Signature]
Per F. Peterson
Chair

References:

Attachment (Exhibit A)

cc (w/att.):
Hon. Edmund G. Brown, Jr., Governor, State of California
c/o Mr. Ken Alex, Senior Policy Advisor/Director of Planning & Research
Hon. Kamala Harris, Attorney General, State of California
c/o Ms. Megan Hey, Deputy Attorney General
Hon. Robert B. Weisenmiller, Chair, California Energy Commission
Ms. Joan Walter, Senior Nuclear Policy Advisor, California Energy Commission
Hon. Michael R. Peevey, President, California Public Utilities Commission
Mr. Thomas Hipschman, DCPP Senior Resident Inspector, U.S. Nuclear Regulatory Commission
Mr. Ed Halpin, Senior Vice President & Chief Nuclear Officer, PG&E
Mr. Barry Allen, Site Vice President, Diablo Canyon
Mr. Douglas E. Dismukes, Bechtel Power Corporation
Ms. Marleigh Wood, Senior Staff Counsel, California State Water Resources Control Board (SWRCB)
Ms. Victoria Whitney, Director of Water Quality, SWRCB
Mr. Rik Rasmussen, Surface Water Assistant Deputy Director, SWRCB
Mr. Paul Hann, Watershed Ocean and Wetlands Section Chief, SWRCB
Dr. Maria de la Paz Carpio-Obeso, Ocean Unit Chief, Division of Water Quality SWRCB
Exhibit A

5 SEPTEMBER 2013

Concurred in by the Three Members of the DCISC at the DCISC Public Meeting on 4 September 2013

Robert J. Budnitz
Peter Lam
Per F. Peterson

Background: The request from the SWRCB “Review Committee”

In early 2011, the California State Water Resources Control Board appointed a special committee, a “Review Committee to Oversee Special Studies for the Nuclear-Fueled Power Plants Using Once-through Cooling” (the “Review Committee”) to assist it in evaluating various technical options that might be used to replace or reduce the environmental impacts of once-through cooling (OTC) at the two nuclear power plants along California’s Pacific coast, Diablo Canyon and San Onofre. To discharge its charter, the Review Committee requested the two companies then operating those nuclear power plants, Pacific Gas and Electric Company and Southern California Edison Company, to contract for a technical evaluation.

Bechtel Power Corporation was selected as the contractor, and its technical work is the subject of the evaluation here. Specifically, Bechtel published a preliminary study in November 2012 (Reference 1), and then in August 2013 published a follow-up technical study (Reference 2) that extends their earlier work in more detail. The current study remains at the conceptual level but contains sufficient details to reach some high-level conclusions on the nuclear-reactor-safety issues. The level of design detail remains insufficient to assess the impact of the potential design changes on the plant reliability and frequency of trips and forced outages, and to assess potential safety impacts that could occur during or after construction of the modified cooling systems.

The original scope for Bechtel was to provide information and analysis related to both Diablo Canyon and San Onofre. However, in summer 2013 Southern California Edison announced that San Onofre would be permanently closed, after which Bechtel’s work has concentrated only on Diablo Canyon. The scope of the DCISC’s evaluation here is also related only to the Diablo Canyon Power Plant (DCPP).

During its meeting on 13 August 2013 in Sacramento, the Review Committee made a request of the DCISC. The specific request was that the DCISC provide a technical evaluation of the nuclear-reactor-safety issues associated with seven alternative cooling technologies or modifications to the existing once-through cooling system for DCPP.
The request asked if the DCISC could provide its evaluation by 5 September 2013, which represented a very tight schedule. One of the DCISC’s three members (Dr. Budnitz) attended the 13 August meeting, at which he agreed that the DCISC could and would do such an evaluation and would try to meet this schedule. The DCISC’s evaluation has concentrated on Bechtel’s second report (Reference 2), but has also relied in part on Bechtel’s earlier work in Reference 1 as a source of important technical information.

Additional information related to the evaluation

1) Light water power reactors, like the two units at Diablo Canyon, produce large amounts of “waste heat” that must be discharged to the environment. During normal operation, the waste heat is discharged to the Pacific Ocean from the Condenser via the Condenser Circulating Water System. During off-normal or emergency conditions or when one or both reactors are shut down, residual decay heat can be ultimately discharged to the Pacific Ocean via a separate safety-related Auxiliary Saltwater (ASW) System termed the “ultimate heat sink” (UHS), and we will use that term here.

2) Today, Diablo Canyon’s normal heat discharge to the adjacent Pacific Ocean uses the specific technology called once-through cooling (OTC), in which cool ocean water is pumped into the plant, warmed up about 20 degrees Fahrenheit, and returned to the ocean. The current OTC approach inevitably produces environmental impacts on the nearby ocean, and the motivation for the current review of OTC is a desire to decrease these impacts by a change in cooling technology. While each of the seven alternatives being evaluated by Bechtel has a different mix of environmental impacts, and although the waste heat must go “somewhere in the environment,” this set of environmental-impact issues is beyond the scope of DCISC’s evaluation here.

3) The SWRCB is currently considering a new regulatory position that would require Diablo Canyon to replace its current OTC system with a system that would produce smaller environmental impacts on certain aspects of the ocean environment.

4) A paraphrasing of Bechtel’s initial scope is that Bechtel was asked to identify a very large range of technically feasible cooling alternatives that might be deployed at Diablo Canyon. It discharged that assignment in its first report (November 2012, Reference 1).

5) The SWRCB Review Committee reviewed Bechtel’s report, and based on criteria that are beyond our scope here, the Review Committee directed Bechtel to narrow the options to seven that were to be evaluated further. In the next phase of Bechtel’s work (Phase 2), more detailed conceptual designs and engineering analyses were completed for each of these seven options, and Bechtel also performed a review of the relevant nuclear-reactor-safety issues for each. A cost study is also part of Bechtel’s Phase 2 work, but evaluating it is outside of the DCISC’s scope.

The seven technologies are as follows:

- Inshore mechanical (active) intake fine mesh screening systems
- Offshore modular wedge wire systems
Closed-cycle cooling systems (5 different approaches):
  - Passive draft dry/air cooling
  - Mechanical (forced) draft dry/air cooling
  - Wet natural draft cooling
  - Wet mechanical (forced) draft cooling
  - Hybrid wet/dry cooling

6) Providing reliable and effective cooling is an important aspect of the overall safety of a nuclear power plant's design, and, as noted above, the DCISC's concern here is to evaluate the implications of a change in cooling technology on the overall nuclear-reactor safety at Diablo Canyon.

Bechtel's safety assessment and conclusions

As noted above, in Bechtel's recent report (Reference 2) the Bechtel team has performed an assessment of the nuclear-reactor safety of each of the seven alternative cooling options that might replace OTC at Diablo Canyon. Bechtel based its assessment on a set of criteria specified by the Review Committee. This set of criteria, called in the Bechtel report "Criterion 10," covers eight "areas of NRC interest," against each of which the assessment was performed. The NRC regulation 10 CFR 50.59 (Reference 3) is a major basis for these criteria. Diablo Canyon's Final Safety Analysis Report Update (Reference 4) is cited by Bechtel as one of the major regulatory documents used by the NRC and the plant to document the plant’s safety analyses.

The eight areas are:

- Seismic issues
- Operability
- Transient analyses
- Nuclear fuel (accident analyses)
- Single failures
- Hydraulic design
- Probabilistic risk assessment
- Instrumentation controls and alarms

The Bechtel report states, "Criterion 10 is a feasibility assessment based on regulatory requirements established by 10 CFR 50.59 to determine whether NRC approval of the alternative technology is required."

For each of the seven alternative UHS options, Bechtel has concluded as follows (Reference 2, Section 1.5, "Conclusions"):

"Based on the results of the feasibility assessment and when more detailed engineering information becomes available, the anticipated responses to the following eight 10 CFR 50.59 criteria questions for each of the proposed modifications would be NO:"
1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the FSARU [Final Safety Analysis Report Update]?

2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC [structure, system, or component] important to safety previously evaluated in the FSARU?

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the FSARU?

4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the FSARU?

5. Create the possibility of an accident of a type different from any previously evaluated in the FSARU?

6. Create the possibility of a malfunction of an SSC important to safety with a result different from any previously evaluated in the FSARU?

7. Result in a design basis limit for a fission product barrier as described in the FSARU being exceeded or altered?

8. Result in a departure from a method of evaluation described in the FSARU used in establishing the design bases or in the safety analyses?

The Bechtel report continues: “Consequently, subject to the limitations of the Phase 2 assessment information, implementation of the closed cooling technology, the inshore dual-flow fine mesh screens, or the offshore modular wedge wire screening system design alternatives is believed to not require a License Amendment Request (LAR) in accordance with 10 CFR 50.59.”

Among the crucial words in these two quotes are the “conditional words,” as follows: “the anticipated responses . . . would be NO” [first sentence in the above quote], and “subject to the limitations of the Phase 2 assessment information, implementation [of any of the options] is believed not to require a License Amendment Request” [final sentence in the above quote.]

**Bechtel’s conclusion concerning safety and DCISC’s evaluation of it**

We understand Bechtel’s conclusion to mean the following: Although more information would be needed to support a definitive conclusion, Bechtel, applying its expert judgment and based on the information at hand, concludes that any of the proposed cooling options can be implemented in a way that will meet NRC requirements vis-à-vis nuclear-reactor-safety. In fact, Bechtel’s conclusion is stronger than that. Bechtel’s judgment is that it is likely that for any of the seven cooling options under consideration, the nuclear-reactor-safety impact on the plant would be modest enough that PG&E would not even need to request a NRC license amendment request (LAR) before it could proceed with installing that option at Diablo Canyon. (All of this is subject to
Bechtel’s appropriate caveat that more detailed information will ultimately be needed, as
the specific design details are developed, before a sufficient basis will be available for a
firmer judgment.)

The DCISC has reviewed Bechtel’s conclusion and the basis for it. We believe that not
enough information is available now to conclude definitively that any of the seven
options will meet NRC’s nuclear-reactor-safety regulations. That will need to await
specific design details that are not available now.

We conclude that the Bechtel assessment that no LAR is required might be correct for
the inshore fine-mesh screening system option, because this option involves the least
extensive modifications to the plant; however, this assessment is questionable for the
off-shore, modular wedge-wire system, because this option requires the installation of a
new, safety-related stop-log system in the plant intake cove. The addition of a new,
safety-related system will certainly require a NRC LAR.

We conclude that the Bechtel assessment is likely to be incorrect for the various closed-
cycle cooling options. All of these options involve very extensive modifications to the
plant, including modifications to the plant intake structure that also houses the ASW
system, protected area boundary, turbine building (which houses safety-related
emergency diesel generators and electrical switchgear), and rerouting of the plant’s
230-kV alternate offsite power transmission system. These major modifications have
the potential to affect the operability of safety-related systems both during and following
construction, and potential undesirable interactions will require detailed design review
by the NRC to identify and mitigate.

While we conclude that most of the proposed cooling system modifications would
require a NRC license amendment request, Bechtel’s conceptual design study has
sufficient detail to allow a preliminary conclusion that NRC approval of the license
amendment could likely be obtained. The most important bases for this, in our view, are
two:

1. First, Bechtel has performed a set of nuclear-reactor-safety evaluations against
each of the various 10 CFR 50.59 criteria for each of the seven alternative
cooling technologies.

2. Second, around the world there are a wide variety of cooling designs deployed
today at the few hundred operating nuclear power plants. The seven options
under consideration here are each represented (broadly, although not in
technical detail) elsewhere, and at large numbers of plants for the closed-cycle
options. Less experience exists with intake fine screening and offshore modular
wedge-wire systems under conditions relevant to the Diablo Canyon site, and we
therefore believe that a testing program should be conducted or actual
experience elsewhere reviewed to verify performance of either system before it
should be selected. Furthermore, for any of the seven proposed alternatives,
there is the potential for a significant reduction in the plant’s reliability and for an
increase in the frequency of trips and forced outages. Much additional work
would be needed before assurances could be had that the overall safety impact
of these potential issues is manageable. However, because these cooling
technologies exist, can be and have been designed and operated safely
elsewhere, we judge that it is probably feasible to deploy any of these seven options at Diablo Canyon in a manner that will meet NRC safety regulations.

However, this finding on our part is not sufficient for us. That is, the DCISC has developed a different criterion for judging the safety of an alternative cooling technology at Diablo Canyon. The next section will explain why we have a different criterion, after which we will present our safety criterion and our evaluation based on it.

The ultimate heat sink

The preceding discussion covered the normal non-safety-related plant cooling system, which discharges waste heat from the condenser to the Pacific Ocean via a Once-Through Cooling System. A totally separate system, the nuclear-safety-related Auxiliary Saltwater System, discharges plant decay heat to the Pacific Ocean in certain shutdown, off-normal, and emergency conditions. This arrangement is called the Ultimate Heat Sink (UHS) because it is the final or ultimate opportunity to keep the plant cool and safe if all other methods are unavailable or have failed.

With two exceptions the seven cooling alternatives proposed by Bechtel would be independent and separate from the UHS, and thus should normally have no adverse impact on nuclear-reactor safety from the UHS standpoint. The two exceptions are the following options:

- Inshore mechanical (active) intake fine mesh screening systems
- Offshore modular wedge wire systems

We are also concerned about a third issue:

- Effects of construction/installation on AWS/UHS

The first two alternative cooling options both utilize the current OTC intake cove and intake structure, which also house the ASW System, part of the UHS. At this stage it appears that these two options would affect the UHS, but final design and analysis would be necessary to permit a determination of the significance. The third item, construction/installation, could adversely impact ASW/UHS, which concerns the DCISC at this conceptual stage. We believe that compensatory measures would likely be taken; however, we reserve final judgment until more is known about this impact.

The DCISC has been studying this issue since December 2010, and in its most recent 2010 – 2011 Annual Report (Reference 11), it concluded the following:

"A range of adverse nuclear safety impacts is known qualitatively at this time and is of concern to the DCISC. The DCISC will continue to take seriously the charge to review the safety impacts of the elimination of Once Through Cooling (OTC) at DCPP and provide analysis and input to the process."
Bechtel concluded the following:

"The safety-related ASW system is not affected by this modification. The CWS (Circulating Water System) and the SCW (Service Cooling Water) system do not provide cooling to any component required for safe shutdown. The CW (Circulating Water) pumps are not required for the safety of the units. A complete shutdown of the SCW system would not affect safe shutdown of the reactor. The replacement of the once-through cooling with closed cycle cooling would result in an increase in circulating water temperature. This increase is not expected to adversely affect FSARU accident analyses since these systems serve no safety related functions."

The DCISC agrees that the alternative cooling systems would not adversely affect the FSARU accident analyses provided that the ASW/UHS is not affected by the proposed alternative cooling system, which appears to be the case based on Bechtel's conceptual studies performed to date, but the reliability of this non-safety related equipment may affect the frequency of plant trips and equipment failures that require safety-related equipment to function in order to prevent or mitigate accidents. Insufficient information is available to answer the question of whether the alternative cooling systems might affect the frequency of accident initiating events.

Effects of plant modifications on plant reliability

One of DCISC's principal concerns with the proposed alternative cooling options is their potential impact on the plant's reliability, and the potential to increase the frequency of plant trips and forced outages that stress plant safety systems (e.g., ASW/UHS) and can provide initiators for accidents. Much of the improvement in nuclear plant safety around the world in the last three decades has come from improved operational methods that have greatly reduced the frequency of plant trips and forced outages.

While the DCISC assesses that the proposed alternative cooling methods could be successfully licensed by the NRC, the level of design detail and information is insufficient to assess the likely affects of the design changes on plant reliability. For example, the closed-cycle options all involve a substantial increase in the operating pressure of the circulating water system, and the potential for increased flooding risk can only be assessed following detailed design. Likewise, the wet closed cycle options include a water storage capacity of only two hours (Reference 2, Section 4.3.4.1) so any outage of the water supply system exceeding this will result in a plant trip. For all systems, there will be a learning curve associated with the transition to alternative cooling that will result in increased risk of plant trips during the learning period.

The importance of the ultimate heat sink in reactor safety, and how an understanding of this importance is developed

Before describing the nuclear-reactor-safety criterion that the DCISC has used in this evaluation, we need to explain something about nuclear-power-plant risk, and about how it is understood by the community of nuclear-power-plant safety analysts.
Every operating US nuclear power reactor, including the two units at Diablo Canyon, meets all applicable NRC regulations. (Otherwise, it would not be operating.) However, this does not mean that any of these reactors presents zero risk to the public. While the NRC has judged the risks acceptably low, the possibility of a release of radioactivity that might affect the public does exist. We will call the ensemble of these risks of a radioactive release the “residual risk,” the word “residual” meaning to imply that these are the risks that remain after all of the hard work has been done to reduce the risks to low levels that are acceptable to the NRC and to the DCISC.

Reactor safety analysts study these risks using many different approaches. The approach that provides the most realistic understanding is embodied in an analysis technology known as “probabilistic risk assessment” (PRA), which delineates every important “accident sequence” that might arise at a given reactor. In the PRA, each such accident sequence begins with a specified “initiating event” (such as an equipment failure, a human error, an electrical fire, or an event external to the plant like an earthquake), proceeds through a series of other failures (either equipment failures or operator errors), and ends up with an end-state other than a “safe, stable” end state. (A PRA sequence that ends up at a “safe, stable” end-state is not an “accident.”) For those sequences that do not end “safe and stable,” the PRA evaluates the overall annual probability of occurrence, the sequence of events that would take place, and the consequences were the sequence to occur. The consequences are analyzed and described quantitatively in terms of damage to the reactor core, the potential for releases of radioactivity from the core to the building, the physical, chemical, and radiological character of those releases, and ultimately the possible release of radioactivity to the environment outside the plant.

It is important to note that the initiating events that can lead to accidents do not necessarily involve safety related systems. Instead, as the reactor-safety community knows from both analysis and operating experience, sometimes these accident sequences may initially involve failures of non-safety related equipment, which then require that safety-related systems function in order to prevent or mitigate an accident. Thus data for the reliability of non-safety-related equipment and systems is a key input to PRA assessments, in addition to that for safety-related systems.

The Diablo Canyon station has performed a PRA of good quality (Reference 5), which is used essentially every day to help understand various issues at the plant as they arise. This PRA is currently being updated in important ways, a process that goes on periodically at Diablo Canyon as elsewhere around the country, because new PRA methodologies are continually being developed, data bases for equipment failures and the like are continually being revised with new information, and there is now a methodology standard for PRA (Reference 6) that is used throughout the U.S. to which the Diablo Canyon PRA is being compared.

The DCISC has reviewed the Diablo Canyon PRA, and also studied several later reviews of it by others (References 7, 8, and 9). We judge that the residual risk as described in the PRA is acceptably small, and have used that judgment as one basis for our conclusion that the plant’s two reactors are now being operated safely.
As noted, many different types of accident sequences can occur at Diablo Canyon, and the PRA analyzes them. Among these accident sequences are some that involve prolonged loss of the function of discharging the waste heat to the environment. Prolonged loss of this function can lead to a serious accident, which is why great care is taken at every nuclear plant in the design and operation of the equipment and structures that carry out this function. There are potential sequences in which loss of this function is the initiating event, and others in which this function is lost as a consequence of another initiating event, such as an equipment failure elsewhere in the plant.

The DCISC has reached two important conclusions about Diablo Canyon that need to be understood before we can explain our evaluation here. First, the DCISC judges (as noted above and based in part on the PRA) that the current level of safety achieved at Diablo Canyon is acceptable. Second, the PRA, which the DCISC judges to be technically sound, finds that none of the major contributors to the residual risk from accident sequences at Diablo Canyon involve prolonged loss of the normal function of discharging the waste heat to the environment.

While prolonged loss of circulating water system (CWS) function is not an important contributor to risk at DCPP with today’s configuration, abrupt loss of CWS results in one of the more severe types of transients the plant can experience. The risk arises from the coupling between different pieces of equipment during the transient, which can affect equipment reliability in ways not fully captured by the normal reliability data. In the case of abrupt failure of CWS, a normal turbine and reactor trip occur, but the capability to dump excess steam to control the primary system pressure and temperature is reduced because the capacity of the turbine condenser to accept steam is lost. Thus abrupt CWS failures result in a larger temperature and pressure transient to the primary system than during normal plant trips. While these temperatures and pressures remain within the design capability of the primary system, the greater stresses increase the probability of failures of safety-related components. For this reason, the DCISC recommends that special attention be paid to assure that any cooling system modifications do not result in a significant reduction in the reliability of the CWS function.

Another consideration is important to mention here. As a result of insights from the Fukushima nuclear-plant accident in Japan in March 2011, the NRC has ordered all US operating reactors to perform certain studies and based on them to carry out certain safety improvements; other safety improvements may be required by the NRC in the future based on technical studies now under way. In parallel, the US nuclear-power-reactor industry as a whole has undertaken other studies, and has taken the initiative to propose a set of safety improvements that it believes are required and beneficial. Among these latter is an industry initiative, known as “FLEX” (Reference 10), that among other benefits will provide each nuclear plant with a more robust capability to respond in the unlikely event of a prolonged loss of ultimate heat sink. We note that the specifics of these FLEX improvements have not yet been finalized, either at Diablo Canyon or anywhere else, but they are surely going to be installed in one form or another, and they will provide Diablo Canyon with an even stronger basis for the safety performance of its current UHS.
The DCISC's safety criterion

As background, we first reiterate something we noted above, which is that the current OTC approach for providing the normal cooling function at Diablo Canyon meets all applicable NRC requirements. The DCISC is acutely cognizant of the US NRC's nuclear-reactor-safety criteria for this function, and would not provide a positive evaluation for any technology that did not meet those criteria. However, we have approached our safety evaluation using a different set of criteria. Our position is that, although replacement cooling technology could meet all NRC regulations, it could still represent an unacceptable degradation of the overall nuclear-reactor-safety performance at Diablo Canyon when compared to the current configuration. For this reason, the DCISC criterion can be stated as follows:

_Having concluded that the current OTC approach for performing the normal plant cooling function at Diablo Canyon has adequate safety, the DCISC's safety criterion is that any alternative proposed as a replacement should provide at least approximately the same level of overall nuclear-reactor safety._

In the DCISC's view, this mainly (but not entirely) comes down to asking the following question of any technology that might be proposed to replace once-through cooling to perform the normal cooling function at Diablo Canyon, after stipulating that the technology must also meet all applicable NRC regulations:

_As analyzed in the plant PRA, will the contribution of accident sequences involving loss of cooling remain as only a modest contributor to the total residual risk at Diablo Canyon?*_

The DCISC cannot answer this question today, because the analysis has not been performed. However, the DCISC is willing to offer the following assessment: Based on our review of the technical information in front of us, meaning the information in the two Bechtel reports (supplemented by our knowledge of how various cooling technologies perform at other nuclear power plants around the world), we judge it likely that none of the proposed new technologies would pose a significant safety problem at Diablo Canyon, if they do not degrade significantly the plant's reliability and increase the frequency of plant trips. However, this is not a strong conclusion based on evidence, but merely a judgment based on what we know so far. Crucially, more analysis is needed. Any new technology must be designed, installed, and operated to high reliability standards, and the first step would be the design step, where details must be developed that will lead to an acceptable design solution.

To summarize: While the DCISC has a technical basis for optimism, we cannot determine from the available conceptual information whether any of the proposed alternative technologies will contribute more to the overall plant risk profile at Diablo Canyon than the modest contribution made today by the current cooling technology

* The comparison between the current cooling configuration and any proposed new one should, in our view, account for the safety benefits to be realized when the new FLEX equipment is installed, because that equipment will surely be available long before any proposed change in the cooling configuration at Diablo Canyon would occur.
(using once-through cooling) -- and we believe that nobody else can fully determine this yet either.

Summary of DCISC findings, conclusions and recommendation

• Bechtel’s assessment (as we have paraphrased it) is that if any of the seven alternative options under consideration were to be selected to replace OTC at Diablo Canyon, the nuclear-reactor-safety impact on the plant would not be significant enough that PG&E would even need to ask for an NRC license amendment before it could proceed with installing that option at Diablo Canyon. The DCISC has reviewed Bechtel’s conclusion and the basis for it. We find that this conclusion is questionable for the offshore wedge-wire system, because this system requires that a new safety-related system be designed and installed in the plant intake structure. We also find that it is unlikely, given how extensive the plant modifications are, that the installation of any of the five closed cooling options could be performed without a license amendment request.

• We find that the nuclear safety impacts of the alternative cooling options, if and when they are appropriately designed, manufactured, and installed, would likely be sufficiently small that NRC approval could be obtained. However, the DCISC has an additional criterion for judging the safety impact of an alternative plant cooling technology at Diablo Canyon. That is because, in our view, meeting NRC’s safety regulations is necessary to support a decision to proceed, but not sufficient.

• Based on our review of the technical information in front of us, we judge it probable that none of the proposed new technologies, if and when they are developed and implemented in accordance with established safety practices, would pose a sufficient safety problem to preclude NRC licensing of the modified design. However, this is not a strong conclusion based on evidence, but merely a judgment based on what we know so far.

• One of our primary concerns with any of the proposed alternative cooling methods involves the potential impact on plant reliability, in particular whether the modified configuration might be more prone to generating plant trips and forced outages, with a potential impact on plant safety, in particular a potential impact on ASW/UHS.

• The DCISC recommends that additional analysis be performed and more design detail be provided by Bechtel or by PG&E in order to assess the likely effects of the alternative cooling methods on plant reliability and to determine whether the DCISC safety criterion will be met.

DCISC follow-on activities

These are all interim DCISC findings and conclusions, in the sense that as new information is developed (and it will be) any of them is subject to updated evaluation. In particular, as a follow-on to the work done so far on this set of issues, we will undertake the following:
• We (the DCISC) will continue to review the latest technical information developed by both Bechtel and PG&E; will follow and review any other new information as it comes to our attention; and will also review any NRC evaluations if the NRC becomes involved.

• We will review any new information about these issues that may emerge in the engineering community more broadly for possible relevance to Diablo Canyon, quite apart from whether it is associated with the current proposals.

All of the above would be a part of our normal DCISC scope to review operational safety at Diablo Canyon, but because of the special inquiry made by the California SWRCB, we will be especially alert about these issues.

References


4. Pacific Gas and Electric Company, “Diablo Canyon Power Plant Unit 1 and 2 Final Safety Analysis Report Update” (revised by the plant on a continuing basis; part of the NRC docket for DCPP)


Ms. Jeanine Townsend
Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, California 95814

Re: Comment Letter – Once-Through Cooling Policy Special Studies.

Dear Ms. Townsend:

The Diablo Canyon Independent Safety Committee (DCISC) was established in 1988 by a settlement agreement approved by the California Public Utilities Commission (CPUC) to review operations at PG&E’s Diablo Canyon Power Plant (DCPP) for the purpose of assessing the safety of operations and suggesting any recommendations for its safe operation. The DCISC consists of three members, one each appointed by the Governor, the Attorney General and the Chairperson of the California Energy Commission.

To assist the State Water Resources Control Board (Board) and its Review Committee for Nuclear Fueled Power Plants (Review Committee) in evaluating the special studies conducted by the Bechtel Power Corporation (Bechtel) regarding the scientific, technical and environmental issues related to a closed-cycle cooling retrofit and the ability, alternatives and costs for DCPP to meet policy requirements on the use of coastal and estuarine waters for power plant cooling, the DCISC conducted two evaluations of the issues and the impacts on safety at DCPP from the elimination of once-through cooling and its replacement by closed-cycle cooling. The major issue that the DCISC considered in both evaluations was that of nuclear safety.

On October 14, 2014, the DCISC approved its Preliminary Evaluation of Safety Issues for Bechtel’s “Addendum to the Independent Third-Party Final Technologies Assessment for the Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling System for the Diablo Canyon Power Plant Addressing the Installation of Saltwater Cooling Towers in the South Parking Lot.” The DCISC’s Preliminary Evaluation is provided herein as Attachment 1 for the Board’s consideration at its meeting on November 18, 2014.
Previously, on September 5, 2013, the DCISC provided to the Board its Evaluation of Bechtel’s “Independent Third-Party Final Technologies Assessment for the Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling System for Diablo Canyon Power Plant.” The DCISC’s September 5, 2013, Evaluation is provided as Attachment 2 herein for the Board’s consideration on November 18, 2014.

Because the DCISC will continue to study the safety implications of alternatives to once-through cooling, and because additional information concerning these issues may be developed by Bechtel or others, and further design and analysis work may be developed in the future either by Bechtel or by PG&E, it is possible that the DCISC may modify either or both evaluations.

In continuing to fulfill its charge from the CPUC to review operations at DCPP for purposes of assessing the safety of operations and suggesting any recommendations for safe operations, the DCISC commits to perform additional study and to be alert to any new information that might lead the DCISC to modify its conclusions about safety as set forth in Attachments 1 and 2. Please provide acknowledgment of your receipt of this letter together with the attachments by reply email and keep us informed concerning the Board’s plans for continuing the process of evaluating alternative cooling methods for DCPP.

On behalf of myself and the other members of the Diablo Canyon Independent Safety Committee, please convey our thanks to the Board for the opportunity to review the Bechtel reports and to contribute to the Board’s assessment of these important issues and their potential to affect the future safety of the DCPP. Should the Board Members have any questions or concerns about the substance or nature of the DCISC’s evaluations or the conclusions or recommendation therein, please do not hesitate to communicate with us.

Very truly yours,

Per F. Peterson  
Chair

Attachments 1 and 2
cc (w/att.):
Hon. Edmund G. Brown, Jr., Governor, State of California
   c/o Mr. Ken Alex, Senior Policy Advisor/Director of Planning & Research
Hon. Kamala Harris, Attorney General, State of California
   c/o Ms. Megan Hey, Deputy Attorney General
Hon. Robert B. Weisenmiller, Chair, California Energy Commission
Mr. Kevin Barker, Advisor to the Chair, California Energy Commission
Ms. Danielle Osborn Mills, Senior Nuclear Policy Advisor, California Energy Commission
Hon. Michael R. Peevey, President, California Public Utilities Commission
Mr. Thomas Hipschman, DCPP Senior Resident Inspector, U.S. Nuclear Regulatory Commission
Mr. Ed Halpin, Senior Vice President and Chief Nuclear Officer, PG&E
Mr. Barry Allen, Site Vice President, PG&E, Diablo Canyon
Mr. Mark Krausse, Director, State Agency Relations, PG&E, Sacramento
Ms. Maureen Zawalick, Corporate Support Manager PG&E, DCPP
Mr. Douglas E. Dismukes, Bechtel Power Corporation
Mr. Jonathan Bishop, Chief Deputy Director, SWRCB
Ms. Marleigh Wood, Senior Staff Counsel, California State Water Resources Control Board (SWRCB)
Ms. Victoria Whitney, Director of Water Quality, SWRCB
Mr. Rik Rasmussen, Surface Water Assistant Deputy Director, SWRCB
Mr. Paul Hann, Watershed Ocean and Wetlands Section Chief, SWRCB
Dr. Maria de la Paz Carpio-Obeso, Ocean Unit Chief, Div. of Water Quality, SWRCB
Ms. Shuka Rastegarpour, Environmental Scientist, Ocean Stnds.Unit, Div. of Water Quality, SWRCB
I. **Background: Addendum to the Bechtel Report Reviewed by the DCISC**

In early 2011, the California State Water Resources Control Board appointed a special committee, a “Review Committee to Oversee Special Studies for the Nuclear-Fueled Power Plants Using Once-through Cooling” (the “Review Committee”) to assist it in evaluating various technical options that might be used to replace or reduce the environmental impacts of once-through cooling (OTC) at the two nuclear power plants then operating along California’s Pacific coast, Diablo Canyon Power Plant (DCPP) and San Onofre Nuclear Generating Station.

Bechtel Power Corporation was selected as the contractor to perform technical evaluation of options. In August 2013, Bechtel published a technical study of seven options (Reference 1). During its meeting on 13 August 2013 in Sacramento, the Review Committee requested that the Diablo Canyon Independent Safety Committee (DCISC) provide a technical evaluation of the nuclear-reactor-safety issues associated with these seven alternative cooling technologies for modifications to the existing once-through cooling system for DCPP.

The DCISC’s charter is to review and make recommendations concerning the safety of operations at Diablo Canyon Power Plant.

On September 5, 2013, the DCISC issued a report reviewing safety issues associated with the seven potential technologies to modify cooling of the DCPP (Reference 2). The DCISC established a “safety criterion” in that prior report, which is repeated below and which also applies to our current review reported here [See the box below].
The DCISC’s Safety Criterion

As background, we first reiterate something we noted above, which is that the current OTC approach for providing the normal cooling function at Diablo Canyon meets all applicable NRC requirements. The DCISC is acutely cognizant of the US NRC’s nuclear-reactor-safety criteria for this function, and would not provide a positive evaluation for any technology that did not meet those criteria. However, we have approached our safety evaluation using a different set of criteria. Our position is that, although replacement cooling technology could meet all NRC regulations, it could still represent an unacceptable degradation of the overall nuclear-reactor-safety performance at Diablo Canyon when compared to the current configuration. For this reason, the DCISC criterion can be stated as follows:

*Having concluded that the current OTC approach for performing the normal plant cooling function at Diablo Canyon has adequate safety, the DCISC’s safety criterion is that any alternative proposed as a replacement should provide at least approximately the same level of overall nuclear-reactor safety.*

In the DCISC’s view, this mainly (but not entirely) comes down to asking the following question of any technology that might be proposed to replace once-through cooling to perform the normal cooling function at Diablo Canyon, after stipulating that the technology must also meet all applicable NRC regulations:

*As analyzed in the plant PRA, will the contribution of accident sequences involving loss of cooling remain as only a modest contributor to the total residual risk at Diablo Canyon?*

The DCISC cannot answer this question today, because the analysis has not been performed. In our review of the first seven options, the DCISC offered the following assessment: Based on our review of the technical information in front of us, meaning the information in the two Bechtel reports (supplemented by our knowledge of how various cooling technologies perform at other nuclear power plants around the world), we judge it likely that none of the [seven technology options studied initially by Bechtel] would pose a significant safety problem at Diablo Canyon, if they do not degrade significantly the plant’s reliability and increase the frequency of plant trips. However, this was not a strong conclusion based on evidence, but merely a judgment based on what we know so far. Crucially, more analysis is needed. Any new technology must be designed, installed, and operated to high reliability standards, and the first step would be the design step, where details must be developed that will lead to an acceptable design solution.

The DCISC received a copy of Bechtel’s draft Addendum on the use of salt water cooling towers south of the plant on July 3, 2014 and published the Bechtel report and a draft evaluation of it developed by Per F. Peterson (then DCISC Chair) and R. Ferman Wardell (a DCISC Consultant) on the DCISC website on August 6, 2014. On August 8, 2014, the DCISC held a public meeting in San Luis Obispo to discuss a draft version of
this report. Public comment received before and during this public meeting strongly encouraged the DCISC not to finalize the report at that meeting because there was insufficient time for public review and comment. Recognizing the importance of public comment, and the value of waiting for the final Bechtel Addendum Report to be issued, at that August 8 Public Meeting the DCISC decided to defer any approval of this report and announced a public comment period for its evaluation. Immediately after that public meeting, the DCISC draft report was placed on the DCISC website (www.dcis.org) and forwarded in draft form to Bechtel and to the SWRCB. Bechtel issued its Final Addendum on September 19, 2014. The DCISC comment period, and its extension, ended on September 26, 2014. Comments were received from the Friends of the Earth (FOE) and the San Luis Obispo Mothers for Peace (SLOMFP), and were posted to the DCISC web site. These comments, and any others, will be discussed at the DCISC October 14-15, 2014 Public Meeting in Avila Beach CA as described on the DCISC website.

As discussed in more detail below, in its preliminary review of the Bechtel Addendum Study, which was issued in final form on September 19, 2014 (Reference 3), we find that the use of salt water evaporative cooling, and the impacts of southern siting of cooling towers on operations and site emergency access both should be studied more to determine if there are overall safety impacts such that the design might not meet the DCISC’s safety criterion.

We did not review the Bechtel cooling tower designs with respect to their optimization or economics. We note that the FOE review suggests that design options are available that could reduce the cost of such towers, in particular, to locate the towers at higher elevations than by Bechtel in their evaluation in order to reduce excavation costs and reduce the number of buildings that would need to be demolished.

The FOE review also notes that closed cooling would eliminate the risk of plant trips caused by entrainment of kelp and salp (a type of jellyfish) into the existing circulating water system at the plant intake cove, which has resulted in periodic plant trips in the past. DCPP has reduced this risk by curtailing power during winter storms and by monitoring for sea life entering the intake cove and maintaining a bubble curtain system to prevent salp from becoming entrained. This has been successful in reducing the frequency of plant trips due to kelp and salp entrainment. The DCISC believes that insufficient information exists to evaluate whether the rate of circulating water trips that might occur during the start up or normal operation of new cooling towers would be lower than, or greater than, the rate that would occur with the existing once-through cooling system, and that further study is warranted.

II. Scope of the Addendum Study

The additional study the Review Committee directed Bechtel to perform evaluated a modified cooling tower system implementing the following changes from the initial study:

1. Southern siting: Relocation of the cooling towers from the north side of the plant to the south side, to reduce excavation requirements,
2. **Seawater evaporative cooling**: Use of seawater in the cooling towers to eliminate the requirement for a desalination plant as part of the overall system, and

3. **Increased coolant temperature**: An evaluation of options with higher cooling water temperature, which would increase the operating pressure of the DCPP condensers and reduce plant efficiency, but also reduce the size and cost of the cooling towers.

In our earlier review (Reference 2), the DCISC disagreed with the Bechtel conclusion that none of the cooling options studied would be likely to require a License Amendment Request (LAR) to the U.S. Nuclear Regulatory Commission (NRC). In the final Addendum Report, Bechtel states (Reference 3, pg. 5),

“Although we believe that the 10 CFR 50.59 process required to make any plant modification would not result in the need for a licensing amendment, it is likely that the U.S. Nuclear Regulatory Commission (USNRC) would be involved in reviewing this change, which may result in a detailed regulatory review process. It is assumed that any USNRC review would be conducted in parallel with the various state permit reviews.”

Ultimately, only the NRC can make the decision about whether an LAR would be required. Under NRC regulations, an LAR would be required if the change to the plant was an unreviewed (by NRC) safety question of the NRC-approved Final Safety Analysis Report (FASR) or Technical Specifications (TS). Our review concludes that the use of cooling towers creates a new flooding risk affecting safety-related emergency diesel generators and switchgear located in the 85-foot level of the turbine building, and that both southern siting and seawater evaporative cooling would impact the operability and performance of several additional safety-related systems, and thus the DCISC concludes that an NRC LAR would almost certainly be required if closed cooling were used, as discussed in the following sections of this report.

FOE (Reference 12) challenged this conclusion at the October 14, 2014 DCISC Public Meeting by citing NRC statements from the 2007 California Energy Commission’s workshop on nuclear safety issues. The NRC statements were that the NRC would defer to the states the decision on whether to require cooling towers or once-through-cooling. The DCISC understands this to be for the concept of cooling for primarily new plant designs, not the effect on safety systems and safety analyses for back-fitting cooling towers. Further, for cooling water backfits, the DCISC’s interpretation is that the NRC would still defer that choice to California but would still perform its own safety review of the safety effects of the change.

FOE stated that, “It is unknown what practical experience DCISC committee members have to challenge Bechtel on this [whether an NRC LAR is required]. As explained in the October 14, 2014 DCISC Public Meeting Dr. Peter Lam served as a Federal Administrative Law Judge for 18 years sitting on the NRC Atomic and Safety Licensing Board panel adjudicating NRC licensing matters. Mr. Wardell has extensive experience in NRC licensing and compliance. Dr. Budnitz was once Director of Research at NRC.

To perform our review of the Bechtel Addendum Report, we used information from several sources. These include information requested from DCPP during the DCISC
May 21-22, 2014 Fact Finding meeting, documented in the resulting DCISC Fact Finding Report (Reference 4); a November 2013 report commissioned by the Friends of the Earth (Reference 5); a detailed report on performance and effects of saltwater cooling towers performed by the California Energy Commission’s Public Interest Energy Research Program (Reference 6); the User Manual for the F400 ClearSky® cooling tower (Reference 7); and information from the Palo Verde Nuclear Generating Station near Phoenix Arizona, which uses cooling towers that operate with relatively high-salinity water (Reference 8), and review comments of the earlier draft report provided by the FOE (Reference 9) and SLOMFp (Reference 10).

III. The Baseline Bechtel Cooling Tower Designs

The initial Bechtel report (Reference 1) evaluated seven cooling technologies, including five closed cycle cooling systems:

- Inshore mechanical (active) intake fine mesh screening systems
- Offshore modular wedge wire systems
- Closed-cycle cooling systems (5 different approaches):
  - Passive draft dry/air cooling
  - Mechanical (forced) draft dry/air cooling
  - Wet natural draft cooling
  - Wet mechanical (forced) draft cooling
  - Hybrid wet/dry cooling

In evaluating the closed cooling options, the 2013 Bechtel study concluded,

"All [closed] cooling technologies are considered viable from a tsunami, seismic, and structural perspective. However, from an efficient design and construction perspective, the wet mechanical (forced) draft cooling is considered most attractive for DCPP (since there is no sufficient space at DCPP site for the mechanical (forced) draft dry/air cooling option). The hybrid wet/dry cooling tower option is also considered to be an efficient option, and warrants further consideration when making the final selection." (Reference 1, pg. 121).

The Bechtel cooling tower designs were located on the northern side of the plant, in an area where little existing infrastructure exists, and the wet-cooling designs used fresh water for cooling provided by a combination of reclaimed water and water produced using a new desalination plant. Also, the wet cooling towers were sized to be capable of providing condenser cooling water at a temperature that would allow the cooling towers to also provide service water cooling, by installing larger service water heat exchangers to accommodate the higher temperature of the cooling water.

Subsequently, the Review Committee received comments from the Friends of the Earth (Reference 5) suggesting that the capital cost of the closed cooling system could be reduced using a combination of southern siting, to reduce excavation costs; seawater evaporative cooling, to eliminate the need for a desalination plant; and allowing

* The plant service water system provides cooling to non-safety-related equipment in the plant.
somewhat higher turbine back pressure to reduce the cooling tower size. The Review Committee then directed Bechtel to develop and evaluate a new closed cooling system design based upon these changes. Bechtel's new work to share this assignment has resulted in their Addendum (Ref. 3).

In this report, the DCISC evaluates the potential additional plant operational safety impacts that would result from these proposed design changes.

FOE submitted additional comments (Reference 12) on this evaluation at the October 14, 2014 DCISC Public Meeting in Avila Beach CA. These comments dealt primarily with conclusions the DCISC had drawn about the effects of salt deposition on DCPP equipment. The DCISC has revised its evaluation to incorporate those comments. Other FOE comments are addressed herein.

IV. Safety Impacts of Southern Siting

Figure 1 presents a plant arrangement drawing developed by Bechtel (Reference 3) showing southern siting of saltwater cooling towers. Bechtel evaluated two design options using ClearSky® cooling towers as a case-study example, Case 1 being a configuration sized to have a visible plume only 5% of the time, and Case 1B being smaller and sized to have a visible plume 55% of the time.

Because the primary access to the plant site is from the south and most of the plant support infrastructure, including parking, security, training, and support buildings are on the south side of the plant, southern siting of cooling towers has the potential to generate more negative impacts on plant operations, emergency response, and safety related systems than northern siting, not only during construction, but also during long-term operation.

To reduce lost electricity revenues, Bechtel proposes that the majority of construction work would occur during a 6.3 to 6.5 year period during which plant operation would continue (Reference 3, Table 5.1-1). The final connection of the new cooling towers would then occur during simultaneous outages of both units lasting 2.3 years.

Because the plant training facility and security facility are required to be available continuously during the construction period (even during the dual unit outage), the Bechtel design leaves these facilities in place. But the plan requires demolition and reconstruction of most other plant infrastructure buildings, access roads, and underground services in the southern area of the plant. Under the Bechtel design, twenty-two buildings would be removed and reconstructed, including the fire department building and fire operations garage (Reference 3, pg. 26). FOE (Reference 9) has stated that fewer buildings would require demolition, and less excavation would be required, if the cooling towers were located at a higher elevation than the locations proposed by Bechtel for its 34 cell design. We have not reviewed how higher elevations would affect building demolition, but note that because circulating water pipe routing would be similar, construction impacts on plant operations would likely be comparable (except those associated with reduced excavation requirements). Because the smaller footprint available to the south of the plant requires that the cooling tower size be reduced, the Bechtel design concludes that it would be impractical to modify the service
water cooling system, and thus a new system to provide once-through cooling for service water is included in the design.

Fig. 1: Bechtel arrangement for a 44-cell southern cooling tower system.

The most relevant experience with major construction projects that has affected plant access, that the DCISC has reviewed in detail to assess potential safety impacts, involved major post 9/11 security upgrades at DCPP. All of these plant security modifications were assessed for their safety impacts, and where the modifications would affect plant access for operation, temporary barriers were erected to gain experience with how these modifications would affect operations and maintenance. In an April, 2005 Fact Finding report, the DCISC described the review process that was required to assess safety impacts of these security upgrades (Reference 11):

"The DCISC reviewed the provisions made for normal and emergency plant access in the new security design modifications. Prior to finalizing and implementing any security upgrade designs, Security involved affected stakeholders in a design review. (This is actually a standard practice in the DCPP Design Change Process). Likewise, Security reviews non-security draft plant design changes for security requirements and effects. The DCISC reviewed an Action Request which documented these reviews by

- California Division of Forestry (for fire truck access)
- Operations
- Radiation Protection
- Outage Coordinators
- Industrial Safety
- Maintenance
• Emergency Preparedness
• Fire Protection
• Security (for effects on other parts of the Security Plan)"

The scale of plant modifications required to implement closed cooling with southern siting, and impacts on site access during construction, would be significantly larger than what was required to implement the post-9/11 security changes or for the northern site. It is not clear to the DCISC that the Bechtel construction schedule provides sufficient time to complete rigorous safety reviews, at the level that was performed for earlier security modifications.

**DCISC Conclusion 1:** The logistics for maintaining effective plant access for normal operations and emergency response, as well as meeting requirements for physical security during the six-year cooling tower construction period prior to the dual-unit outage, will be substantially more complex for the southern siting option.

**DCISC Recommendation 1:** An evaluation should be performed to understand the impact of southern-sited cooling towers on plant security and emergency response capabilities.

Two major safety-related systems are impacted substantially by the southern siting option. Auxiliary Salt Water (ASW) supply, which provides safety-related heat removal from reactors, spent fuel pools, and other safety-related equipment, must be temporarily rerouted and then replaced by a new underground piping system. This system is the last, or ultimate, cooling water supply for the plant. During a beyond design basis accident the plant has the capability to cope temporarily without ASW by injecting water into the steam generators and venting steam and by allowing the spent fuel pools to boil, but ASW’s long-term operation is essential to providing cooling to the fuel in the reactor and the spent fuel pools. Likewise, the two 50,000 gallon underground fuel tanks for the plant Emergency Diesel Generators (EDGs) must be removed and replaced. The EDGs provide the last supply of electricity to the plant, in a similar fashion to the ASW system for cooling water. Both systems are essential for maintaining long-term safe plant shutdown.

The draft Bechtel report states that "[e]mergency backup power required during the outage would be provided by temporary diesel generators." The DCISC concludes that the design of these proposed temporary generators will require very careful review to assure that safety can be maintained. The draft Bechtel report also states that "[e]xcavation and demolition of existing [circulating water system] duct west of the turbine building within the footprint of the new concrete ducts, [will occur] while supporting the five existing ASW lines." The DCISC concludes that it is unlikely that the existing ASW lines, which are integrated into the existing circulating water system underground concrete duct structure, could be maintained. Instead, temporary rerouting of ASW lines to maintain spent fuel pool cooling, followed by replacement, will be needed. This would continue to maintain safety system cooling but would add some adverse risk to plant operational safety.

Bechtel proposes that the construction activities to modify the AWS supply and the EDG fuel storage tanks, along with other construction inside the plant protected area, would occur during the 2.3-year long dual unit outage.
FOE challenged the DCISC concern (Reference 12), stating that “There can be no operational plant risk when the plant is offline, only need to assure cooling water to spent fuel storage pools.” The Bechtel design approach calls for a cooling tower construction period is approximately six years while DCPP is operating, and the cooling tower piping and electrical tie-ins would then occur during another 2.3 year dual unit outage. The DCISC concern for southern construction on safety is primarily for the six year tie-in period when the plant would be fully operational.

**DCISC Conclusion 2:** Installation of cooling water ducts in the protected area will impact operability and require design changes to the emergency diesel generator fuel tanks and the auxiliary saltwater system, and require analysis for new flooding risks for safety-related equipment (emergency diesel generators and switch gear) located in the 85-foot elevation of the turbine building. Southern siting would also require redesign and replacement of the underground Auxiliary Saltwater System piping, which, when modified by DCPP in the past, has required a NRC License Amendment Request (LAR). Combined with other safety-related impacts related to emergency response, fire protection, and security, implementation of closed cooling with southern siting will require NRC review and appears likely to trigger a requirement for a NRC LAR, which would lead to a potentially lengthy NRC review.

**DCISC Recommendation 2:** Additional review/analysis should be performed to provide an estimate of how extensive an NRC review might be necessary concerning the cooling tower options. Such an effort should incorporate NRC staff inputs.

**DCISC Conclusion 3:** The design of the proposed temporary emergency diesel generators will require very careful review to assure that safety can be maintained.

**DCISC Conclusion 4:** It is unlikely that the existing ASW lines, which are integrated into the existing circulating water system underground concrete duct structure, could be maintained. Instead, temporary rerouting of ASW lines to maintain spent fuel pool cooling, followed by replacement, will be needed. This would continue to maintain safety system cooling but would add some adverse risk to plant operational safety.

**DCISC Recommendation 3:** A probabilistic risk assessment analysis should be made to quantify the impact of cooling towers on the risk of transients and accidents and any change to the margins of safety.

V. **Safety Impacts of Seawater Evaporative Cooling**

The consumption of fresh water (including reclaimed and desalinated water) can be reduced in cooling towers by using brackish water (water with sufficient dissolved solids to be non-potable) or seawater for makeup (Reference 6). The primary safety-related impacts of using seawater in cooling towers at DCPP will involve increased rates of salt deposition on plant equipment and structures,
“Nearly all plants with high-salinity cooling towers, both natural and mechanical draft, have encountered accelerated corrosion on unprotected metal surfaces on buildings and equipment at the plant site near the towers.” (Reference 6, pg. 28)

FOE advised at the October 14, 2014 DCISC Public Meeting (Reference 12) that most conclusions from the above-cited report (Reference 6) were about the successful operation of plants with saltwater cooling towers. Conflicting information exists about the salinity levels in the cooling water for the Hope Creek nuclear plant cited in the FOE comments. The DCISC notes that U.S. nuclear plants that currently use brackish or saltwater were designed from the start for saltwater cooling towers, whereas DCPP is being considered for back-fitting saltwater cooling towers, and they likewise operate in areas that have different wind and humidity conditions. The observations provide additional motivation for further study.

Wet cooling towers operate by drawing external air upward in counter flow with cooling water, which runs down over structures designed to provide high contact surface area between the water and the air. Cooling of the water occurs due to a combination of sensible heating of the air (raising the air temperature), as well as evaporation of the water (raising the air humidity). The evaporated water does not contain salt, but inevitably droplets of water, referred to as “drift”, that do contain salt become entrained in the air flow. For the ClearSky® cooling tower selected for review in the Bechtel report, approximately 0.02% of the circulating water flow becomes entrained in the air flow as droplets (Reference 7, Pg. 13). The ClearSky® cooling towers then pass the air flow through a heat exchanger that cools the air and condenses some of the water vapor, using dry ambient air, and then mixes these streams together, to reduce the generation of visible plumes above the cooling towers. The ClearSky® cooling tower also has drift eliminators, which remove most of the entrained water droplets, so the total release of water droplets is reduced to 0.0005% of the circulating water flow.

The total cooling tower flow for the Bechtel design is 2 x 868,300 gallons per minute (gpm) or 1,736,600 gpm. For the design performance of the drift eliminators of 0.0005% (Reference 3, pg. 15), the drift release is 8.7 gpm. The design cycle concentration is 1.5, such that water in the cooling system and drift has 1.5 times the salt content of the makeup seawater. With the dissolved solids in seawater being 35,000 parts per million (ppm), the concentration in the circulating water is then 52,000 ppm. For operation with a 90% capacity factor, the annual release of dissolved salt is then (0.90)(8.7 gpm)(0.052)(8.56 lb/gal)(525,000 min/yr)/(2200 lb/t) = 830 metric tons/yr.

The fraction of the salt contained in this drift flow, that would deposit onto equipment around the plant, depends upon the wind speed, droplet size distribution, and droplet settling velocities. Figure 2 shows a wind direction table (wind rose) for the DCPP site in 2013, which is representative of data for earlier years also (Appendix A). The prevailing winds greater than 3.5 miles per hour (mph) from the west-northwest, northwest and north-northwest would carry droplets away from the plant approximately 55.4% of the time. Approximately 23.3% of the year wind speeds are under 3.5 miles per hour (mph), and approximately 10.1% of the time wind comes from the east-southeast, southeast, or south-southeast at speeds above 3.5 mph, during which times a larger fraction of droplets can be expected to deposit on plant equipment.
Fig. 2: Wind direction table for the DCPP site in 2013.

As a result of insights from recent high-voltage flashover events, discussed later, DCPP recently initiated a program to measure the rate of salt deposition on transformers by
collecting salt samples on coupons placed near the Unit 1 and Unit 2 transformers (Reference 4). This is the first time that salt deposition rates have been measured since the plant initial measurements were performed in 1969. The collection coupons are replaced on a monthly basis, so that seasonal variability in salt deposition rates can be measured. These measurements have revealed that the Unit 2 main transformer area experiences higher rates of salt deposition than for Unit 1, approximately double, which is ascribed to added salt spray from the plant cooling water outfall, that tends to be carried by prevailing winds through the gap between the Turbine Building and the Administration Building and thus to deposit salt on the Unit 2 transformers, whereas the Unit 1 transformers experience salt deposition primarily from natural sources of spray. This higher rate of salt deposition, caused by carryover from the plant outfall, helps explain why the major problems with high-voltage flashover events at DCPP have involved the Unit 2 high-voltage equipment.

The measured rate of deposition of salt in the area of the Unit 2 transformers, on 16 samples exposed over a 30-day period and collected on April 3, 2014, ranged from 0.0368 to 0.2062 mg/cm², with an average of 0.1015 mg/cm². Conversely, for 16 samples collected in similar locations near Unit 1, deposition ranged from 0.0289 to 0.1243 mg/cm², with an average of 0.0520 mg/cm². These values are consistent with studies performed at the site in 1969, which recommended use of a value of 0.011 mg/cm²/week (or 0.047 mg/cm² in 30 days), as an appropriate deposition rate to assume in the design of high voltage insulators.

A key question for salt-water cooling towers is how rapidly salt might deposit onto equipment, particularly during periods of adverse weather when salt water drift would move slowly and deposit primarily onto the plant area, compared to the current deposition rates. Considering the plant area inside the vehicle exclusion barrier, which is approximately 2400 ft (730 m) long and 1200 ft (366 m) wide, at a nominal deposition rate of 0.052 mg/cm² per 30 days, total salt deposition is approximately $(0.052 \, \text{mg/cm}^2)(730 \, \text{m})(366 \, \text{m})(10^4 \, \text{cm}^2/\text{m}^2)(365 \, \text{days/yr})/(30 \, \text{d})(10^8 \, \text{mg/ton}) = 1.7 \, \text{tons/yr}$. This existing rate of salt deposition is very small compared to the rate at which salt would be released from the cooling towers, around 830 tons/yr as calculated above.

Safety-related equipment that could be negatively impacted by increased salt deposition are the Emergency Diesel Generators (which draw in large volumes of external air during test and operation), the Auxiliary Building, Control Room, and Fuel Handling Building Ventilation Systems which also draw in large volumes of external air (Reference 4), and the dry cask storage canisters and overpacks in the plant Independent Spent Fuel Storage Installation (ISFSI), although deposition on the storage casks is likely to have less effect than on the plant itself and its equipment, which is closer to the ocean. In addition, the reliability of high voltage equipment located outdoors could be reduced, including high voltage insulators in transformers and in switchyards. A key area of risk that will require evaluation will be potential for increased frequency of loss of offsite power (LOOP) due to potential simultaneous electrical failures in the 230 kV and 500 kV switchyards.

DCPP has already experienced problems with high-voltage flashover events caused by current rates of salt deposition. The most recent cases involved an event in October 2012, when during a light rain arcing occurred on the Unit 2 A and B Phase Main Bank Transformers (MBT) and shortly afterward the 500 kV insulator flashed to ground,
causing Unit 2 to trip. A similar Unit 2 trip occurred in July 2013 during a periodic hot
washing of the 500 kV insulators for Unit 2, which is conducted every 6 weeks, when
overspray induced an external arc around the lighting arrester insulation and flashover.
A third event occurred in February 2014, after about an hour and a half of light rain,
again on the Unit 2 Main Bank Transformer “B” Phase Lightning Arrester (Reference 4).

Relevant experience with the effects of salt releases from cooling towers on nuclear
plant safety is provided by the Palo Verde Station in Arizona (Reference 6). Because
the Palo Verde Station has a zero discharge design, it runs with a high dissolved solids
concentration in its cooling water of around 24,000 ppm, with a total cooling water flow
rate for 3 reactor units of 1,863,000 gpm (Reference 6). These cooling towers operate
with a drift of under 0.001% (Reference 8). These values can be compared to the
52,000 ppm and 1,736,600 gpm for seawater cooling towers for DCPP, suggesting that
total salt releases for the DCPP cooling towers would be approximately double those for
Palo Verde. Salt deposition would be different at DCPP than at Palo Verde due to
differences in prevailing winds and in average air humidity. Likewise, the corrosive
effects of salt deposits are higher in humid environments, and thus would be larger
under the more humid conditions at DCPP than experienced in the less humid
conditions at Palo Verde.

FOE advised at the October 14, 2014 DCISC Public Meeting (Reference 12) that the
Hope Creek Nuclear Plant in New Jersey has been operating well for 28 years with
saltwater cooling towers. Hope Creek is reported to be operating with cooling towers
using brackish water (Reference 13) withdrawn from the Delaware River Estuary and
thus with lower salinity levels than ocean water. The question about the actual salinity
levels at Hope Creek, its design features to accommodate brackish water in its cooling
towers, and specific wind and humidity conditions at this site suggests more study is
warranted.

The Bechtel report states, “The actual level of additional effort necessary to mitigate the
effects of the saltwater drift will have to be determined based on operating experience
after the saltwater towers are placed in service.” The DCISC does not agree with this
approach. Because the increase in salt deposition rates is likely to be large, the impact
of this change on plant safety related systems should be studied in detail before any
plant modification is performed. As noted in the Bechtel report, modeling tools such as
the Electric Power Research Institute Seasonal/Annual Cooling Tower Impact Model
can simulate drift deposition and can provide a quantitative estimate for the increased
rate of deposition. The DCISC also anticipates that the NRC would require such studies
before it would approve any LAR implementing salt-water cooling towers.

FOE suggested (Reference 12), and the DCISC agrees, that for salt deposition studies
the salt source from the existing DCPP outfall (circulating water discharge) be removed
because the outfall would be eliminated if cooling towers were to be installed. The
DCISC also notes that the areas impacted by drift from the current discharge (outfall)
are limited, while drift from saltwater cooling towers has the potential to deposit on a
wider range of structures and equipment, again suggesting the need for further study.

As discussed earlier, the use of cooling towers would also change, and potentially
improve, the reliability of the circulating water system compared to the current once-
through system which can become plugged by entrained kelp or salp. Because plant
trips due to loss of circulating water place significant stress on the plant, it would be highly desirable to have a better quantitative understanding of the relative reliability, and potential reduction in the rate of trips, that cooling towers could provide. This understanding can be developed as part of the PRA analysis we recommend elsewhere in this report.

DCISC Conclusion 5: The use of salt water cooling towers could result in an increase in the rate of deposition of salt on DCPP plant equipment during the 10.1% of the year that wind blows from the east-south-east and the 23.3% of the year when wind speeds are very low, compared to the rate currently experienced. Higher salt deposition rates have the potential to create negative impacts on some safety-related systems, in particular Emergency Diesel Generators, and ventilation systems for the Auxiliary Building, Control Room, and Fuel Handling Building. Higher salt deposition rates may also reduce the reliability of outdoor high voltage systems that play a major role in plant safety, and increase the frequency of loss of off-site power (LOOP) events. These higher salt deposition rates could also produce negative impacts on the long-term safety of the spent fuel casks in the ISFSI, although these effects should be much less because of the longer distance from the ocean to the ISFSI.

DCISC Recommendation 4: Simulation of rates of salt deposition from salt-water cooling towers, using available modeling tools, should be performed to assess the increase in salt deposition rates that would occur if salt water, rather than fresh water, were used in cooling towers at the site, and these simulations should be used to assess potential impacts on plant safety systems and plant reliability, to inform the decision on whether fresh water or salt water should be used.

VI. Safety Impacts of Increased Coolant Temperature

To reduce the size of the cooling towers to allow them to fit within the smaller footprint available to the south of the plant, and to reduce the cost of the cooling towers, the new cooling towers are sized by Bechtel to operate with higher circulating water temperature than the earlier northern Bechtel design. This results in a somewhat higher condenser back pressure, and somewhat lower power output from the plant turbines. Because the cooling water temperature is higher, the service cooling water system that provides cooling to non-safety related equipment in the plant would continue to use once-through cooling using two new, 10,200 gpm saltwater pumps, to avoid requirements for redesign of service-water system components. The DCPP turbine vendor, Alstom, has indicated that these low pressure turbines can operate reliably at higher condenser pressure.

DCISC Conclusion 6: Operation of the DCPP condensers at a higher pressure of 4 to 5 inches Hg, and the use of a separate once-through cooling system for service water, are unlikely to affect plant safety significantly.

VII. Summary of DCISC Conclusions and Recommendations

Our earlier assessment of closed cooling options, based upon northern siting of the cooling towers and the use of reclaimed and desalinated water, reached the following four conclusions (quoted verbatim from Reference 2):
• "We find that the nuclear safety impacts of the alternative cooling options, if and when they are appropriately designed, manufactured, and installed, would likely be sufficiently small that NRC approval could be obtained. However, the DCISC has an additional criterion for judging the safety impact of an alternative plant cooling technology at Diablo Canyon. That is because, in our view, meeting NRC’s safety regulations is necessary to support a decision to proceed, but not sufficient.

• "Based on our review of the technical information in front of us, we judge it probable that none of the proposed new technologies, if and when they are developed and implemented in accordance with established safety practices, would pose a sufficient safety problem to preclude NRC licensing of the modified design. However, this is not a strong conclusion based on evidence, but merely a judgment based on what we know so far.

• "One of our primary concerns with any of the proposed alternative cooling methods involves the potential impact on plant reliability, in particular whether the modified configuration might be more prone to generating plant trips and forced outages, with a potential impact on plant safety, in particular a potential impact on ASW/UHS [Auxiliary Saltwater System/Ultimate Heat Sink].

• "The DCISC recommends that additional analysis be performed and more design detail be provided by Bechtel or by PG&E in order to assess the likely effects of the alternative cooling methods on plant reliability and to determine whether the DCISC safety criterion will be met." [The bold text is in the original.]

These four earlier conclusions still apply to our assessment of the seven cooling options studied earlier by Bechtel, including closed cooling systems located to the north of the plant and using reclaimed and desalinated water. However, we conclude that the impacts of southern siting of cooling towers on plant access during construction, and the impacts of increased salt deposition on plant equipment from use of salt-water cooling, would both have the potential for substantially more negative safety impacts than would northern siting and use of reclaimed and desalinated water. Conversely, operating with higher cooling temperatures would have minimal safety impact.

VIII. **Conclusions**

The DCISC concludes that the impacts of southern siting of cooling towers on plant access during construction, and the impacts of increased salt deposition on plant equipment from use of salt-water cooling, would both have the potential for more negative safety impacts than would northern siting and use of reclaimed and desalinated water. Conversely, operating with higher cooling temperatures would have minimal safety impact.

Additional conclusions:

1. *The logistics for maintaining effective plant access for normal operations and emergency response, as well as meeting requirements for physical security during the*
six-year cooling tower construction period prior to the dual-unit outage, will be substantially more complex for the southern siting option.

2. Installation of cooling water ducts in the protected area will impact operability and require design changes to the emergency diesel generator fuel tanks and the auxiliary saltwater system, and require analysis for new flooding risks for safety-related equipment (emergency diesel generators and switchgear) located in the 85-foot elevation of the turbine building. Combined with other safety-related impacts related to emergency response, fire protection, and security, implementation of closed cooling with southern siting appears likely to trigger a requirement for an NRC License Amendment Request, which would lead to a potentially lengthy NRC review.

3. The design of the proposed temporary emergency diesel generators will require very careful review to assure that safety can be maintained.

4. It is unlikely that the existing ASW lines, which are integrated into the existing circulating water system underground concrete duct structure, could be maintained. Instead, temporary rerouting of ASW lines to maintain spent fuel pool cooling, followed by replacement, will be needed. This would continue to maintain safety system cooling but would add some adverse risk to plant operational safety.

5. The use of salt water cooling towers could result in an increase in the rate of deposition of salt on DCPP plant equipment during the 10.1% of the year that wind blows from the east-south-east and the 23.3% of the year when wind speeds are very low, compared to the rate currently experienced. Higher salt deposition rates have the potential to create negative impacts on some safety-related systems, in particular Emergency Diesel Generators, and ventilation systems for the Auxiliary Building, Control Room, and Fuel Handling Building. Higher salt deposition rates may also reduce the reliability of outdoor high voltage systems that play a major role in plant safety, and increase the frequency of loss of off-site power (LOOP) events. These higher salt deposition rates could also produce negative impacts on the long-term safety of the spent fuel casks in the ISFSI, although these effects should be much less because of the longer distance from the ocean to the ISFSI.

6. Operation of the DCPP condensers at a higher pressure of 5 inches Hg, which allows the use of smaller cooling towers, is unlikely to affect plant safety significantly.

IX. **Recommendations**

1. An evaluation should be performed to understand the impact of southern-sited cooling towers on plant security and emergency response capabilities.

2. Additional review/analysis should be performed to provide an estimate of how extensive an NRC review might be necessary concerning the cooling tower options. Such an effort should incorporate NRC staff inputs.
3. A probabilistic risk assessment analysis should be made to quantify the impact of cooling towers on the risk of transients and accidents and any change to the margins of safety.

4. Simulation of rates of salt deposition from salt-water cooling towers, using available modeling tools, should be performed to assess the increase in salt deposition rates that would occur if salt water, rather than fresh water, were used in cooling towers at the site, and these simulations should be used to assess potential impacts on plant safety systems and plant reliability, to inform the decision on whether fresh water or salt water should be used.

X. References


10. San Luis Obispo Mothers for Peace, Email communication to DCISC, September 26, 2014.


Fig. A-1: Wind direction table for the DCPP site in 2011.
Fig. A-2: Wind direction table for the DCPP site in 2012.
Attachment 2

5 SEPTEMBER 2013

Concurred in by the Three Members of the DCISC at the DCISC Public Meeting on 4 September 2013

Robert J. Budnitz
Peter Lam
Per F. Peterson

Background: The request from the SWRCB “Review Committee”

In early 2011, the California State Water Resources Control Board appointed a special committee, a “Review Committee to Oversee Special Studies for the Nuclear-Fueled Power Plants Using Once-through Cooling” (the “Review Committee”) to assist it in evaluating various technical options that might be used to replace or reduce the environmental impacts of once-through cooling (OTC) at the two nuclear power plants along California’s Pacific coast, Diablo Canyon and San Onofre. To discharge its charter, the Review Committee requested the two companies then operating those nuclear power plants, Pacific Gas and Electric Company and Southern California Edison Company, to contract for a technical evaluation.

Bechtel Power Corporation was selected as the contractor, and its technical work is the subject of the evaluation here. Specifically, Bechtel published a preliminary study in November 2012 (Reference 1), and then in August 2013 published a follow-up technical study (Reference 2) that extends their earlier work in more detail. The current study remains at the conceptual level but contains sufficient details to reach some high-level conclusions on the nuclear-reactor-safety issues. The level of design detail remains insufficient to assess the impact of the potential design changes on the plant reliability and frequency of trips and forced outages, and to assess potential safety impacts that could occur during or after construction of the modified cooling systems.

The original scope for Bechtel was to provide information and analysis related to both Diablo Canyon and San Onofre. However, in summer 2013 Southern California Edison announced that San Onofre would be permanently closed, after which Bechtel’s work has concentrated only on Diablo Canyon. The scope of the DCISC’s evaluation here is also related only to the Diablo Canyon Power Plant (DCPP).

During its meeting on 13 August 2013 in Sacramento, the Review Committee made a request of the DCISC. The specific request was that the DCISC provide a technical evaluation of the nuclear-reactor-safety issues associated with seven alternative cooling technologies or modifications to the existing once-through cooling system for DCPP.
The request asked if the DCISC could provide its evaluation by 5 September 2013, which represented a very tight schedule. One of the DCISC’s three members (Dr. Budnitz) attended the 13 August meeting, at which he agreed that the DCISC could and would do such an evaluation and would try to meet this schedule. The DCISC’s evaluation has concentrated on Bechtel’s second report (Reference 2), but has also relied in part on Bechtel’s earlier work in Reference 1 as a source of important technical information.

Additional information related to the evaluation

1) Light water power reactors, like the two units at Diablo Canyon, produce large amounts of “waste heat” that must be discharged to the environment. During normal operation, the waste heat is discharged to the Pacific Ocean from the Condenser via the Condenser Circulating Water System. During off-normal or emergency conditions or when one or both reactors are shut down, residual decay heat can be ultimately discharged to the Pacific Ocean via a separate safety-related Auxiliary Saltwater (ASW) System termed the “ultimate heat sink” (UHS), and we will use that term here.

2) Today, Diablo Canyon’s normal heat discharge to the adjacent Pacific Ocean uses the specific technology called once-through cooling (OTC), in which cool ocean water is pumped into the plant, warmed up about 20 degrees Fahrenheit, and returned to the ocean. The current OTC approach inevitably produces environmental impacts on the nearby ocean, and the motivation for the current review of OTC is a desire to decrease these impacts by a change in cooling technology. While each of the seven alternatives being evaluated by Bechtel has a different mix of environmental impacts, and although the waste heat must go “somewhere in the environment,” this set of environmental-impact issues is beyond the scope of DCISC’s evaluation here.

3) The SWRCB is currently considering a new regulatory position that would require Diablo Canyon to replace its current OTC system with a system that would produce smaller environmental impacts on certain aspects of the ocean environment.

4) A paraphrasing of Bechtel’s initial scope is that Bechtel was asked to identify a very large range of technically feasible cooling alternatives that might be deployed at Diablo Canyon. It discharged that assignment in its first report (November 2012, Reference 1).

5) The SWRCB Review Committee reviewed Bechtel’s report, and based on criteria that are beyond our scope here, the Review Committee directed Bechtel to narrow the options to seven that were to be evaluated further. In the next phase of Bechtel’s work (Phase 2), more detailed conceptual designs and engineering analyses were completed for each of these seven options, and Bechtel also performed a review of the relevant nuclear-reactor-safety issues for each. A cost study is also part of Bechtel’s Phase 2 work, but evaluating it is outside of the DCISC’s scope.

The seven technologies are as follows:

- Inshore mechanical (active) intake fine mesh screening systems
- Offshore modular wedge wire systems
Closed-cycle cooling systems (5 different approaches):
- Passive draft dry/air cooling
- Mechanical (forced) draft dry/air cooling
- Wet natural draft cooling
- Wet mechanical (forced) draft cooling
- Hybrid wet/dry cooling

6) Providing reliable and effective cooling is an important aspect of the overall safety of a nuclear power plant's design, and, as noted above, the DCISC's concern here is to evaluate the implications of a change in cooling technology on the overall nuclear-reactor safety at Diablo Canyon.

Bechtel's safety assessment and conclusions

As noted above, in Bechtel's recent report (Reference 2) the Bechtel team has performed an assessment of the nuclear-reactor safety of each of the seven alternative cooling options that might replace OTC at Diablo Canyon. Bechtel based its assessment on a set of criteria specified by the Review Committee. This set of criteria, called in the Bechtel report "Criterion 10," covers eight "areas of NRC interest," against each of which the assessment was performed. The NRC regulation 10 CFR 50.59 (Reference 3) is a major basis for these criteria. Diablo Canyon's Final Safety Analysis Report Update (Reference 4) is cited by Bechtel as one of the major regulatory documents used by the NRC and the plant to document the plant's safety analyses.

The eight areas are:

- Seismic issues
- Operability
- Transient analyses
- Nuclear fuel (accident analyses)
- Single failures
- Hydraulic design
- Probabilistic risk assessment
- Instrumentation controls and alarms

The Bechtel report states, "Criterion 10 is a feasibility assessment based on regulatory requirements established by 10 CFR 50.59 to determine whether NRC approval of the alternative technology is required."

For each of the seven alternative UHS options, Bechtel has concluded as follows (Reference 2, Section 1.5, "Conclusions"): "Based on the results of the feasibility assessment and when more detailed engineering information becomes available, the anticipated responses to the following eight 10 CFR 50.59 criteria questions for each of the proposed modifications would be NO:"
1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the FSARU [Final Safety Analysis Report Update]?

2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC [structure, system, or component] important to safety previously evaluated in the FSARU?

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the FSARU?

4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the FSARU?

5. Create the possibility of an accident of a type different from any previously evaluated in the FSARU?

6. Create the possibility of a malfunction of an SSC important to safety with a result different from any previously evaluated in the FSARU?

7. Result in a design basis limit for a fission product barrier as described in the FSARU being exceeded or altered?

8. Result in a departure from a method of evaluation described in the FSARU used in establishing the design bases or in the safety analyses?

The Bechtel report continues: “Consequently, subject to the limitations of the Phase 2 assessment information, implementation of the closed cooling technology, the inshore dual-flow fine mesh screens, or the offshore modular wedge wire screening system design alternatives is believed to not require a License Amendment Request (LAR) in accordance with 10 CFR 50.59.”

Among the crucial words in these two quotes are the “conditional words,” as follows: “the anticipated responses . . . would be NO” [first sentence in the above quote], and “subject to the limitations of the Phase 2 assessment information, implementation [of any of the options] is believed not to require a License Amendment Request” [final sentence in the above quote.]

Bechtel’s conclusion concerning safety and DCISC’s evaluation of it

We understand Bechtel’s conclusion to mean the following: Although more information would be needed to support a definitive conclusion, Bechtel, applying its expert judgment and based on the information at hand, concludes that any of the proposed cooling options can be implemented in a way that will meet NRC requirements vis-à-vis nuclear-reactor-safety. In fact, Bechtel’s conclusion is stronger than that. Bechtel’s judgment is that it is likely that for any of the seven cooling options under consideration, the nuclear-reactor-safety impact on the plant would be modest enough that PG&E would not even need to request a NRC license amendment request (LAR) before it could proceed with installing that option at Diablo Canyon. (All of this is subject to
Bechtel's appropriate caveat that more detailed information will ultimately be needed, as the specific design details are developed, before a sufficient basis will be available for a firmer judgment.)

The DCISC has reviewed Bechtel's conclusion and the basis for it. We believe that not enough information is available now to conclude definitively that any of the seven options will meet NRC's nuclear-reactor-safety regulations. That will need to await specific design details that are not available now.

We conclude that the Bechtel assessment that no LAR is required might be correct for the inshore fine-mesh screening system option, because this option involves the least extensive modifications to the plant; however, this assessment is questionable for the off-shore, modular wedge-wire system, because this option requires the installation of a new, safety-related stop-log system in the plant intake cove. The addition of a new, safety-related system will certainly require a NRC LAR.

We conclude that the Bechtel assessment is likely to be incorrect for the various closed-cycle cooling options. All of these options involve very extensive modifications to the plant, including modifications to the plant intake structure that also houses the ASW system, protected area boundary, turbine building (which houses safety-related emergency diesel generators and electrical switchgear), and rerouting of the plant's 230-kV alternate offsite power transmission system. These major modifications have the potential to affect the operability of safety-related systems both during and following construction, and potential undesirable interactions will require detailed design review by the NRC to identify and mitigate.

While we conclude that most of the proposed cooling system modifications would require a NRC license amendment request, Bechtel's conceptual design study has sufficient detail to allow a preliminary conclusion that NRC approval of the license amendment could likely be obtained. The most important bases for this, in our view, are two:

1. First, Bechtel has performed a set of nuclear-reactor-safety evaluations against each of the various 10 CFR 50.59 criteria for each of the seven alternative cooling technologies.

2. Second, around the world there are a wide variety of cooling designs deployed today at the few hundred operating nuclear power plants. The seven options under consideration here are each represented (broadly, although not in technical detail) elsewhere, and at large numbers of plants for the closed-cycle options. Less experience exists with intake fine screening and offshore modular wedge-wire systems under conditions relevant to the Diablo Canyon site, and we therefore believe that a testing program should be conducted or actual experience elsewhere reviewed to verify performance of either system before it should be selected. Furthermore, for any of the seven proposed alternatives, there is the potential for a significant reduction in the plant's reliability and for an increase in the frequency of trips and forced outages. Much additional work would be needed before assurances could be had that the overall safety impact of these potential issues is manageable. However, because these cooling technologies exist, can be and have been designed and operated safely
elsewhere, we judge that it is probably feasible to deploy any of these seven options at Diablo Canyon in a manner that will meet NRC safety regulations.

However, this finding on our part is not sufficient for us. That is, the DCISC has developed a different criterion for judging the safety of an alternative cooling technology at Diablo Canyon. The next section will explain why we have a different criterion, after which we will present our safety criterion and our evaluation based on it.

The ultimate heat sink

The preceding discussion covered the normal non-safety-related plant cooling system, which discharges waste heat from the condenser to the Pacific Ocean via a Once-Through Cooling System. A totally separate system, the nuclear-safety-related Auxiliary Saltwater System, discharges plant decay heat to the Pacific Ocean in certain shutdown, off-normal, and emergency conditions. This arrangement is called the Ultimate Heat Sink (UHS) because it is the final or ultimate opportunity to keep the plant cool and safe if all other methods are unavailable or have failed.

With two exceptions the seven cooling alternatives proposed by Bechtel would be independent and separate from the UHS, and thus should normally have no adverse impact on nuclear-reactor safety from the UHS standpoint. The two exceptions are the following options:

- Inshore mechanical (active) intake fine mesh screening systems
- Offshore modular wedge wire systems

We are also concerned about a third issue:

- Effects of construction/installation on AWS/UHS

The first two alternative cooling options both utilize the current OTC intake cove and intake structure, which also house the ASW System, part of the UHS. At this stage it appears that these two options would affect the UHS, but final design and analysis would be necessary to permit a determination of the significance. The third item, construction/installation, could adversely impact ASW/UHS, which concerns the DCISC at this conceptual stage. We believe that compensatory measures would likely be taken; however, we reserve final judgment until more is known about this impact.

The DCISC has been studying this issue since December 2010, and in its most recent 2010 – 2011 Annual Report (Reference 11), it concluded the following:

"A range of adverse nuclear safety impacts is known qualitatively at this time and is of concern to the DCISC. The DCISC will continue to take seriously the charge to review the safety impacts of the elimination of Once Through Cooling (OTC) at DCPP and provide analysis and input to the process."
Bechtel concluded the following:

"The safety-related ASW system is not affected by this modification. The CWS (Circulating Water System) and the SCW (Service Cooling Water) system do not provide cooling to any component required for safe shutdown. The CW (Circulating Water) pumps are not required for the safety of the units. A complete shutdown of the SCW system would not affect safe shutdown of the reactor. The replacement of the once-through cooling with closed cycle cooling would result in an increase in circulating water temperature. This increase is not expected to adversely affect FSARU accident analyses since these systems serve no safety related functions."

The DCISC agrees that the alternative cooling systems would not adversely affect the FSARU accident analyses provided that the ASW/UHS is not affected by the proposed alternative cooling system, which appears to be the case based on Bechtel's conceptual studies performed to date, but the reliability of this non-safety related equipment may affect the frequency of plant trips and equipment failures that require safety-related equipment to function in order to prevent or mitigate accidents. Insufficient information is available to answer the question of whether the alternative cooling systems might affect the frequency of accident initiating events.

Effects of plant modifications on plant reliability

One of DCISC's principal concerns with the proposed alternative cooling options is their potential impact on the plant's reliability, and the potential to increase the frequency of plant trips and forced outages that stress plant safety systems (e.g., ASW/UHS) and can provide initiators for accidents. Much of the improvement in nuclear plant safety around the world in the last three decades has come from improved operational methods that have greatly reduced the frequency of plant trips and forced outages.

While the DCISC assesses that the proposed alternative cooling methods could be successfully licensed by the NRC, the level of design detail and information is insufficient to assess the likely affects of the design changes on plant reliability. For example, the closed-cycle options all involve a substantial increase in the operating pressure of the circulating water system, and the potential for increased flooding risk can only be assessed following detailed design. Likewise, the wet closed cycle options include a water storage capacity of only two hours (Reference 2, Section 4.3.4.1) so any outage of the water supply system exceeding this will result in a plant trip. For all systems, there will be a learning curve associated with the transition to alternative cooling that will result in increased risk of plant trips during the learning period.

The importance of the ultimate heat sink in reactor safety, and how an understanding of this importance is developed

Before describing the nuclear-reactor-safety criterion that the DCISC has used in this evaluation, we need to explain something about nuclear-power-plant risk, and about how it is understood by the community of nuclear-power-plant safety analysts.
Every operating US nuclear power reactor, including the two units at Diablo Canyon, meets all applicable NRC regulations. (Otherwise, it would not be operating.) However, this does not mean that any of these reactors presents zero risk to the public. While the NRC has judged the risks acceptably low, the possibility of a release of radioactivity that might affect the public does exist. We will call the ensemble of these risks of a radioactive release the “residual risk,” the word “residual” meaning to imply that these are the risks that remain after all of the hard work has been done to reduce the risks to low levels that are acceptable to the NRC and to the DCISC.

Reactor safety analysts study these risks using many different approaches. The approach that provides the most realistic understanding is embodied in an analysis technology known as “probabilistic risk assessment” (PRA), which delineates every important “accident sequence” that might arise at a given reactor. In the PRA, each such accident sequence begins with a specified “initiating event” (such as an equipment failure, a human error, an electrical fire, or an event external to the plant like an earthquake), proceeds through a series of other failures (either equipment failures or operator errors), and ends up with an end-state other than a “safe, stable” end state. (A PRA sequence that ends up at a “safe, stable” end-state is not an “accident.”) For those sequences that do not end “safe and stable,” the PRA evaluates the overall annual probability of occurrence, the sequence of events that would take place, and the consequences were the sequence to occur. The consequences are analyzed and described quantitatively in terms of damage to the reactor core, the potential for releases of radioactivity from the core to the building, the physical, chemical, and radiological character of those releases, and ultimately the possible release of radioactivity to the environment outside the plant.

It is important to note that the initiating events that can lead to accidents do not necessarily involve safety related systems. Instead, as the reactor-safety community knows from both analysis and operating experience, sometimes these accident sequences may initially involve failures of non-safety related equipment, which then require that safety-related systems function in order to prevent or mitigate an accident. Thus data for the reliability of non-safety-related equipment and systems is a key input to PRA assessments, in addition to that for safety-related systems.

The Diablo Canyon station has performed a PRA of good quality (Reference 5), which is used essentially every day to help understand various issues at the plant as they arise. This PRA is currently being updated in important ways, a process that goes on periodically at Diablo Canyon as elsewhere around the country, because new PRA methodologies are continually being developed, data bases for equipment failures and the like are continually being revised with new information, and there is now a methodology standard for PRA (Reference 6) that is used throughout the U.S. to which the Diablo Canyon PRA is being compared.

The DCISC has reviewed the Diablo Canyon PRA, and also studied several later reviews of it by others (References 7, 8, and 9). We judge that the residual risk as described in the PRA is acceptably small, and have used that judgment as one basis for our conclusion that the plant’s two reactors are now being operated safely.
As noted, many different types of accident sequences can occur at Diablo Canyon, and the PRA analyzes them. Among these accident sequences are some that involve prolonged loss of the function of discharging the waste heat to the environment. Prolonged loss of this function can lead to a serious accident, which is why great care is taken at every nuclear plant in the design and operation of the equipment and structures that carry out this function. There are potential sequences in which loss of this function is the initiating event, and others in which this function is lost as a consequence of another initiating event, such as an equipment failure elsewhere in the plant.

The DCISC has reached two important conclusions about Diablo Canyon that need to be understood before we can explain our evaluation here. First, the DCISC judges (as noted above and based in part on the PRA) that the current level of safety achieved at Diablo Canyon is acceptable. Second, the PRA, which the DCISC judges to be technically sound, finds that none of the major contributors to the residual risk from accident sequences at Diablo Canyon involve prolonged loss of the normal function of discharging the waste heat to the environment.

While prolonged loss of circulating water system (CWS) function is not an important contributor to risk at DCPW with today’s configuration, abrupt loss of CWS results in one of the more severe types of transients the plant can experience. The risk arises from the coupling between different pieces of equipment during the transient, which can affect equipment reliability in ways not fully captured by the normal reliability data. In the case of abrupt failure of CWS, a normal turbine and reactor trip occur, but the capability to dump excess steam to control the primary system pressure and temperature is reduced because the capacity of the turbine condenser to accept steam is lost. Thus abrupt CWS failures result in a larger temperature and pressure transient to the primary system than during normal plant trips. While these temperatures and pressures remain within the design capability of the primary system, the greater stresses increase the probability of failures of safety-related components. For this reason, the DCISC recommends that special attention be paid to assure that any cooling system modifications do not result in a significant reduction in the reliability of the CWS function.

Another consideration is important to mention here. As a result of insights from the Fukushima nuclear-plant accident in Japan in March 2011, the NRC has ordered all US operating reactors to perform certain studies and based on them to carry out certain safety improvements; other safety improvements may be required by the NRC in the future based on technical studies now under way. In parallel, the US nuclear-power-reactor industry as a whole has undertaken other studies, and has taken the initiative to propose a set of safety improvements that it believes are required and beneficial. Among these latter is an industry initiative, known as “FLEX” (Reference 10), that among other benefits will provide each nuclear plant with a more robust capability to respond in the unlikely event of a prolonged loss of ultimate heat sink. We note that the specifics of these FLEX improvements have not yet been finalized, either at Diablo Canyon or anywhere else, but they are surely going to be installed in one form or another, and they will provide Diablo Canyon with an even stronger basis for the safety performance of its current UHS.
The DCISC’s safety criterion

As background, we first reiterate something we noted above, which is that the current OTC approach for providing the normal cooling function at Diablo Canyon meets all applicable NRC requirements. The DCISC is acutely cognizant of the US NRC’s nuclear-reactor-safety criteria for this function, and would not provide a positive evaluation for any technology that did not meet those criteria. However, we have approached our safety evaluation using a different set of criteria. Our position is that, although replacement cooling technology could meet all NRC regulations, it could still represent an unacceptable degradation of the overall nuclear-reactor-safety performance at Diablo Canyon when compared to the current configuration. For this reason, the DCISC criterion can be stated as follows:

Having concluded that the current OTC approach for performing the normal plant cooling function at Diablo Canyon has adequate safety, the DCISC’s safety criterion is that any alternative proposed as a replacement should provide at least approximately the same level of overall nuclear-reactor safety.

In the DCISC’s view, this mainly (but not entirely) comes down to asking the following question of any technology that might be proposed to replace once-through cooling to perform the normal cooling function at Diablo Canyon, after stipulating that the technology must also meet all applicable NRC regulations:

As analyzed in the plant PRA, will the contribution of accident sequences involving loss of cooling remain as only a modest contributor to the total residual risk at Diablo Canyon? *

The DCISC cannot answer this question today, because the analysis has not been performed. However, the DCISC is willing to offer the following assessment: Based on our review of the technical information in front of us, meaning the information in the two Bechtel reports (supplemented by our knowledge of how various cooling technologies perform at other nuclear power plants around the world), we judge it likely that none of the proposed new technologies would pose a significant safety problem at Diablo Canyon, if they do not degrade significantly the plant’s reliability and increase the frequency of plant trips. However, this is not a strong conclusion based on evidence, but merely a judgment based on what we know so far. Crucially, more analysis is needed. Any new technology must be designed, installed, and operated to high reliability standards, and the first step would be the design step, where details must be developed that will lead to an acceptable design solution.

To summarize: While the DCISC has a technical basis for optimism, we cannot determine from the available conceptual information whether any of the proposed alternative technologies will contribute more to the overall plant risk profile at Diablo Canyon than the modest contribution made today by the current cooling technology.

* The comparison between the current cooling configuration and any proposed new one should, in our view, account for the safety benefits to be realized when the new FLEX equipment is installed, because that equipment will surely be available long before any proposed change in the cooling configuration at Diablo Canyon would occur.
(using once-through cooling) -- and we believe that nobody else can fully determine this yet either.

Summary of DCISC findings, conclusions and recommendation

- Bechtel’s assessment (as we have paraphrased it) is that if any of the seven alternative options under consideration were to be selected to replace OTC at Diablo Canyon, the nuclear-reactor-safety impact on the plant would not be significant enough that PG&E would even need to ask for an NRC license amendment before it could proceed with installing that option at Diablo Canyon. The DCISC has reviewed Bechtel’s conclusion and the basis for it. We find that this conclusion is questionable for the offshore wedge-wire system, because this system requires that a new safety-related system be designed and installed in the plant intake structure. We also find that it is unlikely, given how extensive the plant modifications are, that the installation of any of the five closed cooling options could be performed without a license amendment request.

- We find that the nuclear safety impacts of the alternative cooling options, if and when they are appropriately designed, manufactured, and installed, would likely be sufficiently small that NRC approval could be obtained. However, the DCISC has an additional criterion for judging the safety impact of an alternative plant cooling technology at Diablo Canyon. That is because, in our view, meeting NRC’s safety regulations is necessary to support a decision to proceed, but not sufficient.

- Based on our review of the technical information in front of us, we judge it probable that none of the proposed new technologies, if and when they are developed and implemented in accordance with established safety practices, would pose a sufficient safety problem to preclude NRC licensing of the modified design. However, this is not a strong conclusion based on evidence, but merely a judgment based on what we know so far.

- One of our primary concerns with any of the proposed alternative cooling methods involves the potential impact on plant reliability, in particular whether the modified configuration might be more prone to generating plant trips and forced outages, with a potential impact on plant safety, in particular a potential impact on ASW/UHS.

- The DCISC recommends that additional analysis be performed and more design detail be provided by Bechtel or by PG&E in order to assess the likely effects of the alternative cooling methods on plant reliability and to determine whether the DCISC safety criterion will be met.

DCISC follow-on activities

These are all interim DCISC findings and conclusions, in the sense that as new information is developed (and it will be) any of them is subject to updated evaluation. In particular, as a follow-on to the work done so far on this set of issues, we will undertake the following:
• We (the DCISC) will continue to review the latest technical information developed by both Bechtel and PG&E; will follow and review any other new information as it comes to our attention; and will also review any NRC evaluations if the NRC becomes involved.

• We will review any new information about these issues that may emerge in the engineering community more broadly for possible relevance to Diablo Canyon, quite apart from whether it is associated with the current proposals.

All of the above would be a part of our normal DCISC scope to review operational safety at Diablo Canyon, but because of the special inquiry made by the California SWRCB, we will be especially alert about these issues.

References


4. Pacific Gas and Electric Company, “Diablo Canyon Power Plant Unit 1 and 2 Final Safety Analysis Report Update” (revised by the plant on a continuing basis; part of the NRC docket for DCPP)


May 22, 2018

Office of Senator Monning
State Capitol, Room 313
Sacramento, CA 95814

Attn: Ms. Bethany Westfall, Legislative Director
Re: DCISC Comments on Senator Monning’s CA Senate Bill No. 1090

The Diablo Canyon Independent Safety Committee ("DCISC") hereby submits its comments concerning California Senate Bill 1090, introduced by Sen. Bill Monning on February 12, 2018, which, if approved, would require in part that the California Public Utilities Commission (CPUC) approve full funding by PG&E ratepayers for its Diablo Canyon Nuclear Power Plant ("Diablo Canyon") employee retention program as originally proposed in PG&E’s Application 16-08-006 dated August 11, 2016, to retire Diablo Canyon by 2025.

Background about the DCISC

The DCISC was established as one of the terms of a settlement agreement entered into by the Division of Ratepayer Advocates ("DRA" now known as the Office of Ratepayer Advocates) of the California Public Utilities Commission ("CPUC"), the Attorney General ("AG") for the State of California, and Pacific Gas and Electric Company ("PG&E"). The settlement agreement, dated June 24, 1988, was intended to cover the operation and revenue requirements associated with Diablo Canyon’s two 1,100 megawatt pressurized water reactors located in San Luis Obispo County for the 30-year period following the commercial operation date of each unit. The agreement arose out of rate proceedings that had been pending before the CPUC for four years, and which included numerous hearings and pre-trial depositions. Just prior to the commencement of trial, the DRA, the AG and PG&E prepared and entered into the settlement agreement and submitted it to the CPUC for approval.
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Attn: Ms. Bethany Westfall, Legislative Director  
May 22, 2018  
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The agreement provided that:

"An Independent Safety Committee shall be established consisting of three members, one each appointed by the Governor of the State of California, the Attorney General and the Chairperson of the California Energy Commission ("CEC"), respectively, serving staggered three-year terms. The Committee shall review Diablo Canyon operations for the purpose of assessing the safety of operations [emphasis added] and suggesting any recommendations for safe operations. Neither the Committee nor its members shall have any responsibility or authority for plant operations, and they shall have no authority to direct PG&E personnel. The Committee shall conform in all respects to applicable federal laws, regulations and Nuclear Regulatory Commission ("NRC") policies."

The DCISC is made up of recognized technical experts in the nuclear power field who have visited the plant or held public meetings near the plant almost every month since 1990 and know the value to the safety of operations in retaining an experienced, high-performing plant staff, which now numbers approximately 1,500 persons.

Discussion of the Issue

On June 21, 2016, PG&E announced a Joint Proposal with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Works Local 1245, Coalition of California Utility Employees and the Alliance for Nuclear Responsibility to retire Diablo Canyon at the expiration of its current operating licenses from the NRC in 2024 for Unit 1 and in 2025 for Unit 2. On August 11, 2016, PG&E filed Application 16-08-006 with the CPUC for approval of the retirement of Diablo Canyon, implementation of the Joint Proposal, and recovery of associated costs, including employee retention incentives through proposed ratemaking.

Under the Joint Proposal, PG&E would continue to operate Diablo Canyon at current power levels until retirement, with commitments to continuing the safe operation of Diablo Canyon and providing resources and assistance to transitioning workers. To ensure continued safe operations under the Joint Proposal, PG&E stated that it would be critical to retain existing employees, who are well-trained and highly qualified, throughout the remaining several-year period of power operation. To accomplish this, PG&E proposed to provide employee retention incentive payments of 25% per year1.

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1 The retention incentive would be paid in accordance with two tranches, the first being for the period September 1, 2016 to August 31, 2020 and the second from September 1, 2020 to August 31, 2023.
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May 22, 2018  
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DCISC discussion and recommendation

In its Decision 18-01-022, issued on January 16, 2018, the CPUC directed that the Diablo Canyon ratepayer-supported employee retention incentive payments be reduced from PG&E’s proposed 25% per year to 15% per year. Although the DCISC did not participate as a party in the CPUC proceeding that led to Decision 18-01-022, the DCISC has observed, in its subsequent visits to the plant, disappointment by employees in the reduction of the incentive payments and anticipates significant increases in future employee attrition, especially in nuclear plant operations, maintenance, and security. This is a concern to the DCISC as increased attrition in these critical areas would in all likelihood adversely affect the safety of operations at Diablo Canyon. In fact, the DCISC also recognizes that the overall morale of the entire staff is another important consideration. The DCISC believes that a well-designed and appropriately funded employee retention incentive program is essential to the plant’s safe operation until retirement. While the DCISC does not know what precise funding level is appropriate, the 15% proposal seems to us to be inadequate, based on our recent interactions with the plant staff.

The DCISC strongly believes that continued operation of the power plant through the proposed retirement date of Diablo Canyon Units 1 and 2 in 2024 and 2025, respectively, in a safe manner requires retaining those existing members of the trained workforce who are vital to operating the plant safely. For this reason the employee retention program as originally agreed upon in the Joint Proposal in Application 16-08-006 should not be cut as severely as the cuts in CPUC Decision 18-01-022. A retention program needs to be designed and funded that effectively accomplishes the needed staff-retention objectives for those employees who have vital roles in achieving nuclear safety. For these reasons, the DCISC strongly supports those aspects of Senator Monning’s CA Senate Bill 1090 with regards to appropriate funding for the employee retention program. We are, of course, not in a position to advise on how the needed employee-retention program should be designed in detail, provided it includes adequate incentives for those employees who perform vital safety functions.

The DCISC is not commenting in this letter on aspects of Senator Monning’s bill that deal with issues beyond those related to the safe operation of the nuclear plant, because those other aspects are outside the DCISC’s charter. Although the CPUC Decision is in effect, it is not yet final due to the pendency of an Application for Rehearing.

The DCISC is available to answer questions and provide additional information as needed. We appreciate the opportunity to provide input into the legislative process on this important topic concerning the future of California’s power supply in the rapidly changing energy landscape.
Letter to the Office of Senator Bill Monning  
Attn: Ms. Bethany Westfall, Legislative Director  
May 22, 2018  
Page 4.

On behalf of myself and the other members of the Diablo Canyon Independent Safety Committee, please convey our thanks to Senator Monning for the opportunity to review and comment on CA Senate Bill 1090. It is our hope that this letter will contribute to the Senate’s assessment of these important issues and their potential to adversely affect the future safety of Diablo Canyon. Should the Senator have any questions or concerns about the DCISC’s comments please do not hesitate to communicate with us.

Very truly yours,

Peter Lam, DCISC Chair

PL:rfw
Decision 18-01-022  January 11, 2018

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA


Application 16-08-006

(See Appendix A for Appearances)

DECISION APPROVING RETIREMENT OF DIABLO CANYON NUCLEAR POWER PLANT
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Appendix A – List of Appearances
DECISION APPROVING RETIREMENT OF
DIABLO CANYON NUCLEAR POWER PLANT

Summary

Pacific Gas and Electric Company (PG&E) proposes to retire the Diablo Canyon Power Plant in 2024 and 2025, when its federal Nuclear Regulatory Commission operating licenses expire. PG&E requests Commission approval to recover in rates over $1.76 billion in costs associated with the retirement of Diablo Canyon. Those costs include $1.3 billion for energy efficiency procurement to partially replace the output of Diablo Canyon, $363.4 million for Diablo Canyon employee retention and retraining, $85 million for a Community Impacts Mitigation Program, $18.6 million in costs previously incurred for its Nuclear Regulatory Commission license renewal process, and an unspecified amount for cancelled capital projects. (PG&E Opening Brief at i-ii.)

This order approves PG&E’s proposal to retire Diablo Canyon and approves $241.2 million in rate recovery for costs associated with the retirement of Diablo Canyon. Specifically, PG&E is authorized to recover in rates $222.6 million for employee retention and retraining, and $18.6 million for its license renewal activities, plus a portion of the cost of cancelled capital projects. Rate recovery for the Community Impacts Mitigation Program requires legislative authorization. Replacement procurement issues will be addressed in the Integrated Resource Planning proceeding. This proceeding is closed.

1. Background

Pacific Gas and Electric Company’s (PG&E) Diablo Canyon nuclear power plant is located in coastal San Luis Obispo County, and consists of two units that have been operating since 1985 (Unit 1) and 1986 (Unit 2), with a combined generation capacity of 2,240 megawatts (MW). The units are currently licensed
by the Nuclear Regulatory Commission (NRC) to operate until 2024 (Unit 1) and 2025 (Unit 2).

On August 11, 2016, PG&E filed its application proposing to retire Diablo Canyon upon the expiration of its NRC licenses. In addition to retiring Diablo Canyon, PG&E’s application requested approval of: 1) procurement of three tranches of greenhouse gas-free resources to partially replace the output of Diablo Canyon; 2) retention, retraining, and severance programs for Diablo Canyon employees; 3) a program that would provide funding to the local community to mitigate the economic impact of the plant’s retirement; and 4) rate recovery of various costs, including amounts spent for environmental reviews and PG&E’s now-suspended NRC license renewal application. (PG&E Application at 8-12.)

PG&E’s application was supported by the Natural Resources Defense Council (NRDC), Friends of the Earth (FOE), Environment California, International Brotherhood of Electrical Workers Local 1245 (IBEW 1245), Coalition of California Utility Employees (CCUE), and the Alliance for Nuclear Responsibility (A4NR), and the proposal in the application was referred as a “Joint Proposal.”

Protests to PG&E’s application were filed by the California Large Energy Consumers Association (CLECA), Californians for Green Nuclear Power (CGNP), the Energy Producers and Users Coalition (EPUC), Energy Users Forum, Environmental Progress, LEAN Energy US, the Cities of Paso Robles,

1 The parties supporting the application are referred to as the “Joint Parties.” While generally supporting the Joint Proposal, the A4NR did not support PG&E’s request for rate recovery of its NRC license renewal costs.
Morro Bay, San Luis Obispo, Arroyo Grande, Pismo Beach and Atascadero (filed jointly), California Solar Energy Industries Association, Sierra Club, Shell Energy North America (US), L.P. (Shell), City of Lancaster, Friends of Wild Cherry Canyon, Central Coast Wave Energy Hub, The Utility Reform Network (TURN), World Business Academy, the Commission’s Office of Ratepayer Advocates (ORA), Sonoma Clean Power Authority, Marin Clean Energy, SolarCity Corporation, City and County of San Francisco, A4NR, Women's Energy Matters (WEM), and the Green Power Institute.

Responses to PG&E’s application were filed by OhmConnect, Inc, San Luis Obispo Mothers for Peace, Inc. (Mothers for Peace), Independent Energy Producers Association (IEP), South San Joaquin Irrigation District, Direct Access Customer Coalition, Alliance for Retail Energy Markets, Large-scale Solar Association, EnergyHub, CPower, EnerNOC, Inc., Comverge, Inc., California Energy Storage Alliance, San Luis Coastal Unified School District (School District), IBEW 1245, CCUE, Environmental Defense Fund, FOE, NRDC, Environment California, California Energy Efficiency Industry Council, Center for Energy Efficiency and Renewable Technologies (CEERT) and the County of San Luis Obispo (County).²

The general timeline of the proceeding was:

August 11, 2016 – Application filed.

September 15, 2016 – Protests and Responses filed.

September 26, 2016 – PG&E Reply to Protests and Responses filed.

October 6, 2016 – Pre-hearing Conference held.

² Some responses were filed jointly by multiple parties.
October 20, 2016 – Public Participation Hearings held in San Luis Obispo.
November 18, 2016 - Scoping Memo and Ruling issued.
January 27, 2017 - Intervenor testimony served.
March 17, 2017 - Rebuttal testimony served.
April 19 – 27, 2017 - Evidentiary hearings held.
May 26, 2017 - Opening briefs filed.
June 16, 2017 - Reply briefs filed.
September 14, 2017 – Public Participation Hearings held in San Luis Obispo.

On December 28, 2016, PG&E filed a joint motion requesting approval of a partial settlement between PG&E, the County of San Luis Obispo, the Cities of Arroyo Grande, Atascadero, Morro Bay, Paso Robles, Pismo Beach, and San Luis Obispo (collectively Local Cities), the School District, FOE, NRDC, Environment California, IBEW 1245, CCUE, and A4NR. The proposed settlement modified the Community Impacts Mitigation Program originally proposed by PG&E in its application.

On February 27, 2017, PG&E notified the parties that it was withdrawing its request for two of the three tranches of replacement procurement (and associated cost recovery) that it had proposed in its application, and that this change would be reflected in its rebuttal testimony.

On May 23, 2017, PG&E filed a joint motion requesting approval of a partial settlement between PG&E, A4NR, TURN, ORA, Mothers for Peace, FOE, NRDC, Environment California, IBEW 1245 and CCUE. This second proposed settlement modified PG&E’s original request for rate recovery of its NRC license renewal costs and its cancelled project costs.
2. **Issues Before the Commission**

   The Scoping Memo identified the following issues:

   **Retirement of Diablo Canyon Power Plant**

   PG&E has proposed to retire Diablo Canyon Unit 1 in 2024, and Unit 2 in 2025. Parties have proposed both earlier and later retirement dates. Parties may present testimony in support of PG&E’s proposed dates, or earlier or later retirement dates, including indefinite dates.

   **Proposed Replacement Procurement**

   PG&E has made a proposal for procurement of resources to partially replace Diablo Canyon’s output. Parties may present testimony supporting alternative procurement proposals, including proposals that all necessary replacement procurement should be addressed in this proceeding, that no replacement procurement should be addressed in this proceeding, or that some replacement procurement should be addressed in this proceeding.

   **Proposed Employee Program**

   PG&E has proposed an employee retention, retraining and severance program associated with approximately 1,500 employees at Diablo Canyon. Parties have raised questions about the cost and funding of this program. Parties may present testimony on the need for this program and its size, cost, structure, timing and its source of funding.

   **Proposed Community Impacts Mitigation Program**

   PG&E has proposed a community impacts mitigation program to mitigate some of the adverse economic impacts to the residents of San Luis Obispo County as a result of the planned retirement of Diablo Canyon. Parties may present testimony on the community impacts of the proposed retirement of
Diablo Canyon, including economic and emergency response impacts, and on proposals to mitigate those impacts.

**Recovery of License Renewal Costs**

PG&E has proposed that it be granted rate recovery for costs relating to license renewal activities, including the filing of a license renewal application with the federal NRC. Parties may present testimony on whether it is reasonable for PG&E to recover some or all of these costs in rates.

**Proposed Ratemaking and Cost Allocation Issues**

PG&E has requested rate recovery for the costs of its proposals, including costs of replacement procurement, its employee program and community impacts mitigation program, and its license renewal activities, as well as other costs relating to the operation of Diablo Canyon facilities. Parties may support or criticize PG&E’s proposed rate design and cost allocation, or may present alternative rate design and cost allocation proposals.

**Additional Issues Not Addressed Above**

Parties may present testimony on issues that are within the general scope of the proceeding, as established by the record to date, that are not specifically addressed in the above sections.

The Scoping Memo determined that it was premature to address land use, facilities and decommissioning issues, and that specific recommendations on those issues would not be considered at this time, but parties were allowed to present testimony recommending how to best preserve these issues for future consideration.
3. **Discussion and Analysis**

3.1. **Retirement of Diablo Canyon Power Plant**

PG&E proposes to retire Diablo Canyon upon the expiration of its NRC licenses, which expire on November 2, 2024 for Unit 1 and August 26, 2025 for Unit 2. (Ex. PG&E-1 at 2-1.) PG&E’s forecasts and analysis indicates that in the near future there will be a significantly reduced need for electric generation from Diablo Canyon. (PG&E Opening Brief at 11-18.) Because of projected increases in energy efficiency, distributed generation, renewable generation, and customers moving to community choice aggregation (CCA) and direct access, PG&E’s conclusion is that there is simply less of a need for Diablo Canyon. *(Id.)*

In fact, PG&E believes that the continued operation of Diablo Canyon beyond 2025 would exacerbate over-generation, requiring curtailment of renewable generation. *(Id. at 16-17; Ex. PG&E-1 at 2-20.)* PG&E’s analysis indicates that there is no need to replace Diablo Canyon in order to maintain system reliability. (Transcript Vol. 6 at 957-958.)

PG&E has also been unequivocal that the retirement of Diablo Canyon will not have an adverse impact on local reliability. According to PG&E, because Diablo Canyon’s output is exported on the bulk transmission system, Diablo Canyon is considered a system resource only, and is not needed for local reliability:

DCPP [Diablo Canyon Power Plant] is located in the Los Padres area of PG&E’s service territory, which includes the cities of: San Luis Obispo, Divide, Santa Maria, Mesa, Templeton, Paso Robles, and Atascadero. […] [M]ost of DCPP’s generation is exported to the north and east of the Los Padres division through 500 kilovolts (kV) bulk transmission lines, which includes a transmission connection between the Diablo Canyon and Midway substations. [fn. omitted] Los Padres customer demand is served through a network of 115 kV and 70 kV circuits and does not include DCPP as part of the local
installed generation capacity as DCPP does not serve load within the division. As such, DCPP is not needed for local reliability. Unlike San Onofre Nuclear Generating Station, DCPP is considered as a system resource only and is not needed to provide support for local reliability. (Ex. PG&E-1 at 2-20 to 2-21; see also PG&E Opening Brief at 17.)

A number of parties support PG&E’s determination that Diablo Canyon is not needed; in addition to the parties supporting the Joint Proposal, three other parties also agree that it is appropriate to retire Diablo Canyon:

IEP concurs with PG&E’s decision not to renew the licenses of the two units of the Diablo Canyon Power Plant. Replacement resources that are both less expensive and better able to fit the needs of PG&E’s customers and the electric grid are available. (IEP Opening Brief at 7.)

TURN’s economic analysis demonstrates that ratepayers would benefit from retiring Diablo Canyon and satisfying customer need with incremental renewable resources. This analysis, along with the recognition that continued operations at Diablo Canyon involve the potential for a catastrophic accident or unexpected premature shutdown, affirms the reasonableness of PG&E’s decision to permanently retire the plant by 2025. (TURN Opening Brief at 2.)

The City of San Francisco supports shutting down Diablo Canyon, and states:

PG&E has persuasively demonstrated that Diablo Canyon is no longer a good fit for PG&E’s bundled customers. PG&E has shown that Diablo Canyon should be closed because of the high cost of operating Diablo Canyon, potential regulatory requirements regarding the once through cooling technique used by Diablo Canyon, and system over-generation problems related to Diablo

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3 Those parties are: NRDC, FOE, Environment California, IBEW 1245, CCUE and A4NR.
Canyon’s constant operation. [fn. omitted] PG&E showed also that continued operation of Diablo Canyon is a bad fit in the context of California’s goal of reducing GHG [greenhouse gas] emissions in part by increasing use of renewable energy resources. This is because Diablo Canyon is a baseload, relatively inflexible resource that would exacerbate overgeneration and would result in continued curtailment of renewable resources. PG&E also admits that Diablo Canyon is no longer necessary for reliability. [fn. omitted]

PG&E also projects that its load will shrink considerably by the time Diablo Canyon closes. Between 2017 and 2025, PG&E forecasts that approximately 20,000 GWh [gigawatt hours] of load will migrate to CCAs. [fn. omitted] This is comparable to the amount of bundled customer load (18,500 GWh) Diablo Canyon currently serves. In PG&E’s own words “whether CCA loads depart somewhat sooner or later than expected does not change the overall conclusion that DCPP is not needed for PG&E’s customers after the expiration of the Nuclear Regulatory Commission licenses in 2024 and 2025.” [fn. omitted] (City and County of San Francisco Opening Brief at 3.)

Other parties, while not actively supporting PG&E’s proposal, do not oppose it, including: ORA (ORA Opening Brief at 4), 4 Alliance for Retail Energy Markets, the California Clean DG Coalition, CLECA, the Direct Access Customer Coalition, the Energy Users Forum, Marin Clean Energy, Peninsula Clean Energy, Silicon Valley Clean Energy Authority, and Sonoma Clean Power Authority (Joint Opponents Opening Brief at 2).

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4 Elsewhere, however, ORA states: “ORA supports PG&E’s proposed retirement of the DCPP units at the end of their respective operating license periods in 2024 and 2025.” (Ex. ORA-2 at 4.)
Only one active party, CGNP, argues that Diablo Canyon should continue to operate beyond 2025.\(^5\) CGNP makes three substantive arguments for keeping Diablo Canyon operating: Diablo Canyon is more cost effective than the alternative sources of supply, retiring Diablo Canyon would diminish system reliability, and retiring Diablo Canyon would have an adverse impact on GHG emissions. (CGNP Opening Brief at 5.)

On the issue of the cost effectiveness of Diablo Canyon, TURN identified significant flaws and omissions in CGNP’s cost calculations and estimates. (See, TURN Reply Brief at 1-7; Transcript, vol. 8 at 1,302-1,318.) The record of this proceeding undercuts, rather than supports, CGNP’s argument that continued operation of Diablo Canyon would be cost effective. Accordingly, CGNP’s testimony on this issue is given little weight.

CGNP’s argument that retiring Diablo Canyon would be detrimental to grid reliability seems to be based on the fact that Diablo Canyon has been a reliable resource, and that other generation resources have been less reliable. (CGNP Opening Brief at 40.) The reliability of the plant and the reliability of the system are separate things, and there has been clear testimony that the retirement of Diablo Canyon would not adversely affect the reliability of the system. (Transcript Vol. 6 at 957-958.)\(^6\) As Joint Opponents unequivocally state: “Diablo Canyon, an inflexible resource, is not needed either for system or local

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5 One other party, Environmental Progress, made a similar argument in its protest of the application, but did not present testimony or file briefs.

6 For example, if a person owned 12 cars, but never used more than three cars at one time, selling cars 11 and 12 – even if they were more reliable than cars 9 and 10 – would not significantly change the ability to have three operable cars.
reliability. [fn omitted] It can be retired without impacting grid reliability.” [fn. omitted] (Joint Opponents Opening Brief at 3.)

CGNP’s reliability argument also appears to assume that Diablo Canyon could operate as a flexible resource that could ramp up and down to meet changing daily demand, rather than how it has been operated, as a constant-level baseload resource. (CGNP Opening Brief at 40.) PG&E points out that this is a speculative and unrealistic assumption, and would make Diablo Canyon even less cost effective:

Operating in load-following mode[^7] would take Diablo Canyon outside of the currently authorized NRC license conditions and would require extensive technical feasibility studies, redesign of procedures, processes and systems, maintenance practices and nuclear fuel redesign. […] It is unclear if Diablo Canyon could be retrofitted to safely and reliably operate in a different operating mode, whether the NRC would approve it, and whether it would be cost-effective to do so given the reduction in capacity factor that would result if Diablo Canyon were to be frequently ramped down to minimum operating levels during the daytime hours when solar power is prevalent. (PG&E Reply Brief at 7.)

Finally, CGNP argues that retiring Diablo Canyon will make it “impossible” for the state to meet its GHG reduction goals, and accordingly it should be relicensed and kept available. (CGNP Opening Brief at 41-42.) CGNP claims that the retirement of Diablo Canyon would result in California importing large amounts of fossil fuel generated electricity from PacifiCorp. (Id.)

While the specific arguments made by CGNP are not well supported by the record, the GHG impact of Diablo Canyon’s retirement (and any replacement

[^7]: In this mode Diablo Canyon would ramp up and down to meet daily variations in load.
procurement) does need to be considered. This issue is discussed in more detail below in the section addressing replacement procurement, which finds that the question of the GHG impact of Diablo Canyon’s retirement should be addressed in the Commission’s Integrated Resource Planning (IRP) proceeding.

Two parties – WEM and Mothers for Peace - argue that Diablo Canyon should be shut down earlier than PG&E’s proposed 2024/2025 timing. WEM argues that Diablo Canyon will become “commercially unreasonable” to operate well before 2024/2025, that replacement energy is also available before then, and given the risks associated with nuclear power, Diablo Canyon should be shut down no later than 2020. (WEM Opening Brief at 1-2.) Mothers for Peace similarly recommends a shutdown date of 2019/2020. (Mothers for Peace Opening Brief at 3.)

WEM and Mothers for Peace base their arguments in part upon the potential dangers of nuclear power. While this Commission has broad authority over PG&E and Diablo Canyon (including non-nuclear safety), the Commission’s authority over nuclear safety is less clear; accordingly, the Commission’s decision on this issue is not based on nuclear safety.

But the economics of Diablo Canyon can provide a basis for this Commission’s decision, and WEM and Mothers for Peace also argue that Diablo Canyon will be uneconomic to operate well before 2025. WEM points out that as PG&E’s bundled load decreases, more of Diablo Canyon’s output will need to be sold at a loss on the wholesale market, and that: “This foreseeable development will make continued operation of Diablo Canyon increasingly uneconomic and dysfunctional, and this will likely begin to happen before 2020, not 2025.” (WEM Opening Brief at 12.)
Similarly, Mothers for Peace argues that Diablo Canyon costs are already high:

[T]he costs of operating and maintaining Diablo Canyon are disproportionately high for the contribution the power plant makes to PG&E’s electrical generation capacity and, therefore, further investment in the continued operation of Diablo Canyon is not a prudent economical capital expense for the utility. (Id. at 8.)

Mothers for Peace also raises the additional concern that PG&E will need to spend increasing amounts of money on maintenance and repair of Diablo Canyon due to its age, particularly because of the degradation of a number of major plant components. (Mothers for Peace Opening Brief at 6-9.)

WEM and Mothers for Peace raise valid concerns about the current cost of operating Diablo Canyon, and the potential for significant costs that could be incurred between now and 2024/25, but those concerns cannot be considered in isolation. While shutting down Diablo Canyon in 2019/2020 would likely provide some cost savings, it would also provide less time for replacement procurement to be considered in the IRP proceeding and for the development and deployment of additional greenhouse gas-free resources. These factors are difficult to balance, as we cannot forecast with certainty the precise growth of CCAs, the deployment of greenhouse gas-free resources, or the near-future costs of operating Diablo Canyon. For example, WEM argues that a foreseeable range of utility bundled sales:

[R]esults in a similar—or potentially much less—bundled load for PG&E in 2020 as PG&E projects for 2025. Therefore it is likely that constraints on the need for Diablo Canyon will arise by 2020, and

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8 An early shutdown would also accelerate the impacts on plant employees and the local community.
possibly even earlier. When this occurs, a substantial fraction of Diablo Canyon’s energy will need to be sold on the wholesale market, which is below cost. [fn. omitted] This foreseeable development will make continued operation of Diablo Canyon increasingly uneconomic and dysfunctional, and this will likely begin to happen before 2020, not 2025. (WEM Opening Brief at 12.)

Given the relatively early state of the IRP proceeding, the more prudent and conservative approach to balancing this uncertainty tips against a shutdown before 2024 and 2025. As we gain a clearer picture of future developments, such as the relative cost of operating Diablo Canyon, this balance could change. Because there is a possibility that Diablo Canyon may cease operations earlier than 2024 and 2025, PG&E should prepare for that contingency. In the IRP proceeding, PG&E should be prepared to present scenarios assuming Diablo Canyon retirement dates prior to 2024/2025, including ones that demonstrate no more than a de minimis increase in the greenhouse gas emissions of its electric portfolio.

Based on the record of this proceeding, PG&E’s proposed 2024/2025 retirement schedule for Diablo Canyon provides a reasonable amount of time for the transition process, including further examination of replacement procurement. Accordingly, PG&E’s proposed retirement schedule for Diablo Canyon is approved. If in the interim period the facts change in a manner that indicates Diablo Canyon should be retired earlier, the Commission may reconsider this determination.

3.2. Proposed Replacement Procurement

In its initial Application, PG&E proposed to partially replace Diablo Canyon with greenhouse gas-free resources in three tranches, consisting of:

1) 2,000 gross GWh of energy efficiency; 2) 2,000 GWh of GHG-free energy, including energy efficiency and Renewables Portfolio Standard (RPS) eligible
energy resources; and 3) a voluntary 55% RPS commitment. (PG&E Application at 9.) PG&E described these three tranches as “[A] first step towards replacing Diablo Canyon with a portfolio of GHG-free resources.” (Id.)

While proposing this significant procurement of resources, PG&E noted that:

Additional resources beyond those specified in the Joint Proposal may be needed on a system-wide basis to replace the output of Diablo Canyon. The Joint Parties envision that this issue will primarily be addressed through the Commission’s Integrated Resource Planning process (i.e., R.16-02-007). (Id.)

Multiple parties protested PG&E’s replacement procurement proposal, including Shell, Sierra Club, SolarCity, TURN, and Marin Clean Energy. While parties did not object to the idea of replacing Diablo Canyon with GHG-free resources, they challenged the feasibility, effectiveness, cost-effectiveness, cost, and cost allocation of PG&E’s specific proposal. (See, e.g. Shell Protest at 3-4, Sierra Club Protest at 6-12, SolarCity Protest at 2-7, TURN Protest at 7-11, Marin Clean Energy Protest at 7-10.)

In their testimony, multiple parties expanded upon their criticisms of PG&E’s replacement procurement proposal. Some raised procedural objections. For example, ORA argued that no replacement procurement should be addressed in this proceeding, but it should instead be addressed in the IRP proceeding. (Ex. ORA-3 at 1-5, Ex. ORA-5 at 7-8.) Others, such as MCE, questioned the need for any replacement procurement:

It is certainly possible that there is no need at all to replace the generation that will be lost when PG&E closes Diablo Canyon. …[D]iscontinued operation of the facility, from an operational perspective, is likely a solution to PG&E’s declining energy requirements in and of itself. (Ex. MCE-1 at 10.)
Subsequently, on February 27, 2017, PG&E provided notice to the service list that it was withdrawing part of its replacement procurement proposal:

Specifically, after careful review of the important feedback provided by parties in their January 27, 2017 opening testimony on the Diablo Canyon replacement proposal, PG&E is withdrawing the Diablo Canyon Tranches #2 and #3 replacement proposals, as well as the proposal to implement the Clean Energy Charge to recover the costs associated with Tranches #2 and #3. The Joint Parties believe that these aspects of the Diablo Canyon replacement proposal are better addressed in the Commission’s Integrated Resource Plan (“IRP”) proceeding (Rulemaking 16-02-007). (PG&E February 27, 2017 e-mail.)

PG&E modified its direct testimony to reflect this change. Subsequently, the other parties took a range of positions; some parties (primarily the Joint Parties) supported PG&E’s new position, others proposed different partial replacement procurement schemes, and still others recommended that all replacement procurement be addressed in the IRP proceeding.

Some parties recommended that the Commission approve partial replacement procurement for Diablo Canyon in this proceeding, but in a form different than that proposed by PG&E:

The GPI supports the authorization in this proceeding of an early tranche of procurement of greenhouse-gas-free resources that can be brought online prior to the retirement of DCPP, but only if the procurement is primarily an all-source procurement. (GPI Opening Brief at 19, emphasis in original.)

Thus, CEERT continues to strongly support the authorization of the Tranche #1 and Tranche #2 competitive solicitations in this Application, without deferral to the IRP Process, as critical “early action” GHG-free energy procurement to meet PG&E’s bundled customer need upon the retirement of Diablo Canyon and as a contingency plan in the event of early retirement or shutdown, with cost recovery approved according to existing ratemaking and cost
allocation mechanisms. (CEERT Opening Brief at 7, emphasis in original.)

IEP similarly argued that PG&E should immediately be directed to do an “all-source” solicitation in order to take advantage of federal tax credits for renewable generation projects that are expected to expire or decline in the near future. (IEP Opening Brief at 1-2, 11-12.)

Other parties recommend that the Commission NOT authorize any replacement procurement in this proceeding, but instead advocate that the Commission should do a need analysis (and any resulting authorization) in the IRP proceeding. Those parties include Shell:

The appropriate forum for consideration of all Diablo Canyon replacement procurement, including PG&E’s proposed first “tranche” of procurement, is the IRP proceeding. Ex. Shell-i at pp. 4-7 (Dyer). SB 350 provides that the investor-owned utilities’ (“IOU”) procurement planning decisions must be made in the context of a comprehensive planning process. [fn. omitted] PG&E’s proposal in this proceeding, to replace a portion of Diablo Canyon energy output with energy efficiency, interferes with the Commission’s ability to establish a comprehensive procurement strategy for PG&E in the IRP proceeding. (Shell Opening Brief at 2-3.)

ORA makes a similar argument as well:

In its testimony, ORA recommended that no replacement procurement be addressed in this proceeding. ORA continues to make that recommendation since PG&E has not withdrawn its Tranche #1 proposal, and other parties may seek Commission approval of the Tranche #2 and #3 proposals even though PG&E has withdrawn them.

As ORA noted in its testimony, R.16-02-007, the Commission’s Integrated Resource Planning and Long-Term Procurement Planning rulemaking (“Integrated Resource Planning proceeding”)
is the appropriate Commission proceeding to address all replacement procurement associated with the closure of the Diablo Canyon units. [...]

PG&E will be required to perform portfolio optimization as part of its IRP in 2017. PG&E has likely included Energy Efficiency as part of its proposed preferred resources portfolio. The correct, optimized levels of these resources will be determined in the Commission’s IRP system plan.

PG&E’s proposal for replacement procurement outside of the IRP portfolio optimization process creates the potential for over-procurement in PG&E’s service territory, thereby leading to higher costs for customers and resulting in a sub-optimal resource plan. (ORA Opening Brief at 4-5, fn. omitted)

In addition to arguments that replacement procurement should be addressed in the IRP proceeding rather than here, a number of parties argued that PG&E’s remaining Tranche 1 proposal itself was flawed:

TURN supports PG&E’s intention to dramatically scale up its procurement of cost-effective EE [energy efficiency]. However, as shown in TURN’s testimony and explained below, PG&E has not met its burden of demonstrating that its Tranche 1 proposal offers the right mechanism through which to do that. [fn. omitted] In sum, Tranche 1 suffers from three fundamental design flaws: it may not be feasible, it does not ensure that the EE savings will be additional to the savings that would otherwise occur, and it does not ensure that the EE savings will still be available when Diablo Canyon comes offline. Moreover, the notion of a major EE procurement outside of PG&E’s existing EE portfolio and its new EE Business Plan is ill-conceived, and PG&E has not demonstrated that the benefits of this separate procurement will exceed the costs. (TURN Opening Brief at 20.)

While acknowledging that Tranche 1 may exacerbate conditions of overgeneration and renewable curtailment, PG&E and the other Joint Parties fail to address it: PG&E witness Strauss agreed that
procurement of just EE, as proposed in Tranche 1, may worsen overgeneration issues. (Joint Opponents Opening Brief at 4-5, fn. omitted.)

ORA similarly opposes PG&E’s request for $1.3 billion in customer funding for its Tranche #1 EE procurement proposal and associated shareholder incentive payments. According to ORA:

PG&E fails to demonstrate that its requested Tranche #1 procurement, which is an increase of more than 50% of the currently-identified energy efficiency potential, would be cost effective. (ORA Opening Brief at 10.)

As ORA points out, PG&E is already required under California’s loading order for energy resources to first meet its resource needs through “all available energy efficiency…resources that are cost effective, reliable, and feasible.” (Id., quoting Pub. Util. Code § 454.5(b)(9)(C)(i).) According to ORA, PG&E has acknowledged that in Decision (D.) 15-10-028, the Commission set a goal for PG&E to procure all cost-effective and feasible EE for the years 2016-2024. For 2018-2024, the period corresponding to the Tranche #1 procurement proposal, that goal is a total of 3,741 gross GWh savings. (Id., citing Ex. PG&E-1, at 4-3, Table 4-1, lines 3-9.)

ORA concludes:

Yet, PG&E’s Diablo Canyon application proposes to procure an additional 2,000 gross GWh installed in its service territory in the same period 2018-2024. [fn. omitted] This represents an increase of 53.5% over currently approved goals for the years 2018-2024. Such a substantial increase in the EE potential is only possible by lowering the Commission’s threshold criteria for cost-effectiveness. Lowering the cost-effectiveness standards would burden customers with the cost of Energy Efficiency measures that provide insufficient value to qualify under current standards. (ORA Opening Brief at 11.)
EPUC makes a similar argument:

While labor unions, local governments, environmental organizations and shareholders all receive firm, defined benefits, there are no benefits and no protections for ratepayers. Instead they shoulder greater uncertainty and risks, and the revenue consequences as these uncertainties are resolved. These include:

- whether any replacement of DCPP’s output is needed;
- when, if ever, that replacement should be procured;
- whether the quantity of energy efficiency (EE) to be procured in Tranche 1 is feasible and whether it will be cost-effective, and
- whether the authorization of the Tranche 1 procurement will conflict with and potentially impair the targets of the Rolling Portfolio Business Plans filed by PG&E and the other utilities.

[fn. omitted] The ratepayers assume the risk that all cost effective EE will have been procured through the Business Plan and each of its annual updates, and that any EE authorized in this docket will be more expensive and raise rates inefficiently. (EPUC Opening Brief at 1-2.)

ORA and EPUC make a good point – it is not clear that PG&E could actually procure over 50% more energy efficiency than a goal that is already supposed to include all cost-effective energy efficiency (unless PG&E procures energy efficiency that is not cost effective). There is no reason to approve a $1.3 billion rate increase for a proposal that will most likely either fail to achieve its goal or will achieve a goal not worth reaching. Accordingly, PG&E’s Tranche 1 proposal is not adopted.

While we are rejecting the specific replacement procurement proposed here by PG&E, the larger question remains about what, if anything, should be done here to ensure that the retirement of Diablo Canyon will not result in an increase in GHG emissions. The answer to that is that we simply cannot tell based on the record in this proceeding. It is the intent of the Commission to
avoid any increase in greenhouse gas emissions resulting from the closure of Diablo Canyon. Given the time between now and 2024 and 2025, the rapid changes in the California electricity market, and the growth of renewable generation and CCAs, however, it is not clear based on the limited record in this proceeding what level of GHG-free procurement (if any) may be needed to offset the retirement of Diablo Canyon.

The IRP proceeding, however, is better equipped to make that determination. The IRP is supposed to incorporate the analysis leading to an optimized portfolio of resources, reflecting constraints such as GHG emissions, reliability, cost, and RPS and energy efficiency requirements, while ensuring safe and reliable electricity service at just and reasonable rates. (R. 16-02-007 at 13.) In short, the IRP has the ability to look at a bigger picture than this proceeding, and can better analyze the potential impacts of the retirement of Diablo Canyon and its interaction with other dynamics in the electricity markets in a manner consistent with state policies. PG&E’s previous Tranche 2 and 3 proposals would better be considered in the IRP proceeding.

Overall, practical and policy reasons indicate that it is better for potential replacement procurement issues to be addressed in the Commission’s IRP process, rather than addressing it in a more piecemeal fashion in this proceeding. Accordingly, the need for and authorization of any replacement procurement should be addressed in the IRP proceeding.⁹

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⁹ Or in another proceeding as determined in the IRP proceeding.
3.3. Proposed Employee Program

PG&E proposes to implement an employee retention, severance and retraining program for its Diablo Canyon employees, and requests three related approvals from the Commission:

[1]. Recover $352.1 million in costs associated with retaining approximately 1,500 employees at Diablo Canyon to ensure the plant’s continued safe and efficient operation through the end of each unit’s license in 2024 and 2025, respectively, over a 7-year period through an annual expense-only revenue requirement of $50.9 million beginning January 1, 2018 through December 31, 2024 through the Nuclear Decommissioning Non-Bypassable Charge (NDNBC).

[2]. Implement the Employee Severance Program and authorize PG&E to continue to forecast and recover the cost of the Employee Severance Program in each subsequent Nuclear Decommissioning Cost Triennial Proceeding (NDCTP).

[3]. Recover $11.3 million in costs associated with retraining eligible employees at Diablo Canyon and to recover these costs over a 5-year period through an annual expense-only revenue requirement of $2.3 million from January 1, 2021 through December 31, 2025 through the NDNBC. (PG&E Opening Brief at i.)

Starting with the last one, the retraining of Diablo Canyon employees is intended to support the placement of Diablo Canyon employees who are interested in transitioning to other employment roles within PG&E as a result of the retirement of Diablo Canyon. (Ex. PG&E 1 at 7-8.) While the precise components and details of this program have not been determined, PG&E identifies possible elements of the program, including support for an internal

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10 PG&E’s cost estimates used a headcount of 1,461. (Exhibit PG&E-1 at 7-6.)
PG&E job search, limited wage protection, professional and technical training and relocation assistance. (Id.)

PG&E forecasts the cost of the retraining program to be approximately $11.3 million, to be recovered through the NDNBC. (Id. at 7-11.) PG&E also requests a new two-way expense-only subaccount (the Employee Retraining Program Subaccount) within the existing Diablo Canyon Retirement Balancing Account.

The proposed retraining program is directly related to the retirement of Diablo Canyon, and the cost of the program is recoverable in rates through the NDNBC. (Pub. Util. Code sections 8322(g) and 8330.) PG&E’s request for the retraining program, the new two-way expense-only subaccount, and associated rate recovery through the NDNBC is approved.

PG&E has in place an Employee Severance Program, which provides payments of specified amounts to employees whose jobs will be eliminated upon the closure of Diablo Canyon. (Ex. PG&E -1 at 7-7.) The Employee Severance Program is directly related to the decommissioning of Diablo Canyon, and $148 million in estimated costs for the program are already incorporated into PG&E’s decommissioning estimate. (Ex. PG&E-1 at 7-11.)

PG&E does not request rate recovery for the severance program in this proceeding, as the forecast and recovery of costs are being addressed in PG&E’s NDCTP. (Id.) A severance program for Diablo Canyon employees is appropriate in light of the plant’s pending retirement, and the cost and ratemaking for that program should continue to be addressed in PG&E’s nuclear decommissioning proceeding.

11 PG&E’s more recent estimate of the cost of the program is $168 million.
PG&E’s proposed employee retention program, however, is not so clearly related to the decommissioning of the plant. EPUC argues that the costs of the retention program are not related to the decommissioning of the plant, but rather to its continued operation:

The retention program is part of the operating costs of the plant, incurred to ensure there are qualified employees to continue to operate the plant. As Ms. King testified, it has been a regular practice in the past to increase wages of plant employees to retain them. [fn. omitted] Such operating costs have been, and should continue to be, recovered through the energy rates charged to bundled customers, who benefit from the operation of the plant. (EPUC Reply Brief at 6.)

In response, PG&E argues that the retention program is related to the retirement of the plant, as absent that there would not be a need for the retention plan:

The only reason the Employee Program is necessary is due to the announcement that PG&E would retire and decommission the plant. Accordingly, there is a direct causal link between the closure of the plant and the Employee Program, making it appropriate to recover the costs of the Employee Program through decommissioning rates. (PG&E Reply Brief at 66.)

At the same time, however, PG&E acknowledges that it intends to continue to operate Diablo Canyon for almost a decade before it plans to actually retire the plant. (Ex. PG&E-1 at 7-2.) Looking at PG&E’s proposal, it appears to confirm that EPUC’s position is correct: PG&E is proposing to keep operating Diablo Canyon until 2024/2025, and is proposing the retention program for the purpose of keeping the plant operating, not for the purpose of shutting it down. (PG&E Reply Brief at 49.) This is further reinforced by the fact that the retention program ends on August 31, 2023, but the plant will not completely retire until
2025. (Ex. PG&E-1 at 7-4.) Accordingly, rate recovery for the employee retention plan should come through the existing ratemaking treatment for the operation of Diablo Canyon, not through the NDNBC.

In addition, there are problems with the design and the resulting cost of PG&E’s proposal. PG&E, with the support of the Joint Parties, proposes to pay retention bonuses to every employee of the plant who continues to work through specified time periods. PG&E proposes two “tiers” of retention payments. Tier 1 would run from September 1, 2016 through August 31, 2020, would provide a retention payment to each employee of 25% of the employee’s base salary at the end of each of the four years, and would cost $191.6 million. Tier 2 would run from September 1, 2020 through August 31, 2023, would provide a retention payment to each employee of 25% of the employee’s base salary at the end of each of the three years, and would cost $160.5 million. (Ex. PG&E-1 at 7-4 and 7-6.) PG&E’s estimated $352.1 million cost for the retention plan assumes that approximately 1,500 employees would be retained until August 31, 2023. (Id. at 7-6.)

ORA and CGNP oppose PG&E’s employee retention program as proposed. ORA argues that ratepayers should not pay for the $191.6 million cost of Tier 1, but generally supports rate recovery for the $160.5 million cost of Tier 2. (ORA Opening Brief at 25.) CGNP argues that the entire retention program is unnecessary (CGNP Opening Brief at 14-17), but does note that retention payments may be necessary for a very limited set of hard-to-fill positions. (Id. at 15.)

PG&E’s proposal appears to have a significant “free rider” problem that PG&E does not address, and as such the proposal is overly generous with ratepayer funding. The approximately 1,500 employees eligible to receive the
retention payments include all active full-time employees working at Diablo Canyon, plus those who support Diablo Canyon operations and those whose job or job functions would be eliminated as a result of Diablo Canyon’s retirement. Contractors and temporary or rotational employees would not be eligible. (Ex. PG&E-1 at 7-4, fn. 1.) In short, PG&E is asking the ratepayers to pay for a retention payment for every full-time PG&E employee at Diablo Canyon. As PG&E puts it: “The Employee Retention Program is aimed to keep the entire employee population retained until August 31, 2023.” (Id. at 7-6.)

PG&E’s testimony does not adequately address factual questions such as how many employees would continue to work at Diablo Canyon (until it closes) without a retention payment, or how many employees would leave their employment at Diablo Canyon regardless of a retention payment. In both of those situations, the retention payment provides no benefit to ratepayers. PG&E has significant data about the Diablo Canyon workforce, including retirement eligibility, and has done modeling of potential retirements (PG&E Opening Brief at 45; Ex. PG&E-6), but has chosen to just pay every employee, rather than using that information to more efficiently use ratepayer funds.

CGNP, on the other hand, has used PG&E’s data to support its analysis, and comes to a more nuanced conclusion than that embodied by PG&E’s broad-brush proposal:

In response to Commission_001-Q15, PG&E witness King stated that there are 442 employees eligible for full retirement and 471 eligible for retirement with partial benefits before 2024. [fn. omitted] These

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12 There may also be employees who would continue to work at Diablo Canyon only because of the retention payment, but are otherwise unhappy or unmotivated with their job, so their retention would provide little or no benefit to ratepayers.
employees constitute 63% of the 1458 regular Diablo employees, and it is highly unlikely they would be eager to leave when they could continue to work towards retirement. Older workers face well-known difficulties in finding new employment, thus given the choice of transferring within PG&E vs. a severance package if their job was eliminated, there would be little incentive for employees to leave voluntarily. (CGNP Opening Brief at 15.)

In another area where there is a paucity of analysis, PG&E does not address how many employees would continue to work at Diablo Canyon after its retirement, on tasks such as decommissioning, nuclear fuel storage, maintenance and security. In fact, PG&E states that it does not currently know how many employees it expects will remain at Diablo Canyon after its retirement. (Ex. PG&E-6 at 24.) Because these employees would have continuing employment after the plant retires, they would presumably have less of an incentive to leave because of the retirement. But under PG&E’s proposal, all of these employees would still receive ratepayer-funded retention payments.

PG&E likewise does not address the potential employment prospects for nuclear power plant employees. PG&E cites to CCUE witness Dalzell for the argument that many Diablo Canyon employees are “high-skill, high-wage workers and would be attractive candidates for other jobs.” (PG&E Opening Brief at 46.) PG&E explains the basis for that argument:

The CCUE witness, Tom Dalzell, testified that based on his experience with divestiture of PG&E’s fossil fuel and geothermal generation facilities in the late 1990s, he was certain that absent an employee retention package, employees would find jobs outside of DCPP once a closure date was announced. (PG&E Opening Brief at 46.)

This is not a valid comparison; there are many more fossil fuel plants than there are nuclear plants, and the situation today is different from the divestiture.
of plants in the 1990s. A better comparison would be to look at the relative current and forecasted supply and demand of nuclear power plant jobs and experienced nuclear power plant employees. These factors have a significant impact on how likely Diablo Canyon employees will be to look for and obtain outside employment. PG&E did not present such an analysis in this proceeding. While there is certainly ratepayer benefit from Diablo Canyon being operated in a safe and reliable manner until its retirement, PG&E has failed to show that the amount of ratepayer dollars requested is necessary or reasonable. At the same time, the funding level recommended by ORA, while more reasonable from a ratepayer perspective, also lacks analytical support. ORA’s proposal does not adequately address the possible need for a retention payment in the earlier (Tier 1) years, nor does it consider the nature of Diablo Canyon’s workforce. As a result, while PG&E’s proposed retention payments appear to be too high, ORA’s may be too low.

Taking into consideration the benchmarking data, the presence of significant and pre-funded severance pay, the unique nature of the nuclear industry, and the extended payment period, a 15% per year retention payment level is reasonable. Accordingly, we authorize PG&E’s proposed employee retention program, but at an annual payment level of 15%, rather than 25%. This results in a maximum cost of $115 million for Tier 1, and a maximum cost of

13 Nor did ORA or CGNP. One commenter at a public participation hearing stated: “Given the current status of the nuclear industry, there is no need to pay Diablo Canyon employees an additional $352 million in order to retain them for the eight years in question. The industry is in serious decline.” (Transcript v. 9 at 1,446.)

14 Significant amounts of Diablo Canyon employee data were put into the record in response to a Commission data request. (Ex. PG&E-6.)
$96.3 million for Tier 2, for a total cost of $211.3 million. PG&E is authorized rate recovery for up to $211.3 million for its employee retention program.

Finally, it appears that PG&E (with the participation of at least some of its unions) has already executed retention agreements with its employees, presumably incorporating the payment levels proposed by PG&E in this proceeding. CCUE cites to these agreements, and the fact that 86% of IBEW 1245’s represented employees\(^\text{15}\) at Diablo Canyon have signed them, as showing that PG&E’s retention program is working. (CCUE Opening Brief at 13-14.) CGNP, however, points out that: “[T]he 86% only means that workers will accept free money until such times as they may quit.” (CGNP Reply Brief at 10.)

The retention payments negotiated and agreed to by PG&E and its unions require funding from ratepayers, and accordingly require Commission approval for their funding. At the time it entered into those agreements, PG&E did not have authority to make the payments that the agreements (appear to) promise. This puts the Commission in the position of potentially saying “no” to PG&E’s proposal, while the employees may already be thinking that the answer is “yes.” PG&E should not be making promises (even implied ones) to its employees that it does not know it can keep.

3.4. Proposed Community Impacts Mitigation Program

In its Application, PG&E proposed a Community Impacts Mitigation Program (CIMP), which was described as follows:

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\(^{15}\) 410 out of 476 represented employees.
Diablo Canyon is one of the largest employers, taxpayers, and charitable contributors in the San Luis Obispo County area. Diablo Canyon currently contributes approximately $22 million in property taxes to the local community. With the retirement of Diablo Canyon, this could decline to zero by 2025. The Parties will support funding of continuing revenue streams to address community needs and concerns. PG&E will propose to compensate San Luis Obispo County for the loss of property taxes associated with the declining rate base in Diablo Canyon through a transition period ending in 2025. The payment in lieu of taxes will be recovered through nuclear decommissioning funding. PG&E estimates that the total cost of the Community Impacts Mitigation Program is approximately $49.5 million. As specified in Section 5.4.1, as a condition of the program, PG&E will recover the costs of the Community Impacts Mitigation Program through CPUC-approved rates for nuclear decommissioning. (PG&E Application, Attachment A (Joint Proposal) at 10-11.)

Later in the proceeding, PG&E entered into a proposed settlement with the County, the Local Cities and the School District, along with the original Joint Parties.16 This proposed settlement primarily addressed the Community Impacts Mitigation Program, with PG&E agreeing to increase the payment to the communities to a total $85 million, compared to the prior $49.5 million. (Joint Motion re Settlement on Community Impacts at 2.)

Of the $85 million, $75 million is called an “Essential Services Mitigation Fund” (ESMF), and would be distributed to the County. That $75 million would be allocated by the County to local cities and districts based upon their 2015-2016 unitary tax allocations; approximately $36.8 million would go to the School

16 PG&E filed a joint motion on December 28, 2016 with the County Of San Luis Obispo, the Cities of Arroyo Grande, Atascadero, Morro Bay, Paso Robles, Pismo Beach, San Luis Obispo, the San Luis Coastal Unified School District, FOE, NRDC, Environment California, IBEW 1245, CCUE, and A4NR. (Joint Motion re Settlement on Community Impacts.)
District, including $10 million dedicated to an educational foundation designated by the School District. (Joint Motion re Settlement on Community Impacts at 16.)

In addition to the $75 million ESMF, the proposal includes another $10 million “Economic Development Fund” (EDF). Of that $10 million, $4.24 million would go to the County, and $5.76 million would go to the six Local Cities. The County would then allocate $192,000 to the City of Grover Beach, which is not a party to this proceeding. (Id. at Appendix 2, Attachment A.)

It is uncontested that the retirement of Diablo Canyon would result in reduced local tax revenues and a loss of well-paying jobs, with a corresponding potential for significant adverse economic impacts on the local area. The question before this Commission is not whether there will be economic impacts, or even the potential size and scope of those impacts, but rather whether PG&E ratepayers should pay to mitigate these impacts. 17

The parties presented a range of policy and legal arguments on this issue. The policy arguments focus on issues of fairness: who benefitted from Diablo Canyon, who bore the costs and risks of Diablo Canyon’s operation, and who should bear the costs and risks of the plant’s retirement. (See, e.g. County Opening Brief at 1-3, 16-17; TURN Opening Brief at 43-44.) While it is reasonable for this Commission to consider whether the proposed payment to the community is fair, the Commission must also consider whether that payment is legal.

17 The economic impacts of the retirement of Diablo Canyon are to be studied pursuant to Pub. Util. Code § 712.5, enacted in 2016.

18 Existing support for local emergency services provided through PG&E rates is not at issue in this proceeding, and remains in effect.
Based on the specific facts presented here, and consistent with this Commission’s decision in D.97-05-088, in the absence of legislative authorization, the CIMP is not approved. Utility rates should be used to provide utility services, not government services, no matter how beneficial those services may be. In addition, we have some concerns about the fairness of the CIMP under the proposed settlement.

Looking first at whether the CIMP under the proposed settlement is fair to PG&E, to the community, and to ratepayers, it is clear that the proposed settlement on this issue is fair to PG&E. Because the cost of the payment would be recovered in rates, PG&E itself bears no out-of-pocket costs.

ORA and TURN argue that PG&E’s willingness to provide funding to the community is essentially a type of charitable giving, intended to enhance PG&E’s goodwill in the community, and as such should be funded with shareholder dollars, not ratepayer dollars. (ORA and TURN Joint Comments at 6-7.) PG&E, the Local Cities and the County respond that the CIMP payments do not meet the technical definitions of a charitable gift or a goodwill payment. (PG&E Reply at 10-13; Coalition Cities\(^\text{19}\) Reply at 10-11; County Brief at 17-19.) While PG&E and its supporters may be correct that the payments (in large part due to their multiplicity of benefits) may not squarely fall into the technical definitions of charitable giving or goodwill payments, ORA and TURN raise a fair point that as a practical matter, PG&E will garner praise and enhance its reputation in the community as a result of the CIMP. (ORA and TURN Comments at 6-7.)

\(^\text{19}\) The “Coalition Cities” are the same as the “Local Cities”: Arroyo Grande, Atascadero, Morro Bay, Paso Robles, Pismo Beach, and San Luis Obispo.
PG&E also gets another benefit: the support (or at least non-opposition) of the settling parties for its other litigation positions. The settling parties agreed to:

[S]upport the Employee Program as proposed by PG&E in its Application initiating this proceeding, and the County, the Cities, and the District agree not to oppose or to take no position on the remaining relief requested in PG&E’s Application, as modified by the Agreement. (Joint Motion, December 28, 2016 at 2.)

In short, this appears to be a very good deal for PG&E – it gains some community goodwill, and gets support (or eliminates potential opposition) for its litigation positions, and all at no financial cost.

The fairness to the community is less clear. While the proposed settlement’s payment of $85 million is a clear benefit to the recipient community, not all of that payment is allocated fairly. While the majority of the CIMP appears to be allocated fairly (based upon historic unitary tax allocations), a significant portion is earmarked for the County, Local Cities, and the School District, which are parties to the proceeding and negotiated the proposed payment with PG&E. This is particularly true of the $10 million EDF.

As a result, the amount and allocation of payments appear to have more to do with PG&E’s litigation needs than the economic needs of the community. While in general the community strongly supports the proposed settlement, the allocation of payments to the affected communities does not appear to be fair, and we cannot tell from the record whether the amount of the proposed payment is fair. A clearer picture of the economic impacts on the community should be available upon completion of the assessment required under Pub. Util. Code § 712.5.

Finally, it is essential to consider whether the proposed settlement is fair to PG&E’s ratepayers, who are being asked to pay the $85 million cost of the
payment program. ORA and TURN oppose the proposed payment. ORA argues that the payments to be made “would effectively be a substitute for PG&E’s property taxes,” and should not be funded by PG&E customers. (ORA Opening Brief at 29.)

In its reply brief, PG&E argues that the CIMP: “is not intended to be an in-lieu or substitute tax.” (PG&E Reply Brief at 53.) According to PG&E: “The decline in tax revenues is one measure of the magnitude of the direct fiscal impacts to local governments, and it was therefore appropriate for the settling parties to consider the size of those tax revenue declines in negotiating the appropriate amount of mitigation,” but the payment should not be thought of as a tax payment or a substitute for a tax payment. (PG&E Reply Brief at 53-55; see also County Opening Brief at 19.)

One problem with this attempt to finesse the nature of the CIMP into something other than a substitute for lost tax revenue is that it is contradicted by other statements on the record:

With regard to economic and fiscal impacts, the Cities argued that, at a minimum, PG&E should be required to make payments to the Cities equal to their combined property, sales, and other local taxes over the nine-year period to mitigate the decline in the taxes that the plant’s operations have traditionally provided. (Joint Motion at 10, citing to Protest.)

And: “The District intervened in this proceeding because the property tax PG&E pays for Diablo Canyon each year accounts for a significant portion of the District’s annual funding.” (Id. at 10, citing to Response of School District.)

While all of the money at issue may not be specifically designated as a substitute for tax payment, as a practical matter a significant amount of the money to be collected from ratepayers is in fact a substitute for tax revenue.
Accordingly, we have to analyze whether it is appropriate to substitute ratepayers for taxpayers, which raises legal as well as policy issues.

The parties contesting this issue cite to Commission Resolution E-3535, adopted in 1998, which addressed a similar issue, also for Diablo Canyon. The parties are correct that Resolution E-3535 is on point here; but in order to understand and apply the logic of Resolution E-3535, it is essential to consider D.97-05-088, which led to the Commission’s adoption of Resolution E-3535. In the proceeding leading to D.97-05-088, in the wake of electric restructuring:

The County of San Luis Obispo and the San Luis Coastal Unified School District (County) seek protection against the risk that Diablo Canyon-related property taxes will decrease precipitously and jeopardize the ability of the County to provide basic public and educational services. If the threat actually materializes, the County wants to be made whole. By its recommendation, the County seeks adoption by the Commission of a mechanism that insures that the County has the opportunity to recover the property tax revenues they had a reasonable expectation of receiving but for electric restructuring. (D.97-05-088 at 91.)

In that proceeding, the Commission held that: “The County's proposal that ratepayers pay for property taxes that PG&E does not incur is not permitted under either general ratemaking principles or public utility law.” (Id at 100.) As a result, the Commission held that the County should direct its request for relief to the Legislature, not the Commission.20 (Id.) In large part because the facts presented in this proceeding are unusually aligned with those in D.97-05-088, the Commission reaches the same result today.

20 The County did so, and received limited relief, which was then implemented via Resolution E-3535.
Because the analysis set forth by the Commission in D.97-05-088 is directly on point, we quote it here at length:

The County of San Luis Obispo and the San Luis Coastal Unified School District (County) seek protection against the risk that Diablo Canyon-related property taxes will decrease precipitously and jeopardize the ability of the County to provide basic public and educational services. If the threat actually materializes, the County wants to be made whole. By its recommendation, the County seeks adoption by the Commission of a mechanism that insures that the County has the opportunity to recover the property tax revenues they had a reasonable expectation of receiving but for electric restructuring.

The County recommendation is that this Commission should:

• Find that $158 million (NPV in 1999 dollars) represents a reasonable estimate of the potential difference between property tax revenues that the County would have received from PG&E in the absence of accelerated recovery of Diablo Canyon depreciation and what the County could actually receive given restructuring. [...] 
• Order that the $158 million in potentially forgone property taxes be collected by PG&E as CTC at a rate of $39.5 million per year during the CTC recovery period and held in a separate, segregated interest-bearing account until 2026.

• Order PG&E, starting in 1999 and continuing thereafter on an annual basis, to withdraw funds from the segregated CTC account and to remit to the County the difference between the estimated tax payments based upon straight-line depreciation of Diablo Canyon through the year 2026 [...] and any amount of property taxes actually determinated [sic] to be due and payable by PG&E to the County in each year, to the extent such actual taxes are less than the estimated straight-line depreciation based property taxes [...]. [...] 

The County asserts that adoption of its recommendation will provide protection against the possibility that the County will experience drastic reductions in property tax revenues as a direct
result of electric restructuring. If the risk of property tax reductions
does not materialize or produces lower tax revenue losses than
predicted, any excess amounts otherwise reserved for payment to
the County will be returned to ratepayers.

The County contends that the evidence produced by it shows:

• that the County enjoys unique status by reason of long-standing,
  mutual commitments with PG&E relating to the location and
  operation of Diablo Canyon within the County;

• that electric restructuring, and PG&E’s related pricing proposal for
  Diablo Canyon in particular, create the real possibility that the
  County will suffer far greater negative consequences from
  restructuring than any other similarly situated stakeholder,
  primarily in the form of dramatic reductions in the level of
  otherwise expected property tax revenues to be received from
  PG&E;

• that the consequence for the County of any property tax revenue
  reductions resulting from PG&E’s Diablo Canyon pricing proposal
  includes severe reductions in essential public services available to
  the residents and schoolchildren of San Luis Obispo County;

• that the mutual commitments between the County and PG&E and,
  in particular, the County’s reliance on PG&E’s promises to provide
  identifiable economic benefits in exchange for siting and operating a
  nuclear generation facility within San Luis Obispo County, create an
  enforceable entitlement to a stable and predictable level of property
  tax revenues for the County throughout the projected operating life
  of Diablo Canyon; and

• that the difference between property tax revenues that the County
  would have received from PG&E in the absence of accelerated
  recovery of Diablo Canyon depreciation and what the County
  actually receives given implementation of electric restructuring is
  properly recoverable (by PG&E and payable to the County)[…].

This evidence, in the opinion of the County, leads to only one
conclusion of law: It is consistent with law, policy, and the public interest for the Commission to adopt a mechanism that will provide a safety net for the County by ensuring that the County's property tax receipts are unaffected by any accelerated depreciation of Diablo Canyon authorized by the Commission in conjunction with its initiative to restructure the state's electric industry.

PG&E and ORA oppose the County. […]

In addition to the problems in predicting the actual impacts of restructuring on the County, PG&E asserts that the County's proposal to recover lost property tax revenues is legally suspect. AB 1890 contains no explicit provision to allow utilities to recover costs or lost governmental revenues that they are not liable for but which are incurred by third parties, such as counties, under restructuring. In addition, as a general principle of ratemaking, utilities are not permitted to include in their cost of service payments which in fact they have not incurred or accrued, or forecast to incur, and which they have not become legally obligated to incur or accrue.

ORA states that the County has not cited any statute or rule that would support its position. ORA notes that there has never been any guarantee that Diablo Canyon property tax revenues would not decrease, even in the absence of electric restructuring and PG&E's accelerated depreciation proposal. For example, if Diablo Canyon continued to perform at current levels in the future such that PG&E recovered more in revenues than intended under the original ratemaking settlement, the Commission could require a reduction in prices as was done in 1995, or the early termination of the ratemaking treatment. This would impact San Luis Obispo tax revenues, even in the absence of electric restructuring. In addition, nothing in the existing Diablo Canyon ratemaking treatment precludes the facility from shutting down, not just for catastrophic failure, but for economic reasons as well. Under such circumstances, regardless of electric restructuring, there would likely be no tax revenues for San Luis Obispo. […]

 […]

Most telling is ORA's argument that San Luis Obispo would have the Commission impose on ratepayers what is essentially a tax that
is entirely unrelated to utility service. The County’s proposal that ratepayers pay for property taxes that PG&E does not incur is not permitted under either general ratemaking principles or public utility law. Section 451 of the PU Code requires:

“All charges demanded or received by any public utility ... for any product or commodity furnished or to be furnished or any service rendered or to be rendered shall be just and reasonable. Every unjust or unreasonable charge demanded or received for such product or commodity or service is unlawful.”

A utility cannot charge ratepayers costs that are unrelated to the provision of any product or commodity or service, and the Commission cannot lawfully order such charges. [fn. omitted]

However, ORA supports San Luis Obispo's efforts to seek relief in a more appropriate forum. It is within the state's powers, not the Commission's, to levy taxes and to disburse tax revenues. [...]

The arguments of PG&E and ORA are persuasive. There is no legal basis for this Commission to authorize PG&E to include in its rates and cost of service estimated property taxes which it is not lawfully obligated or forecasted to pay. Taxes which are included in rates are those in effect at the time the rates are approved, unless the existing law provides for a change at a future date. (Re Pac. Tel. & Tel. (1954) 53 CPUC 276, 295.) Absent legislative change, or Board of Equalization change, PG&E's taxes are what they are under existing law and the County's proposal will not change that fact. The County must direct its request for relief to the Legislature and the Board, not this Commission. (D.97-05-088 at 91-100.)

As in 1997, this Commission is reluctant to require ratepayers to pay for the cost of local government services that are typically paid for by taxpayers, no matter how beneficial those services may be. Absent legislative authorization, utility rates should be used to provide utility services, not government services. While Resolution E-3535 subsequently did authorize ratepayer payment to the County and the School District, it is important to take into consideration what
happened in between D.97-05-008 and Resolution E-3535. As described in Resolution E-3535:

After the Commission's Decision was issued, the California Legislature passed into law Chapter 282, section 8660-001-0462, paragraph 3, of Statutes of 1997. This new law states that if PG&E and the County and School District enter into a settlement that resolves claims by the latter parties relating to the effects of AB 1890 (Brulte), enacted 1996, Chapter 854, then PG&E may recover an additional amount, not to exceed $10 million, through base rates in 1998. (Resolution E-3535 at 3.)

In short, there was express legislative authorization for rate recovery for a payment to the community, which was implemented by Resolution E-3535.

Accordingly, ratepayer funding of the CIMP is not authorized. If legislation specifically directs this Commission to provide ratepayer funding for the CIMP (or a similar payment to the community), the Commission would do so, as it did in 1998. PG&E may also choose to use shareholder funds to support the CIMP.

### 3.5. Recovery of License Renewal Costs

In its Application, PG&E requested rate recovery for $52.688 million in costs incurred for its efforts to renew the NRC operating licenses for Diablo Canyon. (Ex. PG&E-1 at 9-1.) This request was opposed by TURN, ORA, A4NR and Mothers for Peace, who argued that PG&E should not get rate recovery for any of the costs associated with relicensing Diablo Canyon. (See, e.g. TURN Protest at 4-6; A4NR Protest at 5-13.)

In late 2009, PG&E filed an application with the NRC to renew Diablo Canyon’s operating licenses. In early 2010, PG&E filed an application with this Commission requesting rate recovery for its estimate of $85 million in costs for Diablo Canyon NRC license renewal and related activities. (Ex. PG&E-1 at 9-4.)
In that proceeding (Application (A.) 10-01-022), PG&E, the Commission’s Division of Ratepayer Advocates (DRA)\textsuperscript{21} and TURN reached a tentative settlement. (D.12-02-004 at 2.)

In March, 2011, prior to a hearing on the settlement, an earthquake and tsunami caused serious damage to a nuclear plant located at Fukushima, Japan, and the NRC effectively halted the relicensing of Diablo Canyon pending further seismic studies. (\textit{Id.} at 2-4; Ex. PG&E-1 at 9-5 to 9-6.) The Commission then closed A.10-01-022 without addressing the proposed settlement. (D.12-02-004 at 5-7.) The proposed settlement between PG&E, DRA and TURN would have allowed PG&E rate recovery for $80 million in licensing renewal costs. (Ex. PG&E-5-2 at 5-19.)

While the license renewal process at the NRC was suspended, PG&E reduced its spending on license renewal activities, but continued with some activities in order to keep its application up-to-date (Ex. PG&E-1 at 9-6) and to retain the ability to re-start and complete the license renewal process in the future. (Ex. PG&E 5-2 at 5-22.) PG&E’s license renewal spending ramped back up significantly in 2014 (although PG&E’s testimony does not clearly identify when it re-started active work on the license renewal). (Ex. PG&E -7 at 278.) PG&E did not return to the Commission to request approval for rate recovery of the license renewal costs it incurred until it filed the present application in August 2016.

\textsuperscript{21} Now ORA.
PG&E divides the costs it incurred for Diablo Canyon license renewal into three time periods: Original LRA Review (2009-11), LR On-Hold (2012-13), and LR Re-Start (2014-16). (Id.) PG&E’s request breaks down as follows:

<table>
<thead>
<tr>
<th>Period</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original LRA Review (2009-11)</td>
<td>$23,651,457</td>
</tr>
<tr>
<td>LR On-Hold (2012-2013)</td>
<td>$ 9,290,172</td>
</tr>
<tr>
<td>LR Re-Start</td>
<td>$19,744,364</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$52,687,764</strong></td>
</tr>
</tbody>
</table>

For all three periods, PG&E’s original request included rate recovery for Allowance for Funds Used During Construction (AFUDC), reflecting the financing cost of the license renewal project. (Id.) TURN and A4NR questioned PG&E’s request for recovery of AFUDC, given that the license renewal project was abandoned or cancelled. (See, Transcript Vol. 8 at 1214-1246.)

Subsequent to evidentiary hearings, a joint motion for adoption of a settlement agreement was filed by PG&E, A4NR, TURN, ORA, Mothers for Peace, FOE, NRDC, Environment California, IBEW 1245, and CCUE (Settling Parties). The proposed settlement addresses the costs incurred by PG&E for its license renewal activities, and recommended that PG&E be granted $18.6 million in rate recovery. (May 23, 2017 Joint Settlement Motion at 13, 15.) The motion explained the basis for this number:

In approaching settlement on this issue, the Settling Parties desired to identify a set of principles upon which to base that settlement. One principle was that PG&E should recover its direct costs incurred during the time that the project was reasonably and prudently undertaken. In this regard, the Settling Parties agreed, for the purpose of compromise and without conceding their litigation positions, that the Commission should consider the project reasonably and prudently undertaken from its inception in 2009 until April 10, 2011, when PG&E requested that the Nuclear Regulatory Commission (“NRC”) defer issuance of the Diablo
Canyon renewed operating licenses. [fn. omitted] The Settling Parties then agreed that PG&E should not recover the direct costs incurred subsequent to that deferral request. After reviewing the costs of the project as summarized in Exhibit PG&E-2, as corrected in Attachment 2 to this Motion, the Settling Parties submit that $18.6 million is a reasonable approximation of the direct costs incurred between the project inception and April 10, 2011 that should be authorized for recovery. Finally, the Settling Parties agreed that no AFUDC should be recovered for the License Renewal Project as a reasonable sharing of risk between customers and shareholders. (Id. at 12-13.)

The parties opposing PG&E’s original request support the settlement. The $18.6 million figure is supported by the record, is well within the range of possible litigation outcomes in this proceeding, and provides significant ratepayer saving compared to PG&E’s original request of more than $52 million. It was reasonable for PG&E to have spent that amount of money in 2009 to 2011 to seek to renew the operating licenses for Diablo Canyon. The removal of AFUDC from the amount sought, given that the relicensing was not completed, also supports the conclusion that the amount is reasonable. The proposed settlement meets the requirements of Rule 12.1(d).

While nuclear power plants are controversial, and renewal of Diablo Canyon’s licenses would have drawn opposition, the record supports a finding that PG&E’s decision to seek renewal of Diablo Canyon’s operating license (and its approach for doing so) from 2009 to April 2011 was reasonable. PG&E requested Commission approval for rate recovery of the costs of renewal at approximately the time they began to actively pursue license renewal, which provided an opportunity for parties (and the Commission) to address the reasonableness of their decision. In that proceeding, DRA and TURN agreed to a proposed settlement allowing PG&E rate recovery for its re-licensing costs, which
implies that whether or not they believed PG&E’s course of action to be reasonable, they believed it likely the Commission would find it reasonable. The Commission also had a potential opportunity to determine that it was unreasonable for PG&E to seek to renew Diablo Canyon’s NRC licenses, but did not do so. And finally, the realities on the ground in California were very different in 2009 than they are in 2017. Our current situation, with the rapid growth of renewable generation and CCAs, had not so fully manifested itself yet, making Diablo Canyon look to be a potentially more valuable asset then than it is now. There is not a good basis to now find unreasonable PG&E’s decision in 2009 to pursue relicensing of Diablo Canyon.22 Accordingly, it is reasonable to grant PG&E rate recovery for the costs (not including AFUDC) that it incurred through April 2011, as proposed by the settlement.

The rate recovery structure of the proposed settlement is described:

The Agreement further provides that PG&E should be authorized to recover the $18.6 million through an annual, levelized, expense-only revenue requirement to be recovered from customers over an 8-year period from January 1, 2018, through December 31, 2025, through the generation rate component of PG&E’s rates. (May 23, 2017 Joint Settlement Motion at 15.)

The proposed settlement on license renewal costs is approved, including the amount of cost recovery and the ratemaking structure. The provisions of the proposed settlement addressing cancelled capital projects are discussed in the Proposed Ratemaking and Cost Allocation Issues section below.

22 Whether PG&E was reasonable to continue relicensing activities after April 2011 is less clear, and the proposed settlement’s use of that date as a cutoff is reasonable and is supported by the record.
3.6. Proposed Ratemaking and Cost Allocation Issues

PG&E’s proposed ratemaking treatment for Diablo Canyon as it approaches retirement does not alter the existing ratemaking treatment, which has generation rates based on a depreciation schedule that assumes Diablo Canyon will be retired (and depreciated to zero) at the end of 2024 for Unit 1 and the end of 2025 for Unit 2. (PG&E Opening Brief at 70.) PG&E does propose to add an annual true-up to reflect actual depreciation and capital spending at Diablo Canyon. (Id., citing Ex. PG&E-1, at 10-4.)

PG&E also proposes:

For capital additions after 2016, PG&E proposes to simplify the recovery over the remaining years of Diablo Canyon’s operations by calculating a remaining life depreciation rate based on the vintage of the addition. Thus, a capital addition project that goes into service in 2017 would have an assumed 8-year life/depreciation schedule and a capital addition project added in 2018 would have an assumed 7-year life/depreciation schedule.

Beginning in 2017, PG&E will true-up the depreciation rates for plant and capital additions set in the 2017 GRC with the actual costs incurred/recorded for these two categories. To implement this proposal, PG&E proposes to establish a new 2-way subaccount within the proposed Diablo Canyon Retirement Balancing Account that would be called the “Diablo Canyon Capital Depreciation Subaccount.” This subaccount would track and adjust the capital revenue requirements associated with Diablo Canyon’s net book value and capital additions. Starting in 2018, PG&E proposes to file in May of each year a Tier 3 advice letter trueing-up the prior year’s forecast to recorded costs and establishing the amount of the depreciation rate adjustment that will be incorporated into the AET

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23 The net plant cost for Diablo Canyon (which PG&E forecasts to be $1.805 billion) and its recovery in rates are addressed in PG&E’s general rate case (GRC).
advice letter for January 1 of the next year. (PG&E Opening Brief at 70-71, fn. omitted.)

In general, this approach (and the new subaccount) is reasonable. However, the review and true-up process should be reviewed in a GRC (or in a process established in a GRC) rather than by advice letter.

For the employee retraining program, as discussed in the employee program section above, the estimated cost of $11.3 million is recoverable in rates through the NDNBC. PG&E’s request for a new two-way expense-only subaccount (the Employee Retraining Program Subaccount) within the existing Diablo Canyon Retirement Balancing Account is approved.

For the employee retention program, as discussed in the employee program section above, PG&E is authorized rate recovery for up to $211.3 million through the existing ratemaking treatment for the operation of Diablo Canyon. PG&E is authorized to establish a two-way expense-only balancing account (or sub-account) consistent with this decision.

For the costs of PG&E’s NRC license renewal project, as discussed in the license renewal costs section above, PG&E is authorized to recover $18.6 million for the license renewal project through an annual, levelized, expense-only revenue requirement of approximately $2.4 million to be recovered from customers over an 8-year period from January 1, 2018, through December 31, 2025, through the generation rate component of PG&E’s rates.

For cancelled capital projects at Diablo Canyon, PG&E is authorized rate recovery generally consistent with the proposed settlement on relicensing costs, under which:

PG&E would be authorized to recover 100% of the direct costs associated with cancelled capital projects at Diablo Canyon recorded to the project as of June 30, 2016, and would be further authorized to
recover 25% of the direct costs associated with cancelled capital projects recorded after June 30, 2016. All other direct costs and the Allowance for Funds Used During Construction (“AFUDC”) associated with such projects would not be recovered from customers. (May 23, 2017 Joint Settlement Motion at 3.)

PG&E’s original position in its Application was that:

In any instance in which PG&E decided in the future to cancel Diablo Canyon capital projects, PG&E proposed that the total projects costs incurred at the time of the decision to cancel be recovered from customers.24 (Id. at 8.)

Accordingly, the proposed settlement results in potentially significant (albeit unquantified) cost savings to ratepayers. The proposed settlement on cancelled capital projects is approved, with one modification. PG&E should make its specific cost recovery requests through its GRC process (or another formal application), rather than through an advice letter process.

3.7. Additional Issues

The Scoping Memo in this proceeding stated:

It is premature to address land use, facilities and decommissioning issues. At the same time, parties expressed concern that deferring consideration of these issues could result in PG&E making changes that would preclude future options. PG&E must obtain Commission approval under Pub. Util. Code § 851 prior to selling, leasing, or otherwise encumbering utility-owned land or facilities. While some of the land at issue is owned by a subsidiary of PG&E, PG&E has committed to take no action with any of the lands and facilities, whether owned by the utility or a subsidiary, before completion of a future process including a public stakeholder process, and states that the parties will not be prejudiced by excluding these issues from the current scope of this proceeding. PG&E is directed to abide by that commitment. (Scoping Memo at 6.)

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24 In addition, those capital project costs charged would include AFUDC.
The commitments and directions in the Scoping Memo are reiterated here in order to ensure that there will be local input and further Commission review prior to the disposition of Diablo Canyon facilities and surrounding lands. All unaddressed motions are denied.

4. **Comments on Proposed Decision**

The proposed decision of ALJ Allen was mailed to the parties in accordance with Section 311 of the Public Utilities Code, and comments were allowed under Rule 14.3 of the Commission’s Rules of Practice and Procedure. Comments were filed on November 29, 2017. Reply comments were filed on December 4, 2017.

During the course of the proceeding, PG&E consistently argued that it intended to operate Diablo Canyon until 2024/2025, particularly in response to parties’ suggestion that PG&E develop a contingency plan for an earlier shutdown. *(See, e.g. WEM Opening Brief at 4, quoting PG&E witness Strauss.)* Now, in the wake of the proposed decision (and its reduction in PG&E’s requested rate recovery), PG&E is warning that it may in fact shut down Diablo Canyon earlier. *(PG&E Comments at 4.)* The proposed decision has been modified to reflect an increased probability of Diablo Canyon shutting down earlier than 2024/2025.

While many parties support the proposed decision’s deferral of replacement procurement issues, including GHG impacts, to the IRP proceeding *(see, e.g. Comments of CLECA, California Clean DG Coalition, AREM, Joint Intervenors and the City and County of San Francisco)*, a number of parties argue that the Commission should not defer to the IRP proceeding consideration of the GHG impacts of the retirement of Diablo Canyon *(see, e.g. Comments of CEERT, FOE, PG&E and NRDC).*
CEERT, for example, argues that by doing so the proposed decision ignores SB 350 and that law’s GHG emission reduction requirements. (CEERT Comments at 5.) According to CEERT, the proposed decision rejects “a commitment to or procurement of GHG-free energy to replace Diablo Canyon,” and accordingly is inconsistent with the Governor’s objectives for clean energy, clean air, and pollution reduction. (Id.)

This is a mischaracterization of the proposed decision. Deferring consideration to the IRP proceeding of the GHG impacts of Diablo Canyon replacement procurement does not reject a commitment to procurement of greenhouse gas-free energy. Consideration of GHG impacts in the IRP proceeding is consistent with SB 350 and the GHG reduction policies of the State of California. The scope of the IRP proceeding expressly includes the following:

Based on the OIR, parties’ comments on the OIR, and the discussion at the PHC, the scope of this proceeding will be focused around two of the new sections of the Public Utilities Code, codified by SB 350. These sections are as follows:

454.51. The commission shall do all of the following:
(a) Identify a diverse and balanced portfolio of resources needed to ensure a reliable electricity supply that provides optimal integration of renewable energy in a cost-effective manner. The portfolio shall rely upon zero carbon-emitting resources to the maximum extent reasonable and be designed to achieve any statewide greenhouse gas emissions limit established pursuant to the California Global Warming Solutions Act of 2006 (Division 25.5 (commencing with Section 38500) of the Health and Safety Code) or any successor legislation. […]

454.52. (a) (1) Commencing in 2017, and to be updated regularly thereafter, the commission shall adopt a process for each loadserving entity, as defined in Section 380, to file an integrated resource plan, and a
schedule for periodic updates to the plan, to ensure that load-serving entities do the following:

(A) Meet the greenhouse gas emissions reduction targets established by the State Air Resources Board, in coordination with the commission and the Energy Commission, for the electricity sector and each load-serving entity that reflect the electricity sector’s percentage in achieving the economy-wide greenhouse gas emissions reductions of 40 percent from 1990 levels by 2030. (R.16-02-007 Scoping Memo and Ruling at 3-5.)

IRP is implementing SB350 and California’s GHG policies. Careful consideration of the relationship between Diablo Canyon, SB 350, and California’s GHG policies in the IRP proceeding is more consistent with SB 350 and those policies than attempting to do so in this more narrowly focused proceeding. To clarify this issue, the decision has been modified to direct PG&E to be prepared to demonstrate in the IRP proceeding the greenhouse gas emissions of its electric portfolio in scenarios assuming Diablo Canyon retirement dates prior to 2024/2025.

CUE and PG&E, in arguing for higher employee retention payments, cast the choice of payment level as an either/or choice – the $352.1 million originally proposed, or the $160.5 million approved by the proposed decision. (CUE Comments at 2-8, PG&E Comments at 3.) CUE then argues that because more evidence was presented supporting the $352.1 million figure than the $160.5 million figure, the proposed decision errs by adopting the lower figure.

This is a false dichotomy. Rather than a binary choice, the Commission must consider a spectrum. Absent a showing that it is reasonable to charge a

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25 In its Reply Comments, CUE acknowledges that approximately $303 million would likely provide the same effective level of payment.
cost to ratepayers, the proper amount is zero. With an adequate showing by a party, the needle moves off of zero, up to whatever level is supported by the record. The proposed decision found that in this case the parties had provided adequate support to move off of zero (although there was also record support for zero), but failed to support a level of $352.1 million. ORA’s testimony in support of $160.5 million helped push the needle up to that level. At the same time, it is not clear that $160.5 million is the correct level, particularly since it does not provide funding for the earlier (Tier 1) years.

CUE and PG&E further fault the proposed decision for not deferring to the retention payment “benchmarking” data cited by PG&E. (CUE Comments at 2, 4-6, 14; PG&E Comments at 6.) But as ORA points out:

[T]here is no data presented in the record regarding an applicable time-period for retention payments. Nothing was presented by PG&E’s consultant in testimony, workpapers, or discovery responses regarding the reasonableness of a seven year retention payment plan relative to the time frame for those programs included within its industry data. (ORA Reply Comments at 3.)

In addition, the retention payment benchmarking data that was used appears to be broad, across a range of industries, rather than specific to the unique characteristics of the nuclear power industry. There is also nothing in the record to indicate that the retention payment benchmarking data reflects an equivalent level of severance pay as is present here. PG&E forecasts severance payment costs of $168 million. (Exhibit PG&E-1 at 7-7.) If that amount were to be distributed equally to 1,461 employees, each employee would receive a severance payment of $115,000. If anything, the benchmarking data appear to confirm that a 25% per year retention payment level is too generous.

There is, however, a benefit to providing certainty as to the contours of the retention program. Continued uncertainly could exacerbate employee concerns,
possibly resulting in increased attrition. In addition, the comments do support
the desirability of retention payments throughout the entire period of Diablo
Canyon’s continuing operations, including the early years. (See, PG&E
Comments at 3, 9.) Accordingly, the proposed decision has been modified to
provide a reasonable fixed level of retention plan payments for Diablo Canyon’s
remaining years of operation.

The supporters of the CIMP make two arguments – first, that the CIMP is
not a substitute for tax revenues, and second, that the CIMP is authorized (or at
least not prohibited) by statute.

The Local Cities argue that the CIMP is not a substitute for tax revenues,
and accordingly, the current situation is distinguishable from that addressed in
D.97-05-088. The Local Cities argue that D.97-05-088 addressed a situation in
which the County was explicitly “seeking a substitute for lost tax revenue,”
while claiming: “Here, the CIMP is not explicitly based on tax revenues at all.
Calculating the amount under the CIMP does not involve a computation of tax
revenues.” (Local Cities Comments at 3.) This argument, however, is undercut
by the County, which states:

Of the 91 taxing jurisdictions in the County, 20 have budgets that
will not decrease as Diablo Canyon's unitary tax payments decrease.
For the remaining 71 taxing jurisdictions whose budgets will
decrease as Diablo Canyon is depreciated to $0, the County
re-allocated the unitary tax factors for the 20 unaffected jurisdictions
to the 71 affected jurisdictions and arrived at $75 million as the
amount necessary to maintain the status quo. Under the settlement,
the County would distribute the annual payment to each of the
affected jurisdictions according to its proportional factor; the
remaining 20 jurisdictions would receive funding from the State to
make up the shortfall from Diablo Canyon's taxes. (County
Comments at 7-8, footnotes omitted.)
Accordingly, it appears that the CIMP is based on tax revenues, and calculating the amount of the CIMP does involve a computation of tax revenues. The Cities have failed to distinguish the present case from D.97-05-088.

A number of parties attempted to cobble together arguments, based on Public Utilities Code Sections 701 and 712.5, to show that the Commission has at least implied authority to approve rate recovery for the CIMP payments to the community. (See, e.g. School District Comments at 3-6; A4NR Reply Comments at 1-4.) While Public Utilities Code Section 701 is very broad, and does grant the Commission significant authority, it does not directly address the situation here, and does not specifically authorize substituting ratepayers for taxpayers.

By comparison, Pub. Util. Code § 712.5 (SB 968) is much narrower, and is specifically focused on Diablo Canyon, but (as TURN points out) also does not expressly authorize the Commission to approve ratepayer funding for the CIMP:

Contrary to the claims made by A4NR and SLCUSD, Public Utilities Code §712.5 (SB 968) does not expressly authorize the Commission to approve ratepayer funding for this purpose. The provision merely directs the Commission to “cause an assessment to be completed’ regarding the “net economic effects” of a Diablo Canyon shutdown. The bill does not provide sweeping (and unbounded) authorization for unlimited ratepayer-funded payments to the affected communities to compensate for any impacts identified in the assessment. (TURN Reply Brief at 2, footnotes omitted.)

TURN is correct; even read in a broad way, Section 712.5 does not provide a basis for rate recovery of the CIMP. Minor clarifying changes have been made to the proposed decision on this issue.26

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26 The retirement of Diablo Canyon and the CIMP proposal, along with D.97-05-088, present a unique situation. This decision is based on and limited to the specific facts presented, and is not a broad or general statement of the scope of the Commission’s authority.
The County requested clarification or greater emphasis of: “PG&E’s commitment to continue funding local emergency response-related equipment, programs, and personnel, through the cessation of plant operations in 2025.” (County Comments at 13.) According to the County: “[T]he emergency response programs are of such importance to the community that there should be no ambiguity as to PG&E’s continued funding.” (Id.) As the County notes, the proposed decision states in a footnote that “[e]xisting support for local emergency services provided through PG&E rates is not at issue in this proceeding, and remains in effect.” (Id., citing Proposed Decision at 32, fn. 18.) This decision is addressing rate recovery for new costs; the cost of PG&E funding of emergency services that is already in rates is not at issue in this proceeding, and accordingly this decision does not reduce or eliminate that funding.

A number of parties criticize the proposed decision for inadequately valuing the “joint” aspect of the Joint Proposal, and argue that the proposed decision should have given the Joint Proposal more deference, as it was the product of a multi-party collaborative process. As FOE puts it:

While it is certainly true that PG&E is the Applicant in this case, it is incorrect to describe the various aspects of the Joint Proposal or the First Amendment as “PG&E proposals.” Doing so obscures the important fact that the Joint Proposal was a negotiated agreement among a diverse group of arms-length parties representing various and often conflicting interests, including labor unions and environmental organizations. (FOE Comments at 13; see also NRDC Comments at 2-3, CEERT Comments at 2-3.)

PG&E takes a similar position, including an argument that the employee retention benefit levels were agreed upon in an “arm’s length” bargaining process, and that the end result was “hard-bargained.” (PG&E Comments at 6.) The Local Cities likewise argue that the CIMP was the result of “good-faith,
arms-length” negotiations among “numerous parties.” (Local Cities Comments at 2.)

These arguments are undercut by the significant fact that the ratepayers were not at the table for these “arms-length” and “hard bargained” negotiations that decided they should pay for the costs of replacement procurement, employee retention, and the CIMP. This is akin to joining a group for dinner, who inform you that they have already ordered, and have decided that you will pay the bill. While the parties to the Joint Proposal may often have conflicting interests, that does not appear to have been the case here, and the Joint Proposal would have received more deference if it had included the interests of those who were being asked to pick up the tab. No changes have been made to the proposed decision on this issue.

Some parties argue that the proposed decision is too short, and that it does not adequately discuss the proposals that it rejects, particularly the deferral of replacement procurement issues to the IRP proceeding. (See, CEERT Comments at 1-2; IEP Comments at 2.) But as the Joint Intervenors point out:

There is detailed and extensive record support for the PD’s conclusion that the IRP should address replacement procurement, including testimony from PG&E’s own witnesses and the other Joint Parties. The PD briefly references solid record evidence supporting deferral of replacement procurement to the IRP, citing ORA and MCE testimony. More than those two parties offered experts who testified on the record that the replacement procurement should be considered in the IRP; the long list of experts whose record testimony supports deferral to the IRP includes: CCSF Witness Kinosian; CLECA witness Barkovich; Joint Intervenor Witnesses Kinosian and Barkovich; MCE Witness Dusel; ORA Witness Myers; Shell Witness Dyer; Solar City Witness Franz; and TURN Witnesses Marcus and Woodruff. These experts spoke to many reasons why the IRP is the right forum for a determination of need and
replacement procurement. (Joint Intervenors Comments at 4, footnotes omitted.)

The Joint Intervenors are correct that there is extensive record support for the proposed decision, particularly on this issue. The decision is based on the record and cites to the record; it is not necessary for it to address in detail every argument made in this proceeding.27 Other than the changes noted above, the proposed decision has not been expanded.

5. Assignment of Proceeding

Michael Picker is the assigned Commissioner and Peter V. Allen is the assigned Administrative Law Judge in this proceeding.

Findings of Fact

1. Continuing operation of Diablo Canyon Unit 1 beyond 2024 and Unit 2 beyond 2025 would require renewal of NRC licenses, and would not be cost effective.

2. The retirement of Diablo Canyon will not cause adverse impacts on local or system reliability.

3. The impact of the retirement of Diablo Canyon on GHG emissions is not clear.

4. The IRP proceeding is broader in scope than this proceeding, and is considering issues including optimized portfolios of generation resources to achieve the statewide GHG emissions target.

27 The record in this proceeding includes 21 opening briefs, 17 reply briefs and over 100 exhibits.
5. PG&E employees at Diablo Canyon who want to transfer to other jobs at PG&E due to the retirement of Diablo Canyon may require retraining and related assistance.

6. PG&E’s proposed employee retention plan is costly and inefficient.

7. A less costly employee retention plan would be more reasonable, and may help to ensure the continued safe operation of Diablo Canyon until its retirement.

8. The CIMP is largely intended to substitute for anticipated lost tax revenue.

9. PG&E’s original request for rate recovery for relicensing costs totaled $52.688 million for expenses from 2009 through 2016, including AFUDC.

10. The proposed settlement on relicensing costs would provide PG&E $18.6 million in rate recovery for expenses from 2009 through 2011, and excludes AFUDC.

11. The proposed settlement on cancelled capital projects reduces ratepayer exposure to the cost of those projects.

12. It is premature to address land use, facilities and decommissioning issues.

13. PG&E has committed to take no action with any of the Diablo Canyon lands and facilities before completion of a future public stakeholder process.

Conclusions of Law

1. PG&E’s proposal to retire Diablo Canyon Unit 1 by 2024 and Unit 2 by 2025 is reasonable, and should be approved.

2. The need for procurement to replace Diablo Canyon should be addressed in the IRP proceeding.

3. Any procurement to replace Diablo Canyon should be addressed in the IRP proceeding to avoid increased GHG emissions in the most optimal manner.

4. Implementation of a retraining program for PG&E employees at Diablo Canyon is reasonable, and should be approved.
5. PG&E’s proposed employee retention plan is not reasonable, and should not be approved.
6. A cost-effective employee retention plan for employees at Diablo Canyon is reasonable, and should be approved.
7. Having ratepayers take the place of taxpayers in paying for government services is not reasonable, and should not be approved.
8. The proposed settlement on relicensing costs is reasonable, and should be approved.
9. The proposed settlement on cancelled capital projects is reasonable as modified, and should be approved.
10. Land use, facilities and decommissioning issues do not need to be addressed in this decision.
11. The proposed settlement on NRC license renewal cost meets the requirements of Rule 12.1.

**ORDER**

**IT IS ORDERED** that:
1. Pacific Gas and Electric Company’s proposal to retire Diablo Canyon Unit 1 by 2024 and Unit 2 by 2025 is approved.
2. Pacific Gas and Electric Company’s “Tranche 1” proposal to procure 2,000 gigawatt hours of energy efficiency is not approved.
3. Pacific Gas and Electric Company’s withdrawn “Tranche 2” and “Tranche 3” replacement procurement proposals are not approved.
4. Replacement procurement will be addressed in the Integrated Resource Planning proceeding or a proceeding designated by the Integrated Resource Planning proceeding.

5. Efforts to avoid an increase in greenhouse gas emissions relating to the retirement of Diablo Canyon, including any replacement procurement, will be addressed in the Integrated Resource Planning proceeding or a proceeding designated by the Integrated Resource Planning proceeding.

6. Pacific Gas and Electric Company should be prepared to present scenarios for Diablo Canyon retirement in the Integrated Resource Planning proceeding that demonstrate no more than a de minimis increase in the GHG emissions of its electric portfolio.

7. Pacific Gas and Electric Company is authorized to recover $11.3 million in rates for its Diablo Canyon employee retraining program.

8. Pacific Gas and Electric Company’s proposed employee retention program is approved at a reduced payment level.

9. Pacific Gas and Electric Company is authorized to recover up to $211.3 million in rates for a Diablo Canyon employee retention program.

10. Ratepayer funding of the Community Impacts Mitigation Program is not approved.

11. The proposed settlement on Nuclear Regulatory Commission (NRC) license renewal costs is approved, and Pacific Gas and Electric Company is authorized to recover $18.6 million in rates for its NRC license renewal costs.

12. The proposed settlement on cancelled capital projects is approved as modified.

13. Pacific Gas and Electric Company will take no action with respect to any of the lands and facilities, whether owned by the utility or a subsidiary, before
completion of a future process including a public stakeholder process; there will be local input and further Commission review prior to the disposition of Diablo Canyon facilities and surrounding lands.

14. Application 16-08-006 is closed

This order is effective today.

Dated January 11, 2018, at San Francisco, California.

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(End of Appendix A)
Summary of PG&E’s Joint Proposal to Retire Diablo Canyon Power Plant (DCPP) at Expiration of the Current Operating Licenses

On June 21, 2016, PG&E announced a Joint Proposal with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Works Local 1245, Coalition of California Utility Employees and the Alliance for Nuclear Responsibility to retire DCPP at the expiration of the current operating licenses. On August 11, 2016, PG&E filed an Application with the California Public Utilities Commission (CPUC) for approval of the retirement of DCPP, implementation of the Joint Proposal, and for recovery of associated costs through proposed ratemaking.

Under the Joint Proposal, PG&E will continue to operate DCPP at current levels through the current license periods. If the Application is approved by the CPUC, in 2024 PG&E would retire Unit-1, and in 2025 would retire Unit-2. To replace DCPP power the Joint Proposal provides specific greenhouse gas (GHG)-free procurement requirements beginning in 2018 and continuing through 2031. Over the period of the next two years, PG&E will prepare a site-specific decommissioning plan including a schedule for post-shutdown treatment of spent fuel. In the Joint Proposal PG&E commits to pursuing dry cask storage as promptly as feasible and to continuing seismic studies. PG&E has suspended its license renewal efforts with the NRC and following CPUC approval of the Joint Proposal, PG&E will formally withdraw its license renewal application with the NRC. Under the Joint Proposal, PG&E has committed to continuing the safe operation of DCPP and to provide resources and assistance to transitioning workers. To continue safe operations under the Joint Proposal it will be critical to retain existing employees, who are highly qualified and PG&E has committed to provide a retention program and severance payments upon completion of employment. Under the Joint Proposal PG&E proposes to continue to provide funding to the San Luis Obispo area at current property tax levels through 2025. The foregoing information and any documents provided are not directly linked to the Committee’s review of operational safety and are provided for information only. The DCISC will continue to monitor and provide information to the public and to the Governor, the California Energy Commission, the California Attorney General, and to the CPUC on implementation of the Joint Proposal. Additional information will be provided here as it comes available.
- The Joint Proposal Overview (PDF)
- The Application of PG&E for Approval of the Retirement of Diablo Canyon Power Plant (PDF)
- Assigned Commissioner and ALJ’s Scoping Memo & Ruling (PDF)
- Joint Parties Motion for Approval of Community Impacts Settlement (PDF)
Diablo Canyon Power Plant: Joint Proposal Proposal Overview

Tom Jones
Director of Strategic Initiatives
October 20, 2016
We deliver natural gas and electric service to approximately 16 million people throughout a 70,000-square-mile service area.
Utility Owned Generation

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</tr>
</tbody>
</table>

- Conventional Hydroelectric Facilities
Energy Mix

PG&E 2015

- Natural gas + other: 42%
- Nuclear: 23%
- Large Hydro: 6%
- Eligible Renewables: 29%

U.S. 2015

- 33% Coal
- 34% Natural Gas + Other
- 20% Nuclear
- 13% Renewables

Wind 8%
Solar electric 11%
Biopower 4%
Geothermal 5%
Small Hydro 1%

Data represents gross generation only. Data is subject to independent audit and verification.

The Grid of Things

Power Plants
- Natural Gas Generators
- Nuclear Power Plants
- Hydropower Plants
- Wind Farms
- Solar Farms / Power Plants

Electric Grid
- Transmission Lines
- Utility-scale Storage
- Distribution Substations
- Rooftop Solar

Customers
- Distributed Storage
- Plug-in Electric Vehicles
- Customers
CA Eligible Renewable Energy Technologies

Notes: Eligible Resources do not include fossil-fueled cogeneration, gasified coal, large hydro, or municipal waste combustion. ** No utility scale PPA offered, emerging technologies.
### California’s Goals

- 50% renewables by 2030
- Double energy efficiency savings by 2030
- Optimal integration of renewables
- 80% decline in greenhouse gases by 2050

### Joint Proposal

- 55% renewables by 2031 (PG&E electricity sales*)
- Implement additional energy efficiency programs between 2018-2024
- More flexible generation mix to integrate renewables
- Facilitates California’s climate goals

* Electricity sales refers to PG&E’s bundled retail sales (i.e. “bundled” electricity, transmission and distribution services)

Joint Proposal

1. Why Now?
Diablo Canyon is subject to federal relicensing and state approvals to continue operations past its current license period.

2. What Has Changed?
The joint proposal allows for the orderly and reliable phase out of Diablo Canyon with GHG-free resources.
Demand for Diablo Canyon’s output is falling due to California energy policies and changing market conditions.

3. How Will Diablo Canyon Be Replaced?
Diablo Canyon will be replaced with energy efficiency, renewables, and other GHG-free resources, and in the process, help reach California’s climate and energy goals.

4. How Will PG&E Support the Employees and Community?
PG&E will provide generous retention & retraining programs for employees and financial support for the community.

Uncertain/Declining Need

**Uncertain Electricity Supply Needs for PG&E**
- Energy efficiency programs
- Growth in Distributed Generation (i.e. rooftop solar)
- Community Choice Aggregation
- Direct Access policies

**Declining Need for Diablo Canyon Generation**
- Resource needs from conventional generation sources are projected to decrease, due to falling electricity sales and increasing renewables supply
Energy efficiency (EE) programs, growth in distributed generation (DG), and Community Choice Aggregation (CCA) & Direct Access (DA) policies create significant uncertainty for PG&E’s electricity sales (Bundled Portfolio). Future electricity sales could fall significantly below current levels.

Source: MJ Bradley & Associates analysis based on data provided by PG&E
Declining Need for Diablo Canyon Generation

Resource needs from conventional generation sources are projected to decrease due to falling electricity sales and increasing renewables supply.

Source: MJ Bradley & Associates analysis based on data provided by PG&E
Three Steps:

1. PG&E procures 2,000 GWh of new energy efficiency projects and programs to be installed from 2018 to 2024.
2. PG&E procures 2,000 GWh of GHG-free energy or energy efficiency offerings to be initiated between 2025 and 2030.
3. Starting in 2031, PG&E will purchase incremental RPS eligible resources through competitive solicitations to voluntarily achieve a 55% RPS.
Community Impact

Joint Proposal supports an orderly transition for the community
• Includes nearly $50 million to County of SLO
• Continued emergency planning resources
PG&E will remain a community partner
• Charitable investments in the community will continue
• Our commitments will continue to focus on Education, Economic & Community Vitality, Emergency Preparedness, and Environment
PG&E 2014/2015: Unitary Tax Revenue Allocation

**$1–$24,999: $273,093**
- San Luis Coastal Unified: $9,338,391
- General Fund: $6,994,007

**$25,000–$249,999: $1,969,913**
- Roads: $298,752
- Paso Robles Unified: $397,711
- Port San Luis Harbor: $388,237
- Atascadero Unified: $409,261
- County Library: $503,415
- Lucia Mar Unified: $1,098,810
- County School Service: $1,157,724
- SLO Co. Community College: $1,951,633
- Education Resource Augmentation Fund (ERAF-State Transfer): $2,207,675

**TOTAL FUNDING: $26,988,621**

*19 organizations receiving between $25,000 to $249,999
**61 organizations receiving between $1 to $24,999

Source: San Luis Obispo County Office of the Auditor-Controller/Treasurer/Tax Collector
Emergency Planning

- Extends PG&E’s emergency plan through Part 50 license above current NRC requirements
- Will be included as part of 2019 site-specific decommissioning estimate
- Will include community and local government input
Decommissioning

- Diablo Canyon Units 1 & 2 will operate to the end of existing licenses (2024 and 2025, respectively)
- As Part of the JPA, PG&E has committed to submitting a site-specific decommissioning study by Q1, 2019
  - Current Rate Case to increase trust by $1.4 billion
    - Out of state shipments
    - Breakwater
    - Security Costs
- Will include community input & enhanced emergency planning commitments under the JPA
Employee Retention & Other Programs

• Proposed at approximately $350 million in the JPA over 9 years
• Offers 25% over base pay per year for a 4 year, then 3 year tranche
• Very high acceptance rate – 86%
• Prorated for new employees
• Full company severance package at end of license
  – Plus employee retraining
  – Plus employee placement within PG&E
Employee Retention Program Continued

Retention Percentages

- Signed: 86%
- 1 Year Until Retirement: 11%
- Other: 3%

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Employee Retention Program Continued
Status of JPA

- Submitted June 21, 2016
- Docket No. A1608006
- October 6, 2016 – CPUC held hearings in San Francisco
- October 20, 2016
  - 1:30 PM Public Participation Hearing
  - 7:00 PM Public Participation Hearing
- Scope and schedule to be issued after San Luis Obispo meetings
Thank you

Tom Jones
Tom.Jones@pge.com
BEFORE THE
PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA


(U 39 E)

APPLICATION OF PACIFIC GAS AND ELECTRIC COMPANY (U 39 E) FOR APPROVAL OF THE RETIREMENT OF DIABLO CANYON POWER PLANT, IMPLEMENTATION OF THE JOINT PROPOSAL, AND RECOVERY OF ASSOCIATED COSTS THROUGH PROPOSED RATEMAKING MECHANISMS

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Attorneys for
PACIFIC GAS AND ELECTRIC COMPANY

Dated: August 11, 2016
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BEFORE THE
PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of Pacific Gas and Electric
Company for Approval of the Retirement of
Diablo Canyon Power Plant, Implementation
of the Joint Proposal, And Recovery of
Associated Costs Through Proposed
Ratemaking Mechanisms

Application 16-08-_____

(U 39 E)

APPLICATION OF PACIFIC GAS AND ELECTRIC COMPANY (U 39 E)
FOR APPROVAL OF THE RETIREMENT OF DIABLO CANYON POWER PLANT,
IMPLEMENTATION OF THE JOINT PROPOSAL, AND RECOVERY OF
ASSOCIATED COSTS THROUGH PROPOSED RATEMAKING MECHANISMS

I. INTRODUCTION

For more than thirty years, Diablo Canyon Power Plant (“DCPP” or “Diablo Canyon”) has provided Californians with safe, reliable, and greenhouse-gas (“GHG”) -free energy. In less than ten years, the licenses issued by the Nuclear Regulatory Commission (“NRC”) for Diablo Canyon will expire. With this timing in mind, Pacific Gas and Electric Company (“PG&E”) has joined with labor, leading environmental organizations, and a community-based nuclear safety advocacy group to chart a different energy future. The Joint Parties represent diverse interests but are united in their commitment to helping California achieve its clean energy vision.

1/ For ease of reference, PG&E includes a table of acronyms and terms as Attachment F to this Application.

2/ The Joint Parties include PG&E, the Natural Resources Defense Council, Friends of the Earth, Environment California, International Brotherhood of Electrical Workers (“IBEW”) Local 1245, Coalition of California Utility Employees, and the Alliance for Nuclear Responsibility. In addition, as described below in Section II.C, the California Energy Efficiency Industry Council (“CEEIC”) has indicated that it supports the Joint Proposal.
Together, the Joint Parties developed a proposal that would increase investment in energy efficiency, renewable resources, and other GHG-free resources while phasing out nuclear power in California in 2024 and 2025.

This broad coalition of partners with diverse points of view collectively came to a shared vision concerning the best and most responsible path forward for Diablo Canyon. A key element of this vision is the recognition of the value of carbon-free nuclear power as an important bridge strategy over the next eight to nine years. This transition period will help to ensure that power remains affordable and there is no increase in the use of fossil fuels. Equally important, this transition period will also provide essential time needed for PG&E’s valued employees and the community to effectively plan for the future.

The Joint Proposal facilitates the retirement of Diablo Canyon and its orderly and measured replacement with energy efficiency, Renewables Portfolio Standard (“RPS”)-eligible, and other GHG-free energy resources. To accomplish these goals, the Joint Proposal includes three tranches of energy efficiency and GHG-free energy resource procurement that will occur between 2018 and 2045, and addresses how the costs associated with this procurement will be allocated.

The Joint Parties also recognize the impact of the retirement of Diablo Canyon on PG&E’s employees and the community. PG&E depends upon and has been committed to its Diablo Canyon employees and the local community where the plant is situated and its employees live. Thus, the Joint Proposal includes an employee retention program to keep Diablo Canyon’s highly qualified workforce operating the plant until its retirement. The Joint Proposal also includes severance program provisions already included in decommissioning estimates and

3/ A copy of the Joint Proposal is included as Attachment A to this Application.
provisions to help employees transition to new positions through a retraining and development program. The proposed Employee Program provides appropriate incentives to the Diablo Canyon team to remain focused on the job of finishing the operating licenses of the plant safely, reliably, and with excellence, while knowing that they will be treated fairly when their current job is complete.

The Joint Proposal also addresses community impacts. Diablo Canyon is one of the largest employers, taxpayers, and charitable contributors in the San Luis Obispo County area. In order to further support this local community, the Joint Proposal includes continued funding for San Luis Obispo County at current Diablo Canyon property tax levels through 2025.

Because Diablo Canyon will be retiring in 2025, the Joint Proposal addresses the process for decommissioning and the cost associated with previous relicensing efforts. With regard to relicensing costs, the Joint Proposal recognizes that it was reasonable and prudent for PG&E to incur the costs related to the federal and state license renewal processes, which are largely comprised of technical and environmental studies and permitting and licensing costs paid to the NRC. PG&E’s relicensing efforts were undertaken to preserve all options during a period of resource planning uncertainty. As a result, the Joint Proposal specifies that PG&E should be authorized to recover in rates the approximately $53 million dollars reasonably incurred in the federal and state license renewal process.

Finally, in order to implement the Joint Proposal, PG&E requests that the Commission approve a new two-way balancing account to track the amortization of Diablo Canyon’s net book value and capital additions and implement annual rate adjustments so that the book value is depreciated to zero and the costs are fully recovered in rates by the time Diablo Canyon ceases operations at the expiration of the current NRC operating licenses.
The Joint Proposal represents a landmark agreement to ensure the orderly retirement of Diablo Canyon, which has provided safe and reliable energy to California for more than 30 years, and to replace it with GHG-free resources, while at the same time addressing the needs of employees and the community. This Application describes the Joint Proposal and the specific relief PG&E seeks related to the Joint Proposal. PG&E’s Prepared Testimony, which is being served concurrently with this Application, provides a more detailed discussion of the Joint Proposal, the relief requested, and the evidence which demonstrates that the requests in this Application are reasonable and in the best interests of California and PG&E’s customers. The Joint Parties request that the Commission expeditiously review and approve this Application, which is a key stepping stone to California achieving its forward-looking energy goals and vision.

II. BACKGROUND

A. Background Regarding Diablo Canyon

Diablo Canyon Unit 1 commenced operation in 1984 and Unit 2 commenced operation in 1985. The NRC licenses expire in 2024 and 2025 for Units 1 and 2, respectively. Diablo Canyon has a capacity of more than 2,200 megawatts (“MW”) and produces more than 18,000 gigawatt-hours (“GWh”) of energy each year, providing approximately 6 percent of the energy generated in California annually, which is enough to meet the energy needs of more than three million Californians.

Over its 30-year lifetime, Diablo Canyon has been in operation more than 80 percent of the time, compared with the national average of 70 percent for other nuclear facilities. Since 1985, Diablo Canyon has operated safely and reliably, earning high performance and safety ratings from the NRC and the Institute of Nuclear Power Operations. Diablo Canyon’s GHG-
free energy avoids seven to eight million metric tons per year of GHG emissions that would otherwise be produced by conventional generation resources.

Because of its safety, reliability, and environmental benefits, PG&E filed a license renewal application with the NRC on November 23, 2009, in order to preserve the option to operate Diablo Canyon for an additional 20 years beyond the expiration of the current operating licenses. The activities performed and costs incurred in support of license renewal were necessary to ensure the potential for continued operations beyond 2024. However, as explained below, PG&E has reconsidered its relicensing efforts due to the significant and accelerating changes in the California energy landscape since 2009.

**B. As A Result Of The Rapidly Changing California Energy Landscape, Diablo Canyon Will Not Be Needed At The End of the License Period**

California’s electric grid is in the midst of a significant shift that creates challenges for Diablo Canyon in the coming decades. Changes in state policies, the electric generation fleet, and market conditions have combined to reduce the need for large, inflexible baseload power plants. These forces reduce the need for Diablo Canyon’s output beyond the current license period. Specifically, PG&E is faced with four primary planning challenges associated with operating Diablo Canyon beyond the current license period.

First, PG&E’s electricity supply needs are uncertain. Three key trends have significantly reduced PG&E’s electricity sales in recent years and will likely have even greater impacts in the future – the expansion of energy efficiency, increases in distributed generation especially privately-owned solar resources, and the growth of alternative energy supplies such as Community Choice Aggregation (“CCA”). This downward pressure on bundled electric sales reduces the need for electricity from Diablo Canyon. The precise impact each of these factors
will have on PG&E’s electricity supply needs is not certain, though in the aggregate these factors clearly reduce PG&E’s electricity sales forecast.

Second, there is a decreasing need for baseload generation. As the electric grid in California continues to evolve, so too will the characteristics of resources needed to reliably operate the California electric system. Given California’s energy goals that require increasing reliance on renewables – at least 50 percent by 2030 – the California electric system will need more flexible resources to integrate renewable energy and has less need for baseload electricity resources. PG&E’s need for baseload power from Diablo Canyon will decrease after 2025.

Third, PG&E is addressing the challenge of renewable resource overgeneration conditions caused by excess renewable energy supply in certain times of the day. As more solar generation comes on line over time, and when its output is at peak supply (e.g., in the middle of the day), there is less room on the electric system for energy from inflexible and large baseload resources such as Diablo Canyon. Additionally, due to expected overgeneration throughout parts of the year, Diablo Canyon may contribute to higher system costs as its current generation profile and lack of dispatchability cause challenges for efficiently integrating renewable resources. Therefore, without Diablo Canyon, the cost to integrate renewables may be lower.

Finally, the cost to operate Diablo Canyon may significantly increase. Future operating costs are uncertain due to a variety of regulatory and other factors and could increase as the facility ages. Compliance with California’s environmental protection regulations and other state and federal requirements may increase costs beyond 2025. These include, for example, any environmental mitigation or compliance measures required by California resource agencies, retrofits to comply with the State Water Resources Control Board’s (“SWRCB”) Once-Through Cooling (“OTC”) regulation, or additional regulations or orders from the NRC in response to federal regulatory or legislative changes either currently under consideration or in the future.
C. Development of the Joint Proposal

Recognizing the changing landscape of California’s energy industry, the importance of California’s GHG goals, and the need to provide sufficient time for an orderly replacement of Diablo Canyon, the Joint Parties worked together to develop the Joint Proposal with the goal of facilitating the retirement of Diablo Canyon at the end of the license periods, and replacing it with energy efficiency and GHG-free energy resources, such as renewable resources. After considerable negotiation, the Joint Proposal was announced on June 21, 2016.

On June 28, 2016, the California State Lands Commission approved the extension of DCPP’s submerged lands leases through the end of the NRC operating licenses, as contemplated in Section 6.1 of the Joint Proposal. In addition, on June 21, PG&E asked the NRC to suspend consideration of PG&E’s license renewal application, as specified in Section 1 of the Joint Proposal.

On July 12, 2016, PG&E and the Joint Parties held a public workshop at PG&E’s office in San Francisco to give interested parties an opportunity to review, ask questions, and potentially join in the Joint Proposal.4/ PG&E also held two public workshops in San Luis Obispo on July 20 and two public workshops in South San Francisco on July 22 to answer questions about the Joint Proposal and hear comments. A report prepared by M.J. Bradley summarizing the issues raised at these sessions is included as an attachment to PG&E’s Prepared

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Testimony. As a result of these workshops and additional discussions, CEEIC has indicated that
it also supports the Joint Proposal.

Finally, after the Joint Proposal was announced, the Joint Parties initiated a number of
meetings with representatives of CCA and direct access (“DA”) providers and customers
regarding the procurement to replace Diablo Canyon outlined in the Joint Proposal. So far, the
parties have discussed issues, concerns, and potential solutions, and have agreed to continue
discussions after this Application is filed. The Joint Parties are hopeful that they can work
collaboratively with CCA and DA representatives to reach a resolution of issues that will work
for all of the parties.

A summary of the Joint Proposal is included below, followed by a description of the
specific requests in this Application.

III. SUMMARY OF THE JOINT PROPOSAL

The Joint Proposal requires approval by and implementation of discrete plan elements
through a number of state and federal regulatory agencies. In this Application, PG&E requests
Commission consideration and approval of Sections 2 through 5 of the Joint Proposal, and
associated accounting, ratemaking, and cost recovery requests. PG&E proposes a procedural
schedule that would call for responsive testimony to be served in the fall, hearings in December,
briefs in January, and a proposed decision by May 2017. A final Commission decision in June
2017 would enable PG&E to proceed with the procurement of GHG-free resources in order to
achieve Joint Proposal milestones for the orderly replacement of Diablo Canyon’s energy.
PG&E’s request includes Commission review and approval of four critical aspects of the Joint
Proposal, discussed in detail below.
A. Section 2 Of the Joint Proposal

Pursuant to Section 2 of the Joint Proposal, PG&E seeks Commission approval of its plan to replace a portion of Diablo Canyon with GHG-free resources procured in three tranches over a fifteen-year period. This includes:

1. **Tranche #1**: This tranche includes one or more competitive solicitations and potentially new utility programs to add 2,000 gross GWh of energy efficiency to be installed by the end of 2024. This tranche is intended to reduce load with a GHG-free resource before Diablo Canyon retires.

2. **Tranche #2**: This tranche includes a competitive solicitation for 2,000 GWh of GHG-free energy for delivery in 2025-2030. Energy efficiency and RPS energy resources, as well as other GHG-free energy resources, will compete to fill this opportunity.

3. **Tranche #3**: This tranche includes a voluntary 55 percent RPS commitment, which is 5 percent above the 2030 RPS mandate in Senate Bill 350. The commitment would start in 2031 and terminate the earlier of 2045 or when superseded by law or a CPUC decision.

The three tranches of GHG-free resources are a first step towards replacing Diablo Canyon with a portfolio of GHG-free resources. Additional resources beyond those specified in the Joint Proposal may be needed on a system-wide basis to replace the output of Diablo Canyon. The Joint Parties envision that this issue will primarily be addressed through the Commission’s Integrated Resource Planning process (i.e., R.16-02-007). The Joint Parties are fully committed to supporting polices that result in replacing the output of Diablo Canyon with GHG-free resources. The Joint Proposal also addresses in Section 2.6 the allocation of costs related to this procurement.

B. Section 3 of the Joint Proposal

Section 3 of the Joint Proposal seeks approval of the Diablo Canyon Employee Program, which includes employee retention, retraining, and severance programs that will be offered to Diablo Canyon staff to compensate employees fairly for their continued service, to provide
incentives for those employees to stay until the plant is retired, and to maintain a safety culture that mitigates the risk of costly plant outages. The Joint Proposal reflects the fact that PG&E and the state have benefited from a well-trained, highly skilled and dedicated workforce at Diablo Canyon for its 31 years of operations. PG&E employs approximately 1,500 workers at the facility. The Employee Program described in Chapter 7 of the Prepared Testimony provides a fair and equitable set of benefits and incentives to ensure that, until the last day of Diablo Canyon’s operation, there is a continuity of operational excellence. This proposal treats employees fairly and benefits customers by mitigating risk of inefficient operation that may result from the loss of experienced and knowledgeable employees.

PG&E executed labor agreements with IBEW Local 1245, the Engineers and Scientists of California, Local 20, and the Service Employees International Union to implement the retention program. PG&E requests Commission approval of these programs and authority to recover its forecasted costs of the retention and retraining programs as specified in Chapters 7 and 10 of the Prepared Testimony.

C. Section 4 of the Joint Proposal

Section 4 of the Joint Proposal recognizes and honors the mutually beneficial relationship that has existed between Diablo Canyon and the local community in which it is situated over the past three decades. Diablo Canyon has provided reliable, safe, and economic GHG-free electricity for more than 30 years. It has done so with the support and assistance of the local community that has provided a home for DCPP and its employees. Over many years, the local community has both reaped the many benefits and also borne the burdens – both realized and potential – associated with hosting an operating nuclear power plant. Simply put, Diablo Canyon could not have realized its tremendous value to all of PG&E’s customers without the help and willing partnership of the local community.
Diablo Canyon is one of the largest employers, taxpayers, and charitable contributors in the San Luis Obispo County area. It currently pays approximately $22 million in annual property taxes to the local community. In order to continue to support this local community even as the facility begins to retire, PG&E proposes to provide $49.5 million in funding to San Luis Obispo County over a nine-year period to mitigate the decline in the economic benefit that the plant’s operations have traditionally provided. The mitigation payment would be recovered through nuclear decommissioning funding.

In addition, PG&E proposes to continue its support for state and local emergency planning and preparedness, including continuing support for the San Luis Obispo County early warning system, until the decommissioning of Diablo Canyon is complete. PG&E and the other Joint Parties believe that this Community Program strikes the right balance between providing appropriate transitional assistance to the community while also recognizing that the community must manage this transition so that it can thrive in the longer term without the historic levels of spending and taxes funded by PG&E customers.

D. Section 5 of the Joint Proposal

Finally, Section 5 of the Joint Proposal addresses cost recovery for Diablo Canyon during the remaining nine years of operations and defines the process ahead for decommissioning. In this Application, PG&E requests the Commission approve a new two-way balancing account to track the amortization of Diablo Canyon’s net book value and capital additions and implement annual rate adjustments so that the book value is depreciated to zero and the costs are fully recovered in rates by the time Diablo Canyon ceases operations at the end of its NRC operations licenses. In addition, the Joint Proposal specifies that PG&E should be authorized to recover in rates the approximately $53 million dollars incurred in the federal and state license renewal process to perform technical and environmental assessments. The Joint Parties agree that it was
reasonable for PG&E to incur these costs in order to preserve all options, including license renewal, during a period of resource planning uncertainty that resulted in the decision reflected in the Joint Proposal.

Section 5.4 of the Joint Proposal addresses the process for decommissioning Diablo Canyon. It states that PG&E will prepare a detailed, site-specific decommissioning plan for Diablo Canyon that will be filed with the Commission no later than the date when the 2018 Nuclear Decommissioning Cost Triennial Proceeding (“NDCTP”) will be submitted. This plan will update the cost estimate for the decommissioning project.

IV. DESCRIPTION OF PG&E’S REQUESTS IN THIS APPLICATION

In order to implement the four sections of the Joint Proposal described above, PG&E requests that the Commission authorize PG&E to:

1. Conduct the procurement activities related to Tranches #1 through #3, as described in Section 2 of the Joint Proposal and in Chapters 4 to 6 of PG&E’s Prepared Testimony.

2. Recover $1.3 billion for administration and acquisition of the new Tranche #1 energy efficiency procurement as authorized energy efficiency funding, subject to return of all unspent funds as described in Chapter 4, over a 7-year period through an annual expense-only revenue requirement of $187 million beginning January 1, 2019 through December 31, 2025 through the electric Public Purpose Program (“PPP”) rate component.

3. Recover Tranche #2 procurement costs for energy efficiency resources through the PPP rate component.

4. Establish the Clean Energy Charge, which would include separate components to: (a) recover GHG-free energy resource procurement costs related to Tranche #2 procurement from all electric users in PG&E’s service territory including PG&E’s bundled electric customers, CCA customers, and DA customers, subject to a self-provision option; and (b) recover RPS procurement costs related to Tranche #3 from PG&E bundled electric customers that depart after the Commission issues a decision approving this Application. These two components of the Clean Energy Charge are described in more detail in Chapters 5 and 6, respectively, of PG&E’s Prepared Testimony, and the Clean Energy Charge itself is described in Chapter 10 of PG&E’s Prepared Testimony.
5. Establish a self-provision option for CCA and DA providers that elect to self-provide GHG-free energy resources in lieu of the Tranche #2 component of the Clean Energy Charge. CCA and DA providers would elect to self-provide within thirty days of a Commission decision approving this Application and would agree to procure a specified amount of GHG-free resources, measured in GWh, and commit to a 55% RPS for the period 2031 through 2045. The self-provision option is described in more detail in Chapter 5 of PG&E’s Prepared Testimony.

6. Recover $352.1 million in costs associated with retaining approximately 1,500 employees at Diablo Canyon, as described in Chapter 7, to ensure the plant's continued safe and efficient operation through the end of each unit’s license in 2024 and 2025, respectively, over a 7-year period through an annual expense-only revenue requirement of $50.9 million beginning January 1, 2018 through December 31, 2024 through the Nuclear Decommissioning (‘‘ND’’) NBC.

7. Implement the Employee Severance Program described in Chapter 7 and authorize PG&E to continue to forecast and recover the cost of the Employee Severance Program in each subsequent NDCTP.

8. Recover $11.3 million in costs associated with retraining eligible employees at Diablo Canyon, as described in Chapter 7, and to recover these costs over a 5-year period through an annual expense-only revenue requirement of $2.3 million from January 1, 2021 through December 31, 2025 through the ND NBC.

9. Continue providing emergency preparedness support to the state and local community during the decommissioning process, as described in Chapter 8, and authorize PG&E to forecast and recover the associated costs in each subsequent NDCTP, subject to the stakeholder review process proposed in Chapter 8.

10. Recover $49.5 million to offset property tax loss for San Luis Obispo County, as described in Chapter 8 of PG&E’s Prepared Testimony, over an 8-year period through an annual expense only revenue requirement of $6.3 million beginning January 1, 2018 through December 31, 2025 through the ND NBC.

11. Recover $52.7 million in costs associated with Diablo Canyon license renewal activities, as described in Chapter 9, through an expense-only revenue requirement of $6.7 million to be recovered from customers over an 8-year period from January 1, 2018 through December 31, 2025, through the generation rate component.

12. Establish a new two-way balancing account, the Diablo Canyon Retirement Balancing Account, as described in Chapter 10 of PG&E’s Prepared Testimony, effective January 1, 2017 with the following subaccounts:
a. Diablo Canyon Capital Depreciation Subaccount to recover DCPP Units 1 and 2 full book value by the time the units cease operations on November 2, 2024 and August 26, 2025, respectively, or by December 31, 2024 should the SWRCB not grant PG&E’s request to continue once through cooling operations for Unit 2 beyond December 30, 2024.

b. Employee Retention Program Subaccount to administer recovery of $352.1 million in costs associated with retaining PG&E’s employees at Diablo Canyon for the remainder of plant operations.

c. Employee Retraining Program Subaccount to administer recovery of $11.3 million in costs associated with retraining eligible employees at Diablo Canyon.

13. Update the Diablo Canyon capital depreciation expense revenue requirement annually, as described in Chapter 10, to reflect the forecast annual gross additions as provided in PG&E’s GRC and to true-up the previous year’s authorized revenues with actual capital depreciation expense through a Tier 3 advice letter to be filed in May of each year through the remainder of DCPP’s licenses.

V. OVERVIEW OF PREPARED TESTIMONY

PG&E’s Prepared Testimony accompanying this Application consists of one exhibit (PG&E-1) which includes the following chapters:

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<td>Tranche #2 – All Source GHG Free Energy Request for Offers</td>
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<td>Tranche #3 – Voluntary 55 Percent Renewables Portfolio Standard Commitment</td>
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<td>Community Impacts Mitigation Program</td>
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<td>DCPP License Renewal Project Costs 2009-2016</td>
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<tr>
<td>10</td>
<td>Accounting, Cost Recovery, and Revenue Requirements</td>
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</tbody>
</table>
VI. INFORMATION REQUIRED BY THE COMMISSION’S RULES OF PRACTICE AND PROCEDURE

A. Statutory and Other Authority (Rule 2.1)

PG&E files this Application pursuant to California Public Utilities Code Sections 365.1, 366.2, 380, 451, 454.5, 454.52, 455, 701, and 8321-8330, the Commission’s Rules of Practice and Procedure, and prior decisions, orders and resolutions of the Commission. There are numerous Commission decisions addressing various aspects of this Application including decisions related to energy efficiency, RPS implementation, resource and long-term planning, allocation of procurement costs, nuclear decommissioning activities and costs, Diablo Canyon relicensing costs, and other issues raised or addressed in this Application.

B. Legal Name and Principal Place of Business (Rule 2.1(a))

The legal name of the Applicant is Pacific Gas and Electric Company. PG&E is a corporation organized under the State of California. PG&E’s principal place of business is 77 Beale Street, San Francisco, California 94105.

C. Correspondence and Communications (Rule 2.1(b))

All correspondence, communications, and service of papers regarding this Application should be directed to:

William Manheim  Conor Doyle
Law Department  Regulatory Affairs
Pacific Gas and Electric Company  Pacific Gas and Electric Company
P.O. Box 7442 (B30A)  P.O. Box 770000 (B9A)
San Francisco, CA  94120  San Francisco, CA  94177
Telephone: (415) 973-6628  Telephone: (415) 973-7817
Facsimile: (415) 973-5520  Facsimile: (415) 973-0942
E-Mail: wvm3@pge.com  E-Mail: jcdt@pge.com

D. Categorization, Hearings, And Issues To Be Considered (Rule 2.1(c))

1. Proposed Categorization

PG&E proposes that this Application be categorized as a ratesetting proceeding.
2. **Need for Hearings**

The need for hearings depends on the degree to which other parties contest this Application. While PG&E hopes to resolve the Application without hearings, PG&E’s proposed schedule conservatively assumes that hearings may be necessary.

3. **Issues to Be Considered**

The issues to be considered in this Application are as follows:

1. Whether PG&E should be authorized to conduct the procurement activities related to Tranches #1 through #3, as described in Section 2 of the Joint Proposal and in Chapters 4 to 6 of PG&E’s Prepared Testimony.

2. Whether PG&E should be authorized to recover $1.3 billion for administration and acquisition of the new Tranche #1 energy efficiency as authorized energy efficiency funding over a 7-year period through an annual expense-only revenue requirement of $187 million beginning January 1, 2019 through December 31, 2025 through the electric PPP rate component, subject to a return of unspent funds.

3. Whether Tranche #2 procurement costs for energy efficiency resources should be recovered through the PPP rate component.

4. Whether PG&E should be authorized to establish the Clean Energy Charge, which would include separate components to: (a) recover GHG-free energy resource procurement costs related to Tranche #2 procurement from all electric users in PG&E’s service territory including PG&E’s bundled electric customers, CCA customers, and DA customers, subject a self-provision option; and (b) recover RPS procurement costs related to Tranche #3 from PG&E bundled electric customers that depart after the Commission issues a decision approving this Application. These two components of the Clean Energy Charge are described in more detail in Chapters 5 and 6, respectively, of PG&E’s Prepared Testimony, and the Clean Energy Charge itself is described in Chapter 10 of PG&E’s Prepared Testimony.

5. Whether PG&E should be authorized to establish a self-provision option for CCA and DA providers that elect to self-provide GHG-free energy resources in lieu of the Tranche #2 component of the Clean Energy Charge. CCA and DA providers would elect to self-provide within thirty days of a Commission decision approving this Application and would agree to procure a certain GWh amount of GHG-free resources as well as commit to a 55% RPS for the period 2031 through 2045. The self-provision option is described in more detail in Chapter 5 of PG&E’s Prepared Testimony.
6. Whether PG&E should be authorized to recover $352.1 million in costs associated with retaining approximately 1,500 employees at Diablo Canyon to ensure the plant’s continued safe and efficient operation through the expiration of each unit’s license in 2024 and 2025, respectively, over a 7-year period through an annual expense-only revenue requirement of $50.9 million beginning January 1, 2018 through December 31, 2024 through the ND NBC.

7. Whether PG&E should recover $11.3 million in costs associated with retraining eligible employees at Diablo Canyon, as described in Chapter 7, and to recover these costs over a 5-year period through an annual expense-only revenue requirement of $2.3 million from January 1, 2021 through December 31, 2025 through the ND NBC.

8. Whether PG&E should be authorized to recover $49.5 million to offset property tax loss to San Luis Obispo County through 2024 over an 8-year period through an annual expense only revenue requirement of $6.3 million beginning January 1, 2018 through December 31, 2025 through the ND NBC.

9. Whether the Commission should approve the Employee Severance Program described in Chapter 7 and authorize PG&E to continue to forecast and recover the cost of the Employee Severance Program in each subsequent NDCTP.

10. Whether the Commission should approve PG&E’s proposal to continue providing emergency preparedness support to the state and local community during the decommissioning process and authorize PG&E to forecast and recover the associated costs in each subsequent NDCTP, subject to the stakeholder review process proposed in Chapter 8.

11. Whether PG&E should be authorized to recover $52.7 million in costs associated with Diablo Canyon license renewal activities, as described in Chapter 9, through an expense-only revenue requirement of $6.7 million to be recovered from customers over an 8-year period from January 1, 2018 through December 31, 2025, through the generation rate component.

12. Whether the Commission should approve the establishment of a new two-way balancing account, the Diablo Canyon Retirement Balancing Account effective January 1, 2017 with the following subaccounts:

   a. Diablo Canyon Capital Depreciation Subaccount to recover DCPP Units 1 and 2 full book value by the time the units cease operations on November 2, 2024 and August 26, 2025, respectively, or by December 31, 2024 should the SWRCB not grant PG&E’s request to continue once through cooling operations for Unit 2 beyond December 30, 2024.
b. Employee Retention Program Subaccount to administer recovery of $352.1 million in costs associated with retaining PG&E’s employees at Diablo Canyon for the remainder of plant operations.

c. Employee Retraining Program Subaccount to administer recovery of $11.3 million in costs associated with retraining eligible employees at Diablo Canyon.

13. Whether the Commission should authorize PG&E to update the Diablo Canyon capital depreciation expense revenue requirement annually to reflect the forecast annual gross additions as provided in PG&E’s GRC and to true-up the previous year’s authorized revenues with actual capital depreciation expense through a Tier 3 advice letter to be filed in May of each year through the remainder of DCPP’s licenses.

E. Procedural Schedule

PG&E proposes the following procedural schedule for this Application.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>August 11, 2016</td>
<td>PG&amp;E files Application</td>
</tr>
<tr>
<td>August 16, 2016</td>
<td>Notice of Application appears in Daily Calendar</td>
</tr>
<tr>
<td>+ 30 days</td>
<td>Protests filed</td>
</tr>
<tr>
<td>+ 10 days</td>
<td>Reply to Protests filed</td>
</tr>
<tr>
<td>September 19, 2016</td>
<td>Prehearing Conference</td>
</tr>
<tr>
<td>October 28, 2016</td>
<td>ORA and Intervenor testimony served (if any)</td>
</tr>
<tr>
<td>November 30, 2016</td>
<td>Rebuttal testimony served (if any)</td>
</tr>
<tr>
<td>December 13-16, 2016</td>
<td>Hearings (if any)</td>
</tr>
<tr>
<td>January 16, 2017</td>
<td>Opening Briefs</td>
</tr>
<tr>
<td>February 3, 2017</td>
<td>Reply Briefs</td>
</tr>
<tr>
<td>May 2017</td>
<td>Proposed Decision</td>
</tr>
<tr>
<td>June 2017</td>
<td>Final Decision</td>
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</tbody>
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F. Articles of Incorporation (Rule 2.2)

PG&E is, and since October 10, 1905, has been, an operating public utility corporation organized under California law. It is engaged principally in the business of furnishing electric and gas services in California. A certified copy of PG&E’s Restated Articles of Incorporation,
effective April 12, 2004, was filed with the Commission on May 3, 2004 with PG&E’s A.04-05-005. These articles are incorporated herein by reference.

G. Authority to Increase Rates (Rule 3.2)

This Application requests an increase in PG&E’s rates. Therefore, PG&E is providing material in this Application that complies with Rule 3.2. This Application is not a general rate increase application, so Rule 3.2(a) applies except for subsections (4), (7), (8), and (9).

H. Balance Sheet and Income Statement (Rule 3.2(a)(1))

Attachment B of this Application presents PG&E’s most current balance sheet and income statement for the period ending June 30, 2016.

I. Statement of Presently Effective Rates (Rule 3.2(a)(2))

Attachment C of this Application presents PG&E’s presently effective electric rates.

J. Statement of Proposed Increases or Changes In Rates (Rule 3.2(a)(3))

Attachment D of this Application presents PG&E’s proposed changes in electric rates.

K. Summary of Earnings (Rule 3.2(a)(5) and (a)(6))

A summary of recorded year 2014 revenues, expenses, rate cases and rate of return for PG&E’s Electric Department was filed with the Commission on September 1, 2015, in A.15-09-001 and is incorporated by reference.

L. Type of Rate Change Requested (Rule 3.2(a)(10))

This Application seeks to pass through to customers increased costs associated with the retirement of Diablo Canyon and its orderly and measured replacement with energy efficiency, RPS-eligible, and other GHG-free energy resources. Specifically, PG&E is requesting that the Commission approve the increased costs described above in Section IV and to pass these costs through by using the cost allocation mechanisms and rates described in Section IV.
M. **Notice to Governmental Entities (Rule 3.2(b))**

Attachment E presents the list of governmental entities, including the State of California and cities and counties served by PG&E, to whom PG&E will mail a notice stating in general terms the proposed revenues, rate changes, and ratemaking mechanisms requested in this Application, within twenty days after filing this Application.

N. **Publication (Rule 3.2(d))**

Within twenty days after filing this Application, PG&E will publish in newspapers of general circulation in each county in its service territory a notice of filing.

O. **Notice to Customers (Rule 3.2(d))**

Within 45 days of filing this Application, PG&E will include notices with the regular bills mailed and emailed to all customers affected by the proposed changes.

P. **Safety (Rule 2.1(c))**

In D.16-01-017, the Commission adopted an amendment to Rule 2.1(c) requiring Applications to clearly state “relevant safety considerations.” This Application address two key safety issues. First, by approving the continued operation of Diablo Canyon through the end of the current licenses in 2025, and the costs associated with this operation, the Commission will ensure that Diablo Canyon continues to operate in a safe and reliable manner through the current license period. While the NRC is ultimately responsible for overseeing the safe operation of Diablo Canyon, this Application will ensure that PG&E has sufficient funds and authority to continue to operate Diablo Canyon in a safe and reliable manner. Second, this Application provides for three procurement tranches including energy efficiency and GHG-free resources. PG&E’s contracts with these resources will address safety and will provide criteria and requirements for providers to safely operate in compliance with legal and regulatory requirements.
VII. CONCLUSION

PG&E has joined with labor, leading environmental organizations and a community-based nuclear safety advocacy group in the Joint Proposal, all united in the commitment to helping California achieve its clean energy vision. To achieve goal, PG&E respectfully requests that the Commission issue a decision in this proceeding that authorizes each of the requests specified in Section IV of this Application.

Respectfully submitted,

By: /s/ William V. Manheim

WILLIAM V. MANHEIM
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Attorney for
PACIFIC GAS AND ELECTRIC COMPANY

Dated: August 11, 2016
VERIFICATION

I, Steven Malnight, say:

I am an officer of Pacific Gas and Electric Company, a corporation, and am authorized pursuant to Rule 2.1 and Rule 1.11 of the Rules of Practice and Procedure of the CPUC to make this Verification for and on behalf of said corporation, and I make this Verification for that reason. I have read the foregoing Application and I am informed and believe that the matters therein concerning Pacific Gas and Electric Company are true. I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed at San Francisco, California, this 11th day of August, 2016.

/s/ Steven Malnight
STEVEN MALNIGHT
Senior Vice President, Regulatory Affairs
Attachment A

Joint Proposal
JOINT PROPOSAL OF
PACIFIC GAS AND ELECTRIC COMPANY, FRIENDS OF THE EARTH,
NATURAL RESOURCES DEFENSE COUNCIL, ENVIRONMENT CALIFORNIA,
INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS LOCAL 1245,
COALITION OF CALIFORNIA UTILITY EMPLOYEES AND ALLIANCE FOR
NUCLEAR RESPONSIBILITY TO RETIRE DIABLO CANYON NUCLEAR POWER
PLANT AT EXPIRATION OF THE CURRENT OPERATING LICENSES AND
REPLACE IT WITH A PORTFOLIO OF GHG FREE RESOURCES

Pacific Gas and Electric Company ("PG&E") Friends of the Earth ("FOE"), Natural Resources Defense Council ("NRDC"), Environment California, International Brotherhood of Electrical Workers Local 1245 ("IBEW Local 1245"), Coalition of California Utility Employees ("CUE") and Alliance for Nuclear Responsibility ("A4NR") (collectively, the "Parties") enter into this Joint Proposal governing the closure of Diablo Canyon Nuclear Power Plant ("Diablo Canyon") at the expiration of its existing Nuclear Regulatory Commission ("NRC") operating licenses and orderly replacement of Diablo Canyon with a greenhouse gas ("GHG") free portfolio of energy efficiency, renewables and energy storage that includes a 55 percent Renewable Portfolio Standard commitment by 2031.

PREAMBLE
A. Diablo Canyon Units 1 and 2 began commercial operation in May 1985 and March 1986, respectively, and are licensed by the NRC for operation until November 2, 2024 and August 26, 2025. Each year Diablo Canyon generates about 20 percent of the annual electricity production in PG&E’s service territory and nine percent of California’s annual production. Diablo Canyon has been operated by a committed and dedicated group of employees throughout its 31 years of operations. In 2009, PG&E filed at the NRC to continue Diablo Canyon’s operations for an additional twenty years.
B. In 2015, Senate Bill (SB) 350 (2015) enacted California Public Utilities Code § 454.51 which requires the California Public Utilities Commission (“CPUC”) to “identify a diverse and balanced portfolio of resources needed to ensure a reliable electricity supply that provides optimal integration of renewable power in a cost-effective manner. SB 350 also enacted Public Utilities Code § 454.52 which requires the CPUC to establish an integrated resource planning (“IRP”) process for regulated load-serving entities that helps to achieve the State’s green house gas emission reduction target of 40 percent below 1990 levels by 2030 while continuing to deliver safe, reliable, least-cost service to customers.

C. After considering factors including, but not limited to, (i) the increase of the Renewable Portfolio Standard (“RPS”) to 50% by 2030; (ii) doubling of energy efficiency goals under SB 350; (iii) the challenge of managing overgeneration and intermittency conditions under a resource portfolio increasingly influenced by solar and wind production; (iv) the growth rate of distributed energy resources; and (v) the potential increases in the departure of PG&E’s retail load customers to Community Choice Aggregation (“CCA”), PG&E in consultation with the Parties has concluded that the most effective and efficient path forward for achieving California’s SB 350 policy goal for deep reductions of GHG emissions is to retire Diablo Canyon at the close of its current operating license period and replace it with a portfolio of GHG free resources. The Parties agree that the orderly replacement of Diablo Canyon with GHG free resources will be the reliable, flexible, and cost-effective solution for PG&E’s customers.

D. The Parties recognize that the three tranches of resource procurement proposed in this Joint Proposal are not intended to specify everything that will be needed to ensure the orderly replacement of Diablo Canyon with GHG free resources, which is the Parties’ shared commitment. The full solution will emerge over the 2024-2045 period, in consultation with
many parties and with the oversight of the CPUC, the California Independent System Operator (“CAISO”), the California Energy Commission (“CEC”), the California Air Resources Board, the Governor, and the Legislature. Additional procurement beyond that specified in the three tranches will be needed on a system wide basis to replace the output of Diablo Canyon and the Parties envision that this issue will primarily be addressed through the CPUC’s IRP process. Some of the factors influencing resource replacement in PG&E’s Northern and Central California service territory will occur outside the CPUC’s resource planning proceedings, including but not limited to Statewide adoption of enhanced energy efficiency goals, customers' additions of distributed energy resources, potential expansion of customer loads by current and future CCAs, Energy Service Providers (“ESPs”) and other load-serving entities (“LSEs”), and reduced need for periodic curtailment of California's increasingly abundant solar and wind resources. Given these and other uncertainties, the Parties cannot, and it would be a mistake to try to, specify all the necessary replacement procurement now; what the Parties have proposed in the Joint Proposal are significant and appropriate steps in the journey. The Parties are fully committed to supporting policies that result in replacing the output of Diablo Canyon with GHG-free resources.

AGREEMENT

The Parties agree to the following terms and conditions:

1. Diablo Canyon License Renewal

   1.1. Under the terms of this Joint Proposal, PG&E will retire Diablo Canyon at the expiration of its current NRC operating licenses. The Parties will jointly propose and support the orderly replacement of Diablo Canyon with GHG-free resources.

   1.2. Recognizing that the procurement, construction and implementation of a GHG-
free portfolio of energy efficiency, renewables and energy storage replacement resources will take years, the Parties recognize that PG&E intends to operate Diablo Canyon to the end of its current NRC operating licenses which expire on November 2, 2024 (Unit 1) and August 26, 2025 (Unit 2), subject to the Unit 2 timing issue discussed in Section 6.2. This eight to nine year transition period will provide the time to begin the process to plan and replace Diablo Canyon’s energy with new GHG-free replacement resources.

1.3. PG&E will immediately cease any efforts on its part to renew the Diablo Canyon operating licenses and will ask the NRC to suspend consideration of the pending Diablo Canyon license renewal application pending withdrawal with prejudice of the NRC application upon CPUC approval of the Joint Proposal Application.

1.4. Nothing in this Joint Proposal constrains or limits in any way the right of Parties to raise safety or compliance issues related to Diablo Canyon with the NRC or any other government agency, going forward.

2. Greenhouse Gas Free Replacement Resources

2.1. The Parties jointly propose that Diablo Canyon be replaced with a GHG-free portfolio of energy efficiency, renewables and energy storage, as specified below. The portfolio will include a mix of investments that facilitates the achievement of broader statewide goals for deep reductions in GHG emissions, reliability, resource integration, and other long-term, cost-effective system wide benefits. The Parties propose that PG&E be authorized to procure GHG-free replacement resources in three competitive procurement tranches. The procurement provisions in section 2 of the Joint Proposal are beyond A4NR’s charter and interests. A4NR takes no position on these provisions (as well as the related provisions in the second and third
sentences of Section 7.3) but agrees not to oppose Section 2 of the Joint Proposal or the implementation actions undertaken by PG&E consistent with these provisions.

In the first tranche (Section 2.2), PG&E will be authorized to obtain 2,000 gross gigawatt-hours ("GWH") of energy efficiency savings to be implemented over the 2018 to 2024 time period. In the second tranche (Section 2.3), PG&E will be authorized to procure 2,000 GWH of GHG-free energy resources through an all-source solicitation that will commence energy deliveries or add energy efficiency programs or projects to the system in the 2025 to 2030 time period. In the third tranche (Section 2.4), with energy delivery starting in 2031, PG&E will purchase incremental RPS eligible resources through competitive solicitations to voluntarily achieve a 55% RPS and PG&E will maintain this voluntary commitment through 2045 or until superseded by action of the legislature or the CPUC.

2.2. **Tranche 1: Energy Efficiency**

2.2.1. PG&E will obtain 2,000 gross GWH from Energy Efficiency ("EE") installed by January 1, 2025 (measured as the sum of the first year gross GWH from EE installed in 2018 – 2024). The objective of this Tranche 1 component of the Joint Proposal is to achieve "early action" GHG savings prior to the retirement of Diablo Canyon in order to support flexibility in the timing of resource commitments in Tranche 2 and 3. PG&E may seek CPUC approval of cost-effective EE programs in excess of the 2,000 gross GWH target.

2.2.2. PG&E will issue a Request for Offers ("RFO") for EE projects and programs on or before June 1, 2018. The RFO will request bids for new EE projects and programs to be installed in the 2018-2024 timeframe. The Tranche 1 RFO will procure EE only. The goal of the RFO is to encourage new EE offerings, not duplicate existing
programs. In order to assure cost-effectiveness, eligible bids must be below a “RPS equivalent” cost cap that will be specified in the RFO. The RFO will compare offers using the Program Administrator Cost Test. The RFO will encourage proposals that estimate savings using an existing conditions baseline and normalized meter-based savings estimates where feasible and appropriate.

2.2.3. In addition, PG&E may propose new utility EE programs for the purpose of meeting the 2,000 gross GWH savings target. New utility EE will be evaluated for cost-effectiveness using the Program Administrator Cost Test. Where feasible and appropriate, PG&E will estimate savings using an existing conditions baseline and normalized meter-based savings estimates.

2.2.4. In its CPUC Application seeking approval of the Joint Proposal (“Joint Proposal Application”), PG&E will request approval of the funding needed to meet the Tranche 1 2,000 gross GWH EE target for the years 2018-2024. The incremental revenue requirement will be recovered in PG&E’s electric public purpose program (“PPP”) rates as non-bypassable charges. PG&E will also seek authorization to issue the RFO, including a description of the RFO process, PG&E will report its progress towards meeting the 2,000 gross GWH target in its annual energy efficiency report, separate from its reports on its other programs. PG&E will hold successive RFOs and/or propose new utility programs until the 2,000 gross GWH target has been achieved.

2.3. **Tranche 2: All Source GHG Free Energy Request For Offers**

2.3.1. No later than June 1, 2020, PG&E will issue an all-source RFO for 2,000 GWH per year of GHG-free energy resources or EE. The RFO eligibility requirements will include: i) the resource must be a source of GHG-free energy or result in energy
savings (for example, renewables, EE; energy storage, by itself, is not a source of energy and therefore is not eligible); ii) EE proposals must be for projects installed in PG&E’s service territory; iii) energy deliveries must be for a minimum term of 5 years; iv) energy deliveries must commence during the period 2025-2030 and achieve the 2,000 GWH per year target during this period; v) at PG&E’s discretion, EE proposals may commence prior to 2025; and vi) utility-owned generation will be eligible to compete in the RFO. In the Joint Proposal Application, PG&E will specify the RFO framework, including the least-cost, best fit evaluation criteria, RFO process and the CPUC approval process.

2.3.2. If PG&E does not obtain CPUC approval of GHG-free energy resource contracts or EE for 2,000 GWH per year as a result of the first RFO, it will hold successive RFOs until the 2,000 GWH per year target has been achieved.

2.3.3. PG&E will submit the winning bids from the RFO to the CPUC for its review and approval. At that time, PG&E may seek CPUC approval of cost-effective contracts from GHG-free resources in excess of the 2,000 GWH target.

2.3.4. The effectiveness of all GHG-free energy resource procurement contracts resulting from the RFOs will be conditioned upon CPUC approval, assurance of cost recovery and, as specified in Section 2.6, pre-approval of a cost allocation method. The incremental revenue requirement for EE programs selected in the all source RFO will be recovered in PG&E’s electric PPP rates as non-bypassable charges.

2.4. **Tranche 3: Voluntary 55 Percent RPS Commitment**

2.4.1. In each of the years beginning in 2031 and ending in 2045, PG&E commits to providing 55 percent of its total retail sales from eligible renewable energy resources, as defined in the CEC Renewables Portfolio Standard Guidebook. In
determining whether PG&E has met this commitment, all RPS requirements and limits set forth in the RPS Statute (California Public Utilities Code Section 399.11 et. seq.) will apply, as interpreted by the CEC and the CPUC (including, but not limited to, the portfolio balance requirements adopted in D.11-12-052, the banking and other compliance rules adopted in D.12-06-038, and the RPS enforcement rules adopted in D.14-12-023), except that the voluntary procurement quantity requirement in each year will be based upon the 55 percent RPS commitment. To facilitate determining whether it met this commitment, PG&E will use the RPS Compliance Report spreadsheet most recently adopted by the CPUC and the volumes reported in final, verified compliance reports for each applicable year.

2.4.2. PG&E’s voluntary 55 percent RPS commitment will terminate on the earlier of 2045 or when superseded through implementation of an RPS requirement (or equivalent GHG reduction regulation) that exceeds 55 percent.

2.5. **Resource Integration and Storage:** The Parties recognize that the retirement of Diablo Canyon in 2025, a large baseload source of energy, will impact the efficient and reliable balancing of load and resources in PG&E’s service territory. On the one hand, removing a large baseload resource during periods of peak solar production will reduce the need for periodic curtailment of RPS resources and enhance RPS resource integration during these periods. On the other hand, the retirement of Diablo Canyon may have impacts on system ramping and the need for additional energy storage. The challenges associated with resource integration, and system and local reliability, must be reviewed and resolved by the CPUC through its IRP process, in collaboration with the CAISO. The Parties will strongly support at the CPUC and before the CAISO the use of cost-effective GHG-free resource solutions, some of which may include
additional large pumped storage and utility-owned storage projects. Given the reliability and resource integration challenges described above, the Parties support a change in existing policies to allow allocation of resource costs for integration and storage through the CAISO’s Transmission Access Charge (“TAC”) or alternatively, through a Cost Allocation Mechanism (“CAM”), such as the CAM specified in Public Utilities Code Section 365.1(c), Section 454.51(c), or other similar CAM mechanisms approved by the CPUC.

2.6. **Cost Recovery:** Under the Joint Proposal, PG&E makes a commitment to procure GHG-free energy resources through 2030 and beyond for the benefit of all customers in its service territory. PG&E’s commitment to replace Diablo Canyon energy with GHG-free energy resources under tranche 2 (Section 2.3) and tranche 3 (Section 2.4) is therefore conditioned upon CPUC pre-approval that any procurement PG&E makes associated with the Joint Proposal will be subject to a non-bypassable cost allocation mechanism that: 1) equitably allocates costs and benefits, such as RPS or Resource Adequacy credits, associated with the procurement among responsible load serving entities; and 2) determines the net capacity costs of such procurement consistent with the methodology for the allocation of net capacity costs described in California Public Utilities Code section 365.1(c)(2)(C). In the Joint Proposal Application, PG&E will ask the CPUC to pre-approve the non-bypassable cost allocation mechanism and the Parties will support approval of this proposal. Costs associated with EE in Tranche 1 or Tranche 2 will be recovered through the PPP on a non-bypassable basis, consistent with existing recovery mechanisms for EE costs.

3. **Employee Retention and Severance Program**

3.1. PG&E and all of California has benefited from a well-trained, highly skilled and dedicated workforce at Diablo Canyon for its 31 years of operations. It is critical to retain these
highly qualified personnel at Diablo Canyon during the remaining years of operations. Pursuant to California Public Utilities Code Section 8330, these costs of these retention and severance programs will be recovered through the rates for Diablo Canyon decommissioning. PG&E will propose a fair and equitable employee package as part of its Joint Proposal Application.

3.2. PG&E’s Employee Program contains the following elements: (i) an employee severance program; (ii) a retention program to ensure adequate staffing levels (iii) a retraining and development program to facilitate redeployment of a portion of plant personnel to the decommissioning project and elsewhere with PG&E. The severance program was previously approved by the CPUC in prior nuclear decommissioning ratemaking proceedings. PG&E estimates that the additional cost of the Employee Retention, Retraining and Development Programs is approximately $350 million. PG&E will provide a detailed description and cost estimate of the Employee Program for CPUC approval in the Joint Proposal CPUC Application and PG&E’s commitment to implement the program is conditioned upon CPUC approval. The Retention, Retraining and Development Programs are subject to bargaining with PG&E’s labor unions.

4. Community Impacts Mitigation Program

4.1. Diablo Canyon is one of the largest employers, taxpayers, and charitable contributors in the San Luis Obispo County area. Diablo Canyon currently contributes approximately $22 million in property taxes to the local community. With the retirement of Diablo Canyon, this could decline to zero by 2025. The Parties will support funding of continuing revenue streams to address community needs and concerns. PG&E will propose to compensate San Luis Obispo County for the loss of property taxes associated with the declining rate base in Diablo Canyon through a transition period ending in 2025. The payment in lieu of
taxes will be recovered through nuclear decommissioning funding. PG&E estimates that the total cost of the Community Impacts Mitigation Program is approximately $49.5 million. As specified in Section 5.4.1, as a condition of the program, PG&E will recover the costs of the Community Impacts Mitigation Program through CPUC-approved rates for nuclear decommissioning.

5. Other Diablo Canyon CPUC Proceedings

5.1. Amortization of Diablo Canyon Book Value: Under the Joint Proposal, PG&E intends to operate Diablo Canyon to the end of its currently authorized NRC license life, subject to the Unit 2 timing issue discussed in Section 6.2. Consistent with the CPUC cost recovery principles for long-life capital assets, the Parties support full cost recovery of PG&E’s investment in and return on Diablo Canyon, fully amortized/depreciated to a zero book value by the end of 2024 for Unit 1 and the end of 2025 for Unit 2, subject to the Unit 2 timing issue discussed in Section 6.2. PG&E will request CPUC approval of this ratemaking approach in the Joint Proposal Application. Parties will not oppose amortization and cost recovery of Diablo Canyon costs in PG&E’s 2017 General Rate Case A. 15-09-001. If there is an early shut-down of Diablo Canyon, the Parties reserve all rights to contest cost recovery of or related to any then-remaining unamortized Diablo Canyon net book costs, provided, however, if Unit 2 closes at the end of 2024 due to the timing issue described in Section 6.2, the Parties support full amortization/depreciation to a zero book value for Unit 2 by December 31, 2024.

5.2. License Renewal Costs: PG&E has incurred approximately $50 million related to the federal and state license renewal processes, including technical and environmental assessments and permitting and licensing costs. With the exception of A4NR, the Parties agree that it was reasonable and prudent for PG&E to conduct the evaluations and incur the costs of
state and federal regulatory review in order to preserve all options, including license renewal, during a period of resource planning uncertainty that resulted in the decision reflected in the Joint Proposal. In the Joint Proposal Application, PG&E will request cost recovery of the license renewal costs. The Parties, with the exception of A4NR, support PG&E’s request for full recovery of license renewal costs. A4NR reserves the right to contest recovery of the License Renewal Costs in the Joint Proposal Application.

5.3. **Seismic Study Process and Costs:** PG&E has been continually engaged in the evaluation of seismic conditions at Diablo Canyon since the start of operations. The decision not to proceed with license renewal does not affect this on-going commitment. Nothing in this agreement shall constrain the Parties from advocacy on issues related to seismic studies. PG&E acknowledges the substantial influence and contribution of A4NR’s work in reaching the positions reflected in the Joint Proposal. Because of PG&E’s decision not to proceed with license renewal, A4NR agrees to withdraw its pending objections and recommendations regarding PG&E’s recovery of costs in the Diablo Canyon Seismic Studies Balancing Account in PG&E’s 2013 and 2014 ERRA proceedings.

5.4. **Nuclear Decommissioning:** PG&E submitted a revised Diablo Canyon decommissioning study on March 1, 2016 in the CPUC Nuclear Decommissioning Triennial Proceeding (“NDCTP”). (CPUC Application 16-03-006) In the 2015 NDCTP, PG&E estimated the cost to decommission Diablo Canyon at $3.779 billion (2014 $). The 2015 NDCTP estimate is based on a financial model prepared by TLG Services, Inc. and does not reflect the results of an actual site-specific decommissioning study.

5.4.1. PG&E will prepare a Diablo Canyon site-specific decommissioning study and submit it to the CPUC in an application for approval no later than the date when the
2018 NDCTP will be filed. PG&E will seek authorization from the CPUC in the Joint Proposal Application to disburse funds from the Diablo Canyon decommissioning trust to fund the site specific decommissioning study. The site-specific decommissioning study will update the 2015 NDCTP forecast and incorporate the costs of (i) the Employee Program described in Section 5.3, (ii) the Community Impacts Mitigation Program in Section 4.1, (iii) a plan for expedited post-shut-down transfer of spent fuel to Dry Cask Storage as promptly as is technically feasible using the transfer schedules implemented at the San Onofre Nuclear Generating Station as a benchmark for comparison, and provided PG&E will also provide the plan to the CEC, collaborate with the CEC, and evaluate the CEC’s comments and input; and (iv) a plan to continue existing emergency planning activities, including maintenance of the public warning sirens and funding of community and state wide emergency planning functions until the termination of Diablo Canyon’s 10 CFR Part 50 license, subject to CPUC approval and funding in decommissioning rates. The Parties will support CPUC approval and funding of these elements of PG&E’s revised Diablo Canyon decommissioning study.

5.4.2. The Parties support CPUC approval of PG&E’s 2015 NDCTP decommissioning forecast and establishment of the proposed revenue requirement until such time as the CPUC reviews, approves and authorizes cost recovery for the Diablo Canyon site specific decommissioning study. A4NR reserves the right to contest PG&E’s forecast and assumptions regarding spent fuel transfer to dry cask storage in the 2015 NDCTP proceeding.

6. Actions at Other Governmental Agencies

6.1. State Lands Commission (“SLC”): PG&E requested that SLC issue new
submerged lands leases for the intake and discharge structures at Diablo Canyon effective from the date of issuance until Diablo Canyon ceases operations under Diablo Canyon’s existing NRC operating licenses in August, 2025. Given PG&E’s decision to retire Diablo Canyon in 2025, the Parties agree to jointly support the granting of the new lease to run coterminous with the existing NRC operating licenses and will submit a joint letter to the SLC to that effect. Given the particular circumstances of this matter, and subject to PG&E’s commitment under the Joint Proposal that PG&E will not seek license renewal and agrees to cease operations at Unit 1 by November 2, 2024 and Unit 2 by August 26, 2025, FOE, NRDC, Environment California, IBEW Local 1245, CUE and A4NR waive any argument that the continuing operations of the plant through August 26, 2025, without any material increase or change in those operations, requires review under the California Environmental Quality Act (“CEQA”). However, A4NR reserves the right to ask the SLC to conduct a discretionary Environmental Impact Report (“EIR”) under CEQA prior to making a decision on the lease extension request. In the event the SLC decides not to perform a discretionary EIR, A4NR waives all rights to appeal the SLC’s decisions in connection with its approval of the short term lease extension.

6.1.1. After PG&E has completed its Diablo Canyon site-specific decommissioning study as specified in Section 5.4.1, PG&E will submit a new and separate lease application to the SLC to allow use of the intake and discharge for the period of time necessary to accommodate decommissioning activities. It is PG&E’s expectation that the SLC’s review of the decommissioning project, in collaboration with the Coastal Commission’s review of any development under the project, will be subject to environmental review under CEQA. Nothing in the Joint Proposal affects the Parties positions regarding CEQA and/or the National Environmental Policy Act (“NEPA”)
compliance regarding the decommissioning process for Diablo Canyon or any other SLC lease extension after August 26, 2025.

6.1.2. If the CPUC rejects the Joint Proposal Application and it or any other entity with the requisite legal authority directs PG&E to pursue Diablo Canyon license renewal at the NRC, PG&E will within 120 days of such final and non-appealable action submit a new lease request to the SLC premised on the change in circumstances which will be fully subject to CEQA and the Parties reserve all rights to contest such application.

6.2. **State Water Resources Control Board (“State Water Board”):** Given PG&E’s decision to retire Diablo Canyon, the Parties agree that compliance issues under Track 1 and Track 2 of the State Water Board’s Once Through Cooling (“OTC”) policy will have been resolved once the plants cease power generation, on the condition that the resulting water flows associated with decommissioning meet the applicable requirements of the OTC policy. PG&E will continue to pay “interim mitigation” fees through the end of PG&E’s existing NRC operating licenses in 2024 and 2025 as specified under State Water Board Resolution No. 2015-0057. These fees shall be in addition to any other fees PG&E is currently paying or will be required to pay in the future. PG&E will disclose actual intake volume data and any other data requested by the State Water Board to support the agency’s calculation of the appropriate interim mitigation fees. In order to clarify the authority of Diablo Canyon Unit 2 to operate beyond December 31, 2024 under the OTC policy, PG&E will ask the State Water Board for an amendment to the OTC policy to conform the compliance timeline table to the date of actual expiration of the Unit 1 and Unit 2 NRC operating licenses. The amendment, if approved, would confirm that Unit 2 is authorized to operate through August 26, 2025, subject to continued
payment of the interim mitigation during Diablo Canyon Unit 2’s 2025 operations. PG&E will implement the Joint Proposal regardless of the State Water Board’s decision on the amendment request. The Parties will review the amendment request and reserve the right to oppose it or seek additional conditions. The Parties shall be unconstrained in their ability to comment on the adequacy of the interim mitigation fee amount.

6.3. NRC License Renewal: Following final and non-appealable CPUC approval of the Joint Proposal Application, 1) PG&E will withdraw the Diablo Canyon NRC license renewal application and request that the proceeding be terminated with prejudice; 2) the Parties will support the withdrawal and termination of the Diablo Canyon NRC license renewal application; and 3) FOE will withdraw with prejudice the petition at the DC Circuit Court of Appeals and related pending hearing requests and motions in the Diablo Canyon license renewal case (Friends of the Earth v. U.S. Nuclear Regulatory Commission, Case No. 16-1004 (D.C. Cir. filed Jan. 8, 2016)).

6.4. NRC Dry Cask Fuel Storage: PG&E’s current NRC license for its Independent Spent Fuel Storage Installation (“ISFSI”) expires in 2024. PG&E expects to file a license renewal application with the NRC for the ISFSI no later than five years prior to expiration of the current license. Parties will not oppose PG&E’s NRC application to renew the license for the ISFSI at Diablo Canyon, including any associated state approvals. While A4NR will not oppose continuing use of the ISFSI, A4NR reserves the right to petition and present recommendations to those state agencies whose approval is necessary to the ISFSI license renewal. This section does not restrict in any way the rights of the Parties to take a position on interim storage of spent nuclear fuel as part of the broader national discourse.
GENERAL PROVISIONS

7. Scope and Approval

7.1. The Parties agree that the Joint Proposal is subject to approval by the CPUC and shall be submitted for approval pursuant to Article 12 (Settlements) of the CPUC’s Rules of Practice and Procedure. Within thirty days after PG&E’s public announcement of the Joint Proposal, PG&E will convene a conference with notice and an opportunity to be heard to all parties as specified under CPUC Rule 12.1(b) for the purpose of discussing the Joint Proposal and inviting parties to comment on and join in a settlement agreement. No later than 30 days after the SLC has approved the new leases for Diablo Canyon as specified in Section 6.1, or as mutually agreed, PG&E shall file the Joint Proposal Application with the CPUC for approval, adoption and implementation of the Joint Proposal and thereafter will complete the process for execution and submission of an associated settlement agreement as specified in CPUC Rule 12.

The Parties agree to: (i) support the Joint Proposal Application and the associated settlement agreement and use their best efforts to secure CPUC approval of the Joint Proposal and the associated settlement agreement in its entirety without modification; (ii) recommend that the CPUC approve and adopt this Joint Proposal and the associated settlement agreement in its entirety without change; and (iii) actively and mutually defend the Joint Proposal and the associated settlement agreement and the Joint Proposal Application if opposed by any other party. Unless the CPUC expressly provides otherwise, and except as otherwise expressly provided herein, such adoption does not constitute approval or precedent for any principle or issue in this or any future proceeding, consistent with CPUC Rule 12.5.

7.2. The Parties intend that CPUC adoption of this Joint Proposal will be binding on the Parties. The Parties agree that, if the CPUC fails to adopt this Joint Proposal and the
associated settlement agreement in its entirety and without modification, the Parties shall meet and confer as specified in CPUC Rule 12.4 within fifteen (15) days thereof to discuss whether the Joint Proposal and associated settlement agreement should be renegotiated with alternative terms and resubmitted to the Commission for approval. The Parties agree under such circumstances to bargain in good faith to restore the balance of benefits and burdens under the Joint Proposal. If the Parties cannot mutually agree to resolve the issues raised by the CPUC’s actions, the Joint Proposal and the associated settlement agreement may be rescinded by any Party and the Parties shall be released from their obligations under the Joint Proposal. Thereafter, the Parties may pursue any action they deem appropriate.

7.3. In the Joint Proposal Application, PG&E will request that the CPUC issue a final decision approving the Joint Proposal Application no later than December 31, 2017. If the CPUC decision is not issued by December 31, 2017, PG&E, in consultation with the Parties, may delay implementation of the actions related to the procurement of GHG-free energy resources as specified in Section 2, until such CPUC approval becomes final and non-appealable. For any procurement voluntarily undertaken by PG&E prior to the time that the CPUC’s approval of the Joint Proposal Application has become final and non-appealable, PG&E may condition the procurement contracts on the approval becoming final and non-appealable. PG&E’s obligation to withdraw its license renewal application under Section 1.3 shall not become effective or binding until the CPUC’s approval of the Joint Proposal Application has become final and non-appealable.

7.4. This Joint Proposal shall be governed by the laws of the State of California as to all matters, including but not limited to, matters of validity, construction, effect, performance, and remedies.
7.5. This Joint Proposal may be executed in separate counterparts by the different Parties hereto with the same effect as if all Parties had signed one and the same document.

The Parties mutually believe that, based on the terms and conditions and reservations of rights stated above, this Joint Proposal is reasonable, consistent with the law, and in the public interest.
The Parties’ authorized representatives have duly executed this Joint Proposal on behalf of the Parties they represent.

PG&E CORPORATION

Anthony F. Earley, Jr.
Chairman, Chief Executive Officer, and President

Date: June 20, 2016

NATURAL RESOURCES DEFENSE COUNCIL

Rhea Suh
President

Date: June 20, 2016

FRIENDS OF THE EARTH

Erich Pica
President

Date: June 20, 2016

INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS LOCAL 1245

Tom Dalzell
Business Manager

Date: June 20, 2016

ENVIRONMENT CALIFORNIA

Dan Jacobson
Legislative Director

Date: June 20, 2016

COALITION OF CALIFORNIA UTILITY EMPLOYEES

Marc D. Joseph
Attorney on behalf of Coalition Of California Utility Employees

Date: June 20, 2016
ALLIANCE FOR NUCLEAR RESPONSIBILITY

Rochelle Becker
Executive Director

Date: June 20, 2016
Attachment B

Current Balance Sheet and Income Statement for the Period
Ending June 30, 2016
# PG&E CORPORATION
## CONDENSED CONSOLIDATED BALANCE SHEETS

(Unaudited)

| (in millions) | Balance At | | |
|---------------|------------|------------|
| | June 30, 2016 | December 31, 2015 |
| **ASSETS** | | |
| Current Assets | | |
| Cash and cash equivalents | $189 | $123 |
|Restricted cash | 235 | 234 |
|Accounts receivable: | | |
| Customers (net of allowance for doubtful accounts of $53 and $54 at respective dates) | 1,039 | 1,106 |
|Accrued unbilled revenue | 957 | 855 |
|Regulatory balancing accounts | 1,697 | 1,760 |
|Other | 567 | 286 |
|Regulatory assets | 464 | 517 |
|Inventories: | | |
|Gas stored underground and fuel oil | 123 | 126 |
|Materials and supplies | 346 | 313 |
|Income taxes receivable | 234 | 155 |
|Other | 284 | 338 |
|Total current assets | 6,135 | 5,813 |
|Property, Plant, and Equipment | | |
|Electric | 50,872 | 48,532 |
|Gas | 17,123 | 16,749 |
|Construction work in progress | 2,096 | 2,059 |
|Other | 2 | 2 |
|Total property, plant, and equipment | 70,093 | 67,342 |
|Accumulated depreciation | (21,496) | (20,619) |
|Net property, plant, and equipment | 48,597 | 46,723 |
|Other Noncurrent Assets | | |
|Regulatory assets | 7,315 | 7,029 |
|Nuclear decommissioning trusts | 2,546 | 2,470 |
|Income taxes receivable | 147 | 135 |
|Other | 1,187 | 1,064 |
|Total other noncurrent assets | 11,195 | 10,698 |
|**TOTAL ASSETS** | $65,927 | $63,234 |

See accompanying Notes to the Condensed Consolidated Financial Statements.
## Balance Sheets

<table>
<thead>
<tr>
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<th>Balance At</th>
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<td></td>
<td>June 30,</td>
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<tr>
<td></td>
<td>2016</td>
</tr>
<tr>
<td><strong>LIABILITIES AND EQUITY</strong></td>
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</tr>
<tr>
<td><strong>Current Liabilities</strong></td>
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<tr>
<td>Short-term borrowings</td>
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<tr>
<td>Long-term debt, classified as current</td>
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<tr>
<td>Accounts payable:</td>
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<tr>
<td>Trade creditors</td>
<td>1,313</td>
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<td>Regulatory balancing accounts</td>
<td>654</td>
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<tr>
<td>Other</td>
<td>527</td>
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<tr>
<td>Disputed claims and customer refunds</td>
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<tr>
<td>Interest payable</td>
<td>214</td>
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<tr>
<td>Other</td>
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<tr>
<td><strong>Total current liabilities</strong></td>
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<tr>
<td><strong>Noncurrent Liabilities</strong></td>
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<td>Long-term debt</td>
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<td>Regulatory liabilities</td>
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<td>Pension and other postretirement benefits</td>
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<td>Asset retirement obligations</td>
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<td>Deferred income taxes</td>
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<td>Other</td>
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<td><strong>Total noncurrent liabilities</strong></td>
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<td><strong>Commitments and Contingencies (Note 9)</strong></td>
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<td><strong>Equity</strong></td>
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<td><strong>Shareholders' Equity</strong></td>
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<tr>
<td>Common stock, no par value, authorized 800,000,000 shares; 498,143,219 and 492,025,443 shares outstanding at respective dates</td>
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<tr>
<td>Reinvested earnings</td>
<td>5,137</td>
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<tr>
<td>Accumulated other comprehensive loss</td>
<td>(7)</td>
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<td><strong>Total shareholders' equity</strong></td>
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<td><strong>Noncontrolling Interest - Preferred Stock of Subsidiary</strong></td>
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<td><strong>Total equity</strong></td>
<td>16,998</td>
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<td><strong>TOTAL LIABILITIES AND EQUITY</strong></td>
<td>$65,927</td>
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See accompanying Notes to the Condensed Consolidated Financial Statements.
Attachment C

PG&E’s Presently Effective Electric Rates
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<tr>
<th>LINE NO.</th>
<th>SCHEDULE</th>
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<td>SUMMER</td>
<td>WINTER</td>
<td>SUMMER</td>
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<td>SCHEDULE E-1</td>
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<td>2</td>
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<td>3</td>
<td>ES UNIT DISCOUNT ($/UNIT/MONTH)</td>
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<td>ET UNIT DISCOUNT ($/UNIT/MONTH)</td>
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<td>ES/ET MINIMUM RATE LIMITER ($/KWH)</td>
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<td>14</td>
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# Residential Rates

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<th>Line No.</th>
<th>Schedule</th>
<th>Minimum Bill ($/Month)</th>
<th>E-6 Meter Charge ($/Month)</th>
<th>On-Peak Energy ($/kWh)</th>
<th>Part-Peak Energy ($/kWh)</th>
<th>Off-Peak Energy ($/kWh)</th>
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## Present Electric Rates
### As of August 1, 2016

#### Medium & P Rates

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C-6
**PACIFIC GAS AND ELECTRIC COMPANY**
**PRESENT ELECTRIC RATES**
**AS OF AUGUST 1, 2016**

**E-19 FIRM RATES**

<table>
<thead>
<tr>
<th>NO.</th>
<th>SCHEDULE E-19 T FIRM</th>
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<th>8/1/16</th>
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<td><strong>SUMMER</strong></td>
<td><strong>WINTER</strong></td>
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# Standby Rates

**Pacific Gas and Electric Company**  
**Present Electric Rates**  
**As of August 1, 2016**  

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<th>Capacity Charge ($/KW/MO.)</th>
<th>Reservation Charge ($/KW/MO.)</th>
<th>Energy ($/KWH)</th>
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## Standby Rates

**Present Electric Rates As of August 1, 2016**

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<td>$6.00</td>
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<td>Small Light and Power (less than or equal to 50 kW)</td>
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<td>Large Light and Power (&gt; 1000 kW)</td>
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<td>$7.75</td>
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# AGRICULTURAL RATES

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<th>8/1/16 WINTER</th>
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<th>8/1/16 WINTER</th>
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PACIFIC GAS AND ELECTRIC COMPANY  
PRESENT ELECTRIC RATES  
AS OF AUGUST 1, 2016  
STREETLIGHTING RATES

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**Nominal Lamp Ratings**

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C-17
## Pacific Gas & Electric Company

### Rate Change

**ELECTRIC RATES FOR SCHEDULES LS-1, LS-2 AND OL-1**

### NOMINAL LAMP RATINGS

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### All LEDs now on separate tab.

### Energy Rate @

- $0.15712 per kWh LS-1 & LS-2
- $0.16408 per kWh OL-1

### Pole Painting Charge @

- Per Pole Per Month

08-Aug-16

C-18
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<td>$11.609</td>
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<td>215.1-220.0</td>
<td>74.3</td>
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<td>220.1-225.0</td>
<td>76.0</td>
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</tr>
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<td>225.1-230.0</td>
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<td>230.1-235.0</td>
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<td>235.1-240.0</td>
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<td>240.1-245.0</td>
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<td>245.1-250.0</td>
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<td>250.1-255.0</td>
<td>86.3</td>
<td>$13.761</td>
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<td>255.1-260.0</td>
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<td>260.1-265.0</td>
<td>89.7</td>
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<td>265.1-270.0</td>
<td>91.4</td>
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<td>270.1-275.0</td>
<td>93.1</td>
<td>$14.829</td>
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<td>275.1-280.0</td>
<td>94.8</td>
<td>$15.096</td>
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<td>280.1-285.0</td>
<td>96.5</td>
<td>$15.363</td>
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<td>285.1-290.0</td>
<td>98.2</td>
<td>$15.630</td>
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<tr>
<td>290.1-295.0</td>
<td>99.9</td>
<td>$15.897</td>
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<tr>
<td>295.1-300.0</td>
<td>101.6</td>
<td>$16.164</td>
</tr>
<tr>
<td>300.1-305.0</td>
<td>103.4</td>
<td>$16.447</td>
</tr>
<tr>
<td>305.1-310.0</td>
<td>105.1</td>
<td>$16.714</td>
</tr>
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</table>

C-20
<table>
<thead>
<tr>
<th>NOMINAL LAMP RATINGS</th>
<th>ALL NIGHT RATES</th>
<th>HALF-HOUR ADJUSTMENT</th>
<th>ALL NIGHT RATES</th>
<th>LED lights are only applicable to LS-1A, 1C, 1E and 1F</th>
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</thead>
<tbody>
<tr>
<td>Watt</td>
<td>Average kWh</td>
<td>PER LAMP Per Month</td>
<td>PER MONTH</td>
<td>PER LAMP PER MONTH</td>
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<tr>
<td>LS-2A &amp; LS-1A, C, E, F &amp; LS-2A</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>310.1-315.0</td>
<td>106.8</td>
<td>$16.981</td>
<td>$0.763</td>
<td>$23.241</td>
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<tr>
<td>315.1-320.0</td>
<td>108.5</td>
<td>$17.248</td>
<td>$0.775</td>
<td>$23.508</td>
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<tr>
<td>320.1-325.0</td>
<td>110.2</td>
<td>$17.515</td>
<td>$0.787</td>
<td>$23.755</td>
</tr>
<tr>
<td>325.1-330.0</td>
<td>111.9</td>
<td>$17.782</td>
<td>$0.799</td>
<td>$24.042</td>
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<tr>
<td>330.1-335.0</td>
<td>113.6</td>
<td>$18.049</td>
<td>$0.811</td>
<td>$24.309</td>
</tr>
<tr>
<td>335.1-340.0</td>
<td>115.3</td>
<td>$18.316</td>
<td>$0.823</td>
<td>$24.576</td>
</tr>
<tr>
<td>340.1-345.0</td>
<td>117.0</td>
<td>$18.583</td>
<td>$0.835</td>
<td>$24.843</td>
</tr>
<tr>
<td>345.1-350.0</td>
<td>118.7</td>
<td>$18.850</td>
<td>$0.847</td>
<td>$25.110</td>
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<td>350.1-355.0</td>
<td>120.4</td>
<td>$19.117</td>
<td>$0.860</td>
<td>$25.377</td>
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<tr>
<td>355.1-360.0</td>
<td>122.1</td>
<td>$19.384</td>
<td>$0.872</td>
<td>$25.644</td>
</tr>
<tr>
<td>360.1-365.0</td>
<td>123.9</td>
<td>$19.667</td>
<td>$0.885</td>
<td>$25.927</td>
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<tr>
<td>365.1-370.0</td>
<td>125.6</td>
<td>$19.934</td>
<td>$0.897</td>
<td>$26.194</td>
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<tr>
<td>370.1-375.0</td>
<td>127.3</td>
<td>$20.201</td>
<td>$0.909</td>
<td>$26.461</td>
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<tr>
<td>375.1-380.0</td>
<td>129.0</td>
<td>$20.468</td>
<td>$0.921</td>
<td>$26.728</td>
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<tr>
<td>380.1-385.0</td>
<td>130.7</td>
<td>$20.735</td>
<td>$0.933</td>
<td>$26.995</td>
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<td>385.1-390.0</td>
<td>132.4</td>
<td>$21.002</td>
<td>$0.945</td>
<td>$27.262</td>
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<td>390.1-395.0</td>
<td>134.1</td>
<td>$21.269</td>
<td>$0.957</td>
<td>$27.529</td>
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<tr>
<td>395.1-400.0</td>
<td>135.8</td>
<td>$21.536</td>
<td>$0.970</td>
<td>$27.796</td>
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C-21
Attachment D

PG&E’s Proposed Changes in Electric Rates
### Electric Rates

#### Customer Class

<table>
<thead>
<tr>
<th>Customer Class</th>
<th>Present (A)</th>
<th>Proposed (B)</th>
<th>Change (B) - (A)</th>
<th>% Change</th>
<th>Proposed (D)</th>
<th>Change (D) - (C)</th>
<th>% Change</th>
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<tbody>
<tr>
<td>Residential</td>
<td>19.47</td>
<td>19.77</td>
<td>0.30</td>
<td>1.6%</td>
<td>13.80</td>
<td>14.14</td>
<td>0.34 2.4%</td>
</tr>
<tr>
<td>CARE</td>
<td>12.75</td>
<td>12.94</td>
<td>0.19</td>
<td>1.5%</td>
<td>4.68</td>
<td>4.87</td>
<td>0.20 4.2%</td>
</tr>
<tr>
<td>Non-CARE</td>
<td>21.81</td>
<td>22.15</td>
<td>0.34</td>
<td>1.6%</td>
<td>15.16</td>
<td>15.52</td>
<td>0.36 2.3%</td>
</tr>
<tr>
<td>Small Commercial</td>
<td>22.38</td>
<td>22.74</td>
<td>0.36</td>
<td>1.6%</td>
<td>14.50</td>
<td>14.85</td>
<td>0.35 2.4%</td>
</tr>
<tr>
<td>Medium Commercial</td>
<td>19.66</td>
<td>19.99</td>
<td>0.32</td>
<td>1.7%</td>
<td>10.91</td>
<td>11.23</td>
<td>0.32 2.9%</td>
</tr>
<tr>
<td>Large Commercial (E-19)</td>
<td>16.81</td>
<td>17.11</td>
<td>0.30</td>
<td>1.8%</td>
<td>8.34</td>
<td>8.62</td>
<td>0.29 3.4%</td>
</tr>
<tr>
<td>E-19 T</td>
<td>12.63</td>
<td>12.88</td>
<td>0.26</td>
<td>2.0%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A N/A</td>
</tr>
<tr>
<td>E-19 P</td>
<td>15.59</td>
<td>15.85</td>
<td>0.26</td>
<td>1.7%</td>
<td>7.99</td>
<td>8.25</td>
<td>0.26 3.2%</td>
</tr>
<tr>
<td>E-19 S</td>
<td>16.92</td>
<td>17.22</td>
<td>0.30</td>
<td>1.8%</td>
<td>8.36</td>
<td>8.65</td>
<td>0.29 3.4%</td>
</tr>
<tr>
<td>Streetlight</td>
<td>21.42</td>
<td>21.77</td>
<td>0.35</td>
<td>1.7%</td>
<td>8.60</td>
<td>8.94</td>
<td>0.35 4.0%</td>
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<tr>
<td>Standby</td>
<td>16.34</td>
<td>16.61</td>
<td>0.28</td>
<td>1.7%</td>
<td>7.74</td>
<td>7.98</td>
<td>0.24 3.1%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>17.00</td>
<td>17.27</td>
<td>0.27</td>
<td>1.6%</td>
<td>15.92</td>
<td>16.25</td>
<td>0.33 2.1%</td>
</tr>
<tr>
<td>Industrial (E-20)</td>
<td>13.35</td>
<td>13.58</td>
<td>0.23</td>
<td>1.8%</td>
<td>5.44</td>
<td>5.66</td>
<td>0.22 4.1%</td>
</tr>
<tr>
<td>E-20 T</td>
<td>10.74</td>
<td>10.93</td>
<td>0.19</td>
<td>1.8%</td>
<td>3.55</td>
<td>3.73</td>
<td>0.18 5.1%</td>
</tr>
<tr>
<td>E-20 P</td>
<td>14.50</td>
<td>14.75</td>
<td>0.25</td>
<td>1.7%</td>
<td>6.60</td>
<td>6.85</td>
<td>0.24 3.7%</td>
</tr>
<tr>
<td>E-20 S</td>
<td>15.97</td>
<td>16.25</td>
<td>0.28</td>
<td>1.8%</td>
<td>7.08</td>
<td>7.36</td>
<td>0.27 3.9%</td>
</tr>
<tr>
<td>Average System Rate</td>
<td>18.22</td>
<td>18.52</td>
<td>0.30</td>
<td>1.6%</td>
<td>8.34</td>
<td>8.61</td>
<td>0.27 3.2%</td>
</tr>
</tbody>
</table>

#### Tier 1

<table>
<thead>
<tr>
<th>Non-CARE (cents/kWh)</th>
<th>8/1/2016</th>
<th>01/01/21</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>18.21</td>
<td>18.48</td>
<td>1.5%</td>
</tr>
<tr>
<td>Tier 2</td>
<td>24.08</td>
<td>24.45</td>
<td>1.5%</td>
</tr>
<tr>
<td>Tier 3</td>
<td>24.08</td>
<td>24.45</td>
<td>1.5%</td>
</tr>
<tr>
<td>Tier 4</td>
<td>39.98</td>
<td>40.59</td>
<td>1.5%</td>
</tr>
<tr>
<td>Tier 5</td>
<td>39.98</td>
<td>40.59</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

#### Tier 2

<table>
<thead>
<tr>
<th>CARE (cents/kWh)</th>
<th>8/1/2016</th>
<th>01/01/21</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>11.93</td>
<td>12.11</td>
<td>1.5%</td>
</tr>
<tr>
<td>Tier 2</td>
<td>14.72</td>
<td>14.94</td>
<td>1.5%</td>
</tr>
<tr>
<td>Tier 3</td>
<td>14.72</td>
<td>14.94</td>
<td>1.5%</td>
</tr>
<tr>
<td>Tier 4</td>
<td>21.66</td>
<td>21.99</td>
<td>1.5%</td>
</tr>
<tr>
<td>Tier 5</td>
<td>21.66</td>
<td>21.99</td>
<td>1.5%</td>
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</table>

#### Tier 3

<table>
<thead>
<tr>
<th>Non-CARE - Average Monthly Bill ($)</th>
<th>8/1/2016</th>
<th>01/01/21</th>
<th>Bill Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential 350 kWh</td>
<td>$60.82</td>
<td>$61.81</td>
<td>$0.99</td>
<td>1.6%</td>
</tr>
<tr>
<td>500 kWh</td>
<td>$96.94</td>
<td>$98.48</td>
<td>$1.54</td>
<td>1.6%</td>
</tr>
<tr>
<td>700 kWh</td>
<td>$154.80</td>
<td>$157.22</td>
<td>$2.41</td>
<td>1.6%</td>
</tr>
<tr>
<td>Small Commercial</td>
<td>$287.16</td>
<td>$291.80</td>
<td>$4.63</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CARE - Average Monthly Bill ($)</th>
<th>8/1/2016</th>
<th>01/01/21</th>
<th>Bill Change</th>
<th>% Change</th>
</tr>
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<tbody>
<tr>
<td>Bundled</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td>$37.91</td>
<td>$38.56</td>
<td>$0.64</td>
<td>1.7%</td>
</tr>
<tr>
<td>500 kWh</td>
<td>$59.99</td>
<td>$60.97</td>
<td>$0.98</td>
<td>1.6%</td>
</tr>
<tr>
<td>700 kWh</td>
<td>$93.67</td>
<td>$95.15</td>
<td>$1.49</td>
<td>1.6%</td>
</tr>
<tr>
<td>Small Commercial</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Notes:

1. Rates are rounded to two decimal places for presentation purposes. % Change based on rates carrying additional digits.
2. There no DA/CCA customers on E-19T.

### Electric Bills

#### Residential Tiers

<table>
<thead>
<tr>
<th>Tier 1</th>
<th>8/1/2016</th>
<th>01/01/21</th>
<th>Bill Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential 350 kWh</td>
<td>$60.82</td>
<td>$61.81</td>
<td>$0.99</td>
<td>1.6%</td>
</tr>
<tr>
<td>500 kWh</td>
<td>$96.94</td>
<td>$98.48</td>
<td>$1.54</td>
<td>1.6%</td>
</tr>
<tr>
<td>700 kWh</td>
<td>$154.80</td>
<td>$157.22</td>
<td>$2.41</td>
<td>1.6%</td>
</tr>
<tr>
<td>Small Commercial</td>
<td>$287.16</td>
<td>$291.80</td>
<td>$4.63</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

### Notes:

Departing load revenue increases from $31.8M to $37.8M, or an increase of $5M (15.5%).

#### Bundled

<table>
<thead>
<tr>
<th>Tier 1</th>
<th>8/1/2016</th>
<th>01/01/21</th>
<th>Bill Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential 350 kWh</td>
<td>$37.91</td>
<td>$38.56</td>
<td>$0.64</td>
<td>1.7%</td>
</tr>
<tr>
<td>500 kWh</td>
<td>$59.99</td>
<td>$60.97</td>
<td>$0.98</td>
<td>1.6%</td>
</tr>
<tr>
<td>700 kWh</td>
<td>$93.67</td>
<td>$95.15</td>
<td>$1.49</td>
<td>1.6%</td>
</tr>
<tr>
<td>Small Commercial</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Attachment E

List of governmental entities, including the State of California and cities and counties served by PG&E, to whom PG&E will mail a notice stating in general terms the proposed revenues, rate changes, and ratemaking mechanisms requested in this Application, within twenty days after filing this Application.
In accordance with Rule 3.2(b), Applicant will mail a notice to the following, stating in general terms its proposed change in rates.

**State of California**

To the Attorney General and the Department of General Services.

State of California  
Office of Attorney General  
1300 I St Ste 1101  
Sacramento, CA 95814

and

Department of General Services  
Office of Buildings & Grounds  
505 Van Ness Avenue, Room 2012  
San Francisco, CA 94102

**Counties**

To the County Counsel or District Attorney and the County Clerk in the following counties:

Alameda  
Mariposa  
Santa Clara  

Alpine  
Mendocino  
Santa Cruz  

Amador  
Merced  
Shasta  

Butte  
Modoc  
Sierra  

Calaveras  
Monterey  
Siskiyou  

Colusa  
Napa  
Solano  

Contra Costa  
Nevada  
Sonoma  

El Dorado  
Placer  
Stanislaus  

Fresno  
Plumas  
Sutter  

Glenn  
Sacramento  
Tehama  

Humboldt  
San Benito  
Trinity  

Kern  
San Bernardino  
Tulare  

Kings  
San Francisco  
Tuolumne  

Lake  
San Joaquin  
Yolo  

Lassen  
San Luis Obispo  
Yuba  

Madera  
San Mateo  

Marin  
Santa Barbara  

E-1
# Municipal Corporations

To the City Attorney and the City Clerk of the following municipal corporations:

<table>
<thead>
<tr>
<th>Alameda</th>
<th>Colusa</th>
<th>Hanford</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>Concord</td>
<td>Hayward</td>
</tr>
<tr>
<td>Amador City</td>
<td>Corcoran</td>
<td>Healdsburg</td>
</tr>
<tr>
<td>American Canyon</td>
<td>Corning</td>
<td>Hercules</td>
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<tr>
<td>Anderson</td>
<td>Corte Madera</td>
<td>Hillsborough</td>
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<tr>
<td>Angels Camp</td>
<td>Cotati</td>
<td>Hollister</td>
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<tr>
<td>Antioch</td>
<td>Cupertino</td>
<td>Hughson</td>
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<tr>
<td>Arcata</td>
<td>Daly City</td>
<td>Huron</td>
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<td>Arroyo Grande</td>
<td>Danville</td>
<td>Ione</td>
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<td>Arvin</td>
<td>Davis</td>
<td>Isleton</td>
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<td>Atascadero</td>
<td>Del Rey Oakes</td>
<td>Jackson</td>
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<td>Atherton</td>
<td>Dinuba</td>
<td>Kerman</td>
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<tr>
<td>Atwater</td>
<td>Dixon</td>
<td>King City</td>
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<tr>
<td>Auburn</td>
<td>Dos Palos</td>
<td>Kingsburg</td>
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<td>Avenal</td>
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<td>East Palo Alto</td>
<td>Lakeport</td>
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<td>Belmont</td>
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<td>Lathrop</td>
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<td>Lincoln</td>
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<td>Berkeley</td>
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<td>Live Oak</td>
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Attachment F

Table of Acronyms and Terms
## ATTACHMENT F
### TABLE OF ACRONYMS AND TERMS

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<td>Megawatt</td>
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<td>Once-Through Cooling</td>
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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA


Application 16-08-006 (Filed August 11, 2016)

SCOPING MEMO AND RULING OF ASSIGNED COMMISSIONER AND ADMINISTRATIVE LAW JUDGE

Summary

This Scoping Memo and Ruling sets forth the category, issues, need for hearing, schedule, and other matters necessary to scope this proceeding pursuant to Public Utilities Code (Pub. Util. Code) Section 1701.1 and Article 7 of the Commission’s Rules of Practice and Procedure (Rules).¹

1. Background

On August 11, 2016, Pacific Gas and Electric Company (PG&E) filed an Application requesting Commission approval of its plan to retire its Diablo Canyon Power Plant and related proposals. A prehearing conference (PHC) was held on October 6, 2016 to determine parties and discuss scope, schedule, and other procedural matters. Two public participation hearings (PPHs) were held in San Luis Obispo on October 20, 2016 to obtain public input on local concerns and the scope of the proceeding.

¹ California Code of Regulations, Title 20, Division 1, Chapter 1; hereinafter, Rule or Rules.
2. **Scope**

The scope of this proceeding is based upon the issues raised by PG&E’s application, parties’ protests and responses, the discussion at the PHC, and statements at the PPHs. Specifically, the scope of the proceeding includes the following issues:

2.1 **Retirement of Diablo Canyon Power Plant**

PG&E has proposed to retire Diablo Canyon Unit 1 in 2024, and Unit 2 in 2025. Parties have proposed both earlier and later retirement dates. Parties may present testimony in support of PG&E’s proposed dates, or earlier or later retirement dates, including indefinite dates. Issues relating to the operation of the plant until the retirement date that do not have a dedicated section may also be addressed here.

2.2 **Proposed Replacement Procurement**

PG&E has made a proposal for procurement of resources to partially replace Diablo Canyon’s output, at a cost of $1.3 billion. Parties may present testimony supporting alternative procurement proposals, including proposals that all necessary replacement procurement should be addressed in this proceeding, that no replacement procurement should be addressed in this proceeding, or that some replacement procurement should be addressed in this proceeding. All proposals should address potential reliability, safety, cost and greenhouse gas impacts. All proposals should address how much of Diablo Canyon’s output needs to be replaced in light of current and projected levels of electric generation.

All testimony on replacement procurement should address the relationship between the proposal being made in this proceeding with other related Commission proceedings, and how this proceeding should coordinate
with other related proceedings on this issue. Testimony recommending that some or all replacement procurement be addressed in another proceeding should indicate when, where, and how that procurement will be addressed. Specifically, any testimony recommending that replacement procurement be addressed in other proceedings at the CPUC should identify those other proceedings, why it would be more appropriate to address replacement procurement in those proceedings rather than in this proceeding, and whether issues including or relating to replacing Diablo Canyon are already being addressed in those proceedings. Testimony recommending that all replacement procurement be addressed in this proceeding should describe how doing so would affect or interact with other proceedings at the CPUC.

2.3 Proposed Employee Program

PG&E has proposed an employee retention, retraining and severance program associated with approximately 1,500 employees at Diablo Canyon. PG&E requests the CPUC approve PG&E’s proposed:

1. Employee Retention Program and associated cost estimate of $352.1 million;
2. Employee Retraining Program and associated cost estimate of $11.3 million; and

Parties have raised questions about the cost and funding of this program. Parties may present testimony on the need for this program and its size, cost, structure, timing and its source of funding.²

________________________
² Testimony discussing whether the source of funding should (or should not) be the nuclear decommissioning charge should be presented in this area. Testimony discussing ratemaking
2.4 Proposed Community Impacts Mitigation Program

PG&E has proposed a community impacts mitigation program and associated costs of $49.5 million to mitigate some of the adverse economic impacts to the residents of San Luis Obispo County as a result of the planned retirement of Diablo Canyon. This issue was addressed by parties in their protests and responses, and by numerous speakers at the PPHs. Parties may present testimony on the community impacts of the proposed retirement of the Diablo Canyon, including economic and emergency response impacts, and on proposals to mitigate those impacts.

PG&E’s proposal would mitigate some, but not all, of the community impacts resulting from the proposed retirement of Diablo Canyon; testimony can support or criticize PG&E’s proposal, or propose alternatives for mitigation of community impacts ranging from no ratepayer funding of community impact mitigation to 100% ratepayer funding of complete community impact mitigation.

Testimony should address the appropriate size and timing of any mitigation measures and the source of funding for mitigation measures (i.e. decommissioning funds, other ratepayer funding, shareholders, or taxpayers). To the extent possible, testimony should separately address (or otherwise clearly distinguish) economic impacts and emergency services impacts.

and cost allocation proposals based on a different source of ratepayer funding should be presented in section VI. Proposed Ratemaking and Cost Allocation Issues.

3 Please note that the CPUC cannot authorize new or increased taxes. For any proposed ratepayer-funded mitigation measures, ratemaking and cost allocation issues should be addressed in section VI. Proposed Ratemaking and Cost Allocation Issues.
The recently-enacted SB 968 (Monning) requires the Commission to complete an assessment of the local economic impacts of the proposed retirement of Diablo Canyon. The language and timeline of SB 968 would indicate that the assessment would be independent of this proceeding, and most likely follow this proceeding. In order to ensure coordination of this proceeding with the SB 968 process, the assigned Administrative Law Judge (ALJ) requested input on the relationship between this application and SB 968. At a PPH, Senator Monning’s office provided a statement to clarify the legislative intent behind SB 968. Senator Monning opposed delaying this proceeding to incorporate the analysis required by SB 968, and stated: “The economic assessment required under SB 968 was never intended to impact or be part of the discussions and decisions being considered under Application 16-08-006.” This is consistent with the language of SB 968. Accordingly, this proceeding will go forward independently, and the record of this proceeding may be used as appropriate in the assessment required by SB 968.

2.5 Recovery of License Renewal Costs

PG&E has proposed that it be granted rate recovery for approximately $53 million in costs relating to license renewal activities, including the filing of a license renewal application with the federal Nuclear Regulatory Commission. Other parties have questioned whether PG&E should get rate recovery for these costs. Parties may present testimony on whether it is reasonable for PG&E to recover some or all of these costs in rates. Specific ratemaking and cost allocation testimony should be addressed in section

2.6 Proposed Ratemaking and Cost Allocation Issues

PG&E has requested rate recovery for the costs of its proposals, including costs of replacement procurement, its employee program and community
impacts mitigation program, and its license renewal activities, as well as other costs relating to the operation of Diablo Canyon facilities. PG&E has also requested to recover the full book value of Diablo Canyon Units 1 and 2 by the time the units cease operations on November 2, 2024 and August 26, 2025.

Parties may present testimony on the rate design and cost allocation for these items. Parties may support or criticize PG&E’s proposed rate design and cost allocation, or may present alternative rate design and cost allocation proposals. In general, recommendations that PG&E should or should not get rate recovery for replacement procurement, employee programs, community impact mitigation, and license renewal costs should be presented in the sections addressing those issues. Recommendations regarding rate recovery for issues that do not have a dedicated section may be presented in this section.

2.7 Land Use, Facilities and Decommissioning Issues

It is premature to address land use, facilities and decommissioning issues. At the same time, parties expressed concern that deferring consideration of these issues could result in PG&E making changes that would preclude future options. PG&E must obtain Commission approval under Pub. Util. Code § 851 prior to selling, leasing, or otherwise encumbering utility-owned land or facilities. While some of the land at issue is owned by a subsidiary of PG&E, PG&E has committed to take no action with any of the lands and facilities, whether owned by the utility or a subsidiary, before completion of a future process including a public stakeholder process, and states that the parties will not be prejudiced by excluding these issues from the current scope of this proceeding. PG&E is directed to abide by that commitment. Parties may present testimony recommending how to best preserve these issues for future consideration, and
how, when, and where they should be addressed. Specific land use, facilities and decommissioning recommendations will not be considered at this time.

2.8 Additional Issues Not Addressed Above

Parties may present testimony on issues that are within the general scope of the proceeding, as established by the record to date, that are not specifically addressed in the above sections. The assigned ALJ or Commissioner can determine if any such testimony is appropriately within the scope of the proceeding, and may strike testimony or defer consideration of issues as appropriate.

3. Guidance for Testimony

All testimony should be organized using the above section headings. If a party has no testimony on one or more of those issues, the testimony should still include all headings, with a brief note under a heading stating that the party is not submitting testimony on that issue.

PG&E has already served its direct testimony; all other parties may serve testimony on the date set for intervenor testimony. The “Joint Parties” that support PG&E’s application may also submit testimony on that date, but that testimony should be limited in scope to matters not addressed in PG&E’s testimony, or to areas of disagreement with PG&E’s testimony.

PG&E and all other parties may serve rebuttal testimony to the intervenor testimony. Rebuttal testimony may respond to the intervenor testimony of any

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4 Given the large number of parties to this proceeding, the assigned ALJ requested the parties to develop a common, high-level outline for testimony. The above section headings are based on the outline developed by the parties.
or all other parties. Rebuttal testimony should use the same format and section headings as intervenor testimony.

Testimony should focus on factual and policy issues. Purely legal issues should not be addressed in testimony, but should be addressed in briefs. While a party may indicate in its testimony that it intends to raise a particular legal issue, parties do not need to do so, and parties may raise a legal issue in briefs without having addressed that issue in testimony.

The Commission’s web site now allows electronic submittal of supporting documents, such as testimony. Accordingly, parties shall submit their testimony in this proceeding through the Commission’s electronic filing system, as described in Appendix A to this ruling.

4. **Categorization**

The Commission in Resolution ALJ 176-3382, issued on August 18, 2016, preliminarily determined that the category of the proceeding is ratesetting.

Anyone who disagrees with this categorization must file an appeal of the categorization no later than ten days after the date of this scoping ruling. *(See Rule 7.6.)*

5. **Need for Hearing**

The Commission in Resolution ALJ 176-3382 also preliminarily determined that hearings are required. This scoping memo finds hearings necessary.

6. **Ex Parte Communications**

In a ratesetting proceeding such as this one, *ex parte* communications with the assigned Commissioner, other Commissioners, their advisors and the ALJ are only permitted as described at Pub. Util. Code § 1701.3(c) and Article 8 of the Rules.
Notice of workshops will be posted on the Commission’s Daily Calendar to inform the public that a decision-maker or an advisor may be present at those workshops. Parties shall check the Daily Calendar regularly for such notices.

7. **Intervenor Compensation**
   
Pursuant to Pub. Util. Code § 1804(a)(1), a customer who intends to seek an award of compensation must file and serve a notice of intent to claim compensation by November 7, 2016, 30 days after the PHC.

8. **Assigned Commissioner, Presiding Officer**
   
Commission President Michael Picker is the assigned Commissioner and Peter V. Allen is the assigned Administrative Law Judge (ALJ). Pursuant to Pub. Util. Code § 1701.3 and Rule 13.2, ALJ Allen is designated as the Presiding Officer.

9. **Filing, Service and Service List**
   
The official service list has been created and is on the Commission’s website. Parties should confirm that their information on the service list is correct, and serve notice of any errors on the Commission’s Process office, the service list, and the ALJ. Persons may become a party pursuant to Rule 1.4.

   When serving any document, each party must ensure that it is using the current official service list on the Commission’s website.

   This proceeding will follow the electronic service protocols set forth in Rule 1.10. All parties to this proceeding shall serve documents and pleadings using electronic mail, whenever possible, transmitted no later than 5:00 p.m., on the date scheduled for service to occur. Parties are reminded, when serving copies of documents, the document format must be consistent with the requirements set forth in Rules 1.5 and 1.6. Additionally, Rule 1.10 requires
service on the ALJ of both an electronic and a paper copy of filed or served documents.

Rules 1.9 and 1.10 govern service of documents only and do not change the Rules regarding the tendering of documents for filing. Parties can find information about electronic filing of documents at the Commission’s Docket Office at www.cpuc.ca.gov/PUC/efiling. All documents formally filed with the Commission’s Docket Office must include the caption approved by the Docket Office and this caption must be accurate.

Persons who are not parties but wish to receive electronic service of documents filed in the proceeding may contact the Process Office at process_office@cpuc.ca.gov to request addition to the “Information Only” category of the official service list pursuant to Rule 1.9(f).

10. **Discovery**

Discovery may be conducted by the parties consistent with Article 10 of the Commission’s Rules. Any party issuing or responding to a discovery request shall serve a copy of the request or response simultaneously on all parties. Electronic service under Rule 1.10 is sufficient, except Rule 1.10(e) does not apply to the service of discovery and discovery shall not be served on the Administrative Law Judge. Deadlines for responses may be determined by the parties. Motions to compel or limit discovery shall comply with Rule 11.3.

11. **Public Advisor**

Any person interested in participating in this proceeding who is unfamiliar with the Commission’s procedures or who has questions about the electronic filing procedures is encouraged to obtain more information at http://consumers.cpuc.ca.gov/pao/ or contact the Commission’s Public
Advisor at 866-849-8390 or 415-703-2074 or 866-836-7825 (TTY), or send an e-mail to public.advisor@cpuc.ca.gov.

12. Schedule

At the suggestion of Marin Clean Energy, workshops are being held on replacement procurement and cost allocation. The purpose of these workshops is to generally increase the parties’ understanding of the issues presented in those areas, and more specifically to increase their understanding of PG&E’s proposals in those areas. This should assist the parties in the preparation of their testimony, and may also reduce the amount of discovery required on those issues. The workshops will be conducted by staff of the Commission’s Energy Division, and they are scheduled for December 8, 2016, at 10:00 a.m. at the CPUC Auditorium, 505 Van Ness Avenue, San Francisco, CA 94102.

The adopted schedule is:

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<td>Prehearing Conference</td>
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<td>Public Participation Hearing</td>
<td>October 20, 2016</td>
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<td>Workshop re replacement procurement</td>
<td>December 8, 2016</td>
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<td>Workshop re cost allocation</td>
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PG&E should ensure that representatives of PG&E with detailed knowledge of these issues are in attendance at the workshop, and that they are prepared to discuss PG&E’s proposals.
The proceeding will be submitted upon the filing of reply briefs, unless the assigned Commissioner or the ALJ directs further evidence or argument.

The assigned Commissioner or assigned ALJ may modify this schedule as necessary to promote the efficient management and fair resolution of this proceeding.

It is the Commission’s intent to complete this proceeding within 18 months of the date this Scoping Memo is filed. This deadline may be extended by order of the Commission. (Pub. Util. Code § 1701.5(a).)

13. Settlement and Alternative Dispute Resolution

While the schedule does not include specific dates for settlement conferences it does not preclude parties from meeting at other times provided notice is given consistent with our Rules.

The Commission offers Alternative Dispute Resolution (ADR) services consisting of mediation, facilitation, or early neutral evaluation. Use of ADR services is voluntary, confidential, and at no cost to the parties. Trained ALJs

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<td>Request for Final Oral Argument</td>
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</tbody>
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serve as neutrals. The parties are encouraged to visit the Commission’s ADR webpage at http://www.cpuc.ca.gov/adr/, for more information. If requested, the assigned ALJ will refer this proceeding, or a portion of it, to the Commission’s ADR Coordinator. Alternatively, the parties may contact the ADR Coordinator directly at adr_program@cpuc.ca.gov. The parties will be notified as soon as a neutral has been assigned; thereafter, the neutral will contact the parties to make pertinent scheduling and process arrangements. Alternatively, and at their own expense, the parties may agree to use outside ADR services.

14. **Final Oral Argument**

If hearings are held, a party in this proceeding has the right to make a Final Oral Argument before the Commission, but only if the argument is requested by the deadline set in the schedule above. (Rule 13.13.)

**IT IS RULED:**

1. The category of this proceeding is ratesetting. Appeals as to category, if any, must be filed and served within ten days from the date of this scoping memo.
2. Administrative Law Judge Peter V. Allen is designated as the Presiding Officer.
3. The scope of the issues for this proceeding is as stated in “Section 2. Scope” of this ruling.
4. Hearings may be necessary.
5. The schedule for the proceeding is set in “Section 11. Schedule” of this ruling. The assigned Commissioner or Presiding Officer may adjust this schedule as necessary for efficient management and fair resolution of this proceeding.
6. With limited exceptions that are subject to reporting requirements, *ex parte* communications are prohibited. (*See* Public Utilities Code § 1701.3(c); Article 8 of the Commission’s Rules of Practice and Procedure.)

7. A party may submit request for Final Oral Argument in its opening briefs, but the right to Final Oral Argument ceases to exist if hearings are not needed.

8. Parties shall adhere to the instructions provided in Appendix A of this ruling for submitting supporting documents.

Dated November 18, 2016, at San Francisco, California.

/s/ MICHAEL PICKER
Michael Picker
Assigned Commissioner

/s/ PETER V. ALLEN
Peter V. Allen
Administrative Law Judge
APPENDIX A

1. Electronic Submission and Format of Supporting Documents

The Commission’s web site now allows electronic submittal of supporting documents (such as testimony and work papers).

Parties shall submit their testimony or workpapers in this proceeding through the Commission’s electronic filing system.\(^1\) Parties must adhere to the following:

- The Instructions for Using the “Supporting Documents” Feature, (http://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&DocID=158653546), and
- The Supporting Document feature does not change or replace the Commission’s Rules of Practice and Procedure. Parties must continue to adhere to all rules and guidelines in the Commission’s Rules of Practice and Procedures including but not limited to rules for participating in a formal proceeding, filing and serving formal documents and rules for written and oral communications with

\(^1\) These instructions are for submitting supporting documents such as testimony and work papers in formal proceedings through the Commission’s electronic filing system. Parties must follow all other rules regarding serving testimony.

Any document that needs to be formally filed such as motions, briefs, comments, etc., should be submitted using Tabs 1 through 4 in the electronic filing screen.
Commissioners and advisors (i.e. “ex parte communications”) or other matters related to a proceeding.

- The Supporting Document feature is intended to be solely for the purpose of parties submitting electronic public copies of testimony, work papers and workshop reports (unless instructed otherwise by the Administrative Law Judge), and does not replace the requirement to serve documents to other parties in a proceeding.

- Unauthorized or improper use of the Supporting Document feature will result in the removal of the submitted document by the CPUC.

- Supporting Documents should not be construed as the formal files of the proceeding. The documents submitted through the Supporting Document feature are for information only and are not part of the formal file (i.e. “record”) unless accepted into the record by the Administrative Law Judge.

All documents submitted through the “Supporting Documents” Feature shall be in PDF/A format. The reasons for requiring PDF/A format are:

- Security – PDF/A prohibits the use of programming or links to external executable files. Therefore, it does not allow malicious codes in the document.

- Retention – The Commission is required by Resolution L-204, dated September 20, 1978, to retain documents in formal proceedings for 30 years. PDF/A is an independent standard and the Commission staff anticipates that programs will remain available in 30 years to read PDF/A.
• Accessibility – PDF/A requires text behind the PDF graphics so the files can be read by devices designed for those with limited sight. PDF/A is also searchable.

Until further notice, the “Supporting Documents” do not appear on the “Docket Card”. In order to find the supporting documents that are submitted electronically, go to:

• Online documents, choose: “E-filed Documents”,
• Select “Supporting Document” as the document type, (do not choose testimony)
• Type in the proceeding number and hit search.

Please refer all technical questions regarding submitting supporting documents to:

• Kale Williams (kale.williams@cpuc.ca.gov) 415 703-3251 and
• Ryan Cayabyab (ryan.cayabyab@cpuc.ca.gov) 415 703-5999

(END OF APPENDIX A)
Annual Report Periods

Notes

1. The recommendation designator, e.g., “R14-1”, signifies the calendar period and sequential number of the recommendation for that time period. In this example “14” stands for the period July 1, 2013–June 30, 2014.

2. All DCPP responses to recommendations were determined to be acceptable by the DCISC, some after further discussions or actions. There were no open or unresolved recommendations.

DCISC Recommendations

R14-1
DCPP should reexamine the significance of the role that Operations personnel played and could have played to avoid the loss of power to Unit 2 4 kV Bus G during refueling outage 2R17.

R13-1
Because of the relatively large increase in Licensee Event Reports from the previous reporting period, continuing high number of Non-Cited Violations, and the number of items in the Conservative Decision Making Cross-Cutting Aspect, the DCISC recommends that DCPP review the effectiveness of its Regulatory Excellence Action Plan.

R13-2
The DCISC recommends that DCPP evaluate the various constraints on how fast spent fuel bundles can be loaded into the Independent Spent Fuel Storage Installation (ISFSI), and develop an estimate of, and the rationale for, the practical limit on the number of spent fuel bundles that can be loaded into the ISFSI on a per year basis.

R12-1
DCPP should assign a manager with the authority and inclination to develop the DCPP site office and workspace seismic safety policy and devote the resources needed to implement necessary changes to avoid harm to personnel from a seismic event.

R11-1
Due to the substantial increase in the numbers of NRC Non-cited Violations and Severity Level IV Violations over the last two reporting periods and because the NRC Substantive Crosscutting Issue in Problem Identification and Resolution still exists, the DCISC recommends that DCPP re-examine its earlier Root Cause Analysis for effectiveness and consider an independent review of its corrective actions by Quality Verification, the Nuclear Safety Oversight Committee, or the Institute of Nuclear Power Operations in an assist visit.

R11-2
The DCISC recommended that DCPP initiate and promptly complete its first self-assessment of the significant gap in the thoroughness and rigor of its engineering evaluations, which was to have been completed by the end of 2010.

R11-3
DCPP’s Post Earthquake Response Procedure should be expanded to require examination of Spent Fuel Pool (SFP) levels after an earthquake and sampling locally for indications of possible SFP liner leakage. DCPP should also consider providing permanently installed, remote wide-range SFP level monitoring capability.

R11-4
DCPP needs to develop and implement a schedule for taking the necessary actions to brace furniture appropriately throughout the station, and to better educate plant staff about seismic hazards and seismic safety.

R10-1
Due to the increases in the numbers of Licensee Event Reports and Severity Level IV Violations and because of the newly re-identified NRC Substantive Crosscutting Issue in Problem Identification and Resolution, the DCISC recommends that DCPP perform a comprehensive analysis to determine the cause of these negative regulatory trends.

R10-2
The DCISC recommends that DCPP managers and supervisors periodically share the specific lessons learned from the series of events involving containment sump valve interlocks with station personnel at all levels, especially before the commencement of outages. The DCISC further recommends that DCPP share this same information with the industry.

R09-1
DCPP should complete the MIDAS-related actions listed in the CAP in a timely manner and resolve this issue with the San Luis Obispo County APCD for use at future Emergency Drills. It is important that the modeling of plume dispersion from the plant be capable of accurately predicting which Protective Action Zones would be impacted by a release.

R09-2
PG&E should carefully review its emergency response communications with the media (press briefings and releases) and with San Luis Obispo County and other government officials, and develop different approaches that better communicate risk information. PG&E also needs to include more technical detail in its press releases, with the understanding that they are likely to be read and interpreted to the media by external experts. If asked during press briefings for more detailed technical information, PG&E should not deflect these questions but instead should answer them using technical terms while avoiding jargon. In future EP exercises (around half), scenarios should involve events where releases are too small to warrant public evacuation, so that PG&E and government officials can practice providing more effective information for these more likely emergency events.

R08-1
Emergency Response Organization (ERO) should consider designing a drill that focuses on the information exchange with the news media. The event chosen could be less serious than those designed to challenge the operators. It could involve a low level of risk to the surrounding population, and require the Joint Media Center (JMC) personnel to communicate this effectively to the media.

R07-1

DCPP should consider developing a system to categorize and catalog Operational Decision Making documents (ODMs) for future reference and use. This is especially important as DCPP brings new operators into its workforce and moves experienced operators to other plant functional areas.

R07-2

PG&E should strongly consider involving craft personnel when developing industrial safety standards, procedures, or guidelines to obtain craft buy-in and ownership.

R07-3

DCPP does not have a written description of all the Make-Up Water Systems with associated operating procedures. The DCISC believes this to be an unsatisfactory condition and strongly suggests DCPP management review it for appropriate correction action.

R06-1

DCPP management should place special emphasis on Operations achieving Green Quality Performance status in a timely manner, correcting problems in human performance, component mispositioning errors, and procedure use and adherence. Management should deal directly and promptly with known Operations personnel issues.

R06-2

DCPP should review the staffing of the QV Department to be sure they have sufficient personnel to perform the necessary audits (both regulatory required and others as needed).

R06-3

DCPP should consider expanding QV audits beyond just those required by regulation to aid management and NSOC in assessing and monitoring the health of programs, processes, initiatives and systems.

R06-4

DCPP should place additional emphasis and resources at the management and project level to improve the health of its Fire Protection System from Yellow status (unsatisfactory) to at least White status (satisfactory) in a timelier manner than is currently planned.

R05-1

It is recommended that DCPP participate in more industry and INPO meetings and visits to be sure that DCPP is staying up with industry good practices in all areas of plant operation. DCPP should also have a QV audit of this area.

R05-2

PG&E should consider using one designated Lead Public Spokesperson, an officer, for all of its media briefings on emergency information to the media and public at the Joint Media Center. Because a specific person cannot be available at all times, backup personnel also need to be designated and trained. PG&E should work with both San Luis Obispo County and the State of California to improve the clarity and precision of their statements regarding radiation releases. This is necessary to assure that information on projected and measured offsite dose rate
measurements by PG&E and County monitors are more clearly communicated to the media and public.

R05-3
The Quality Verification (QV) Department should request that the NSOC Subcommittee on Corrective Action & Oversight and other outside NSOC Members recommend the areas of QV to be audited for the outside biennial audit in 2005. QV should also include the Corrective Action Group in an audit in 2005).

R05-4
DCPP’s July 2005 STARS self-assessment should include a review of the quality oversight of switchyard work by DCPP and non-DCPP (e.g., PG&E Transmission Department) personnel. (Note: this recommendation was provided to PG&E during the DCISC June 1–2, 2005 Public Meeting).

R05-5
Because necessary post-9/11 security upgrades at DCPP have been very substantial, over the next one to two years PG&E should actively monitor interactions of security with plant operations, maintenance, and emergency response to assure that potential negative security/safety interactions are identified and mitigated, as necessary to assure plant safety. Upcoming emergency exercises should be designed to test scenarios where plant operators and emergency response personnel would be expected to have significant interactions with plant security systems and forces, to confirm that effective communication and coordination are achieved.

R04-1
DCPP should remain aware of the possible unintended consequences of the “Operations Leadership” initiative on the rest of DCPP and its impact on DCPP and its culture.

R04-2
DCPP should examine further the employee perception that management expectations (on safety) are not consistent with performance reviews, rewards, and discipline, specifically including the relationship between the newer method of employee performance evaluation and these perceptions.

R04-3
Safety culture needs to be a commonly shared and understood term at DCPP. DCPP should develop or adopt a definition of “safety culture”. Each employee at DCPP should become familiar with the concept of safety culture. Safety culture should be incorporated in training and all other activities at DCPP. A belief that safety culture is “built in” through design, testing, procedures and QA/QC is not enough. There must be a conscious effort to incorporate the concepts of safety culture into all activities, including training, coaching, supervision, management, and leadership.

R04-4
There should be a responsible party over the areas of cultural change, safety culture, organizational effectiveness, and leadership so that there can be coordination and integration, and a single comprehensive plan can be developed and executed that addresses these issues as a system.

R04-5
PG&E should review its specification of root causes in Corrective Action Program cause analyses to assure that they are identified accurately and clearly in order to promote the most effective corrective action. In particular, PG&E and the Human Performance Group should develop a method to assure that human performance errors are always addressed in cause analysis and are distinguished from other causes, such as organizational effectiveness issues. Management should make clear their expectations that the results of cause analyses will be stated clearly and bluntly and not softened,
avoided or disguised.

R04-6

DCPP should review the organization and practices of the NSOC to identify ways to ensure that all issues identified and all recommendations made by the NSOC are fully discussed and acted upon. Benchmarking of other organizations to determine evolving best practices should be included as part of this evaluation.

R04-7

As previously recommended in the 2002–03 Annual Report, DCPP still needs to develop a comprehensive integrated change management plan, where all changes can be located, where interaction effects can be anticipated from changes that are occurring in the organization, where the consequences of multiple simultaneous changes can be anticipated, and the value of change (or not changing) can be ascertained.

R04-8

DCPP needs to continue to utilize external consultants such as Mercer-Delta to observe the work of DCPP and coach its Executives, Directors, Officers and Managers, as well as front-line employees.

R04-9

PG&E should decide when they are going to perform a life-cycle management study of the 12 kv System and complete it on schedule. In the interim, they should proceed with corrective actions on the items identified in the system health report.

R04-10

PG&E should grant security clearances to two DCISC Members and a Consultant.

R04-11

To make the coaching process sustainable, DCPP should further support the Coaching Center of Excellence in developing a formal structure for coaching.

R03-1

PG&E should apply a focused effort to complete and implement the process for measuring and monitoring the effectiveness of its Corrective Action Program.

R03-2

Emergency Preparedness should be improved by (1) extending its emergency exercises or perform separate exercises to more fully exercise its radiation release assessment and communications and Joint Media Center (JMC) spokespersons, (2) identifying the spokesperson for security-related events and having that person fill a functional JMC role at drills dealing with security events, (3) establishing better coordination with San Luis Obispo County on providing information to media and Public, (4) connecting the telecommunications between emergency centers to emergency power supplies, (5) making statements communicating radiation releases to the public easier for the public to understand, and PG&E (6) working with San Luis Obispo County to issue joint news releases to provide the public with a single, coordinated source of information about the incident at the plant, the nature and expected impact of any radioactive releases, and protective action recommendations, and (7) providing more training and practice in communicating unplanned radiation releases to the public via written news releases and through media briefings at the Joint Media Center.

R03-3

NSOC should be strengthened by adding a (non-STARS plant) fourth external member.

R03-4

PG&E should allocate enough resources and management attention to the Equipment Reliability Program to effectively implement the recommendations made in the Equipment Reliability Process Self-Assessment and consider expanding the Equipment
Reliability Program to include all equipment important to unit availability.

R03-5
DCPP should develop a coherent framework or model for cultural change showing how the various initiatives fit together and a plan to integrate the changes.

R03-6
PG&E should develop strategies to monitor, on a regular basis, DCPP’s cultural change and the impact of cultural change on safety.

R03-7
DCPP should institutionalize the coaching strategy, remaining aware of unintended consequences of separating personnel evaluation and coaching and ensure a close association between coaches and supervisors.

R03-8
A Phase Two of the WE Culture should be initiated as soon as possible

R03-9
The Process Facilitator position, for DCPP Process and Process Transition, should be filled promptly with a recognized leader.

R02-1
In addition to having an internal Organization Design Specialist, it is recommended that PG&E consider “Outside help.” This would mean bringing in consultants in specialized areas of human performance, change management, and process management, to support the internal OD Specialist and the Human Performance Center of Excellence.

R02-2
To enhance the human performance/behavior change process DCISC recommends that PG&E develop and implement:

- A glossary of terms that would enhance communication and thinking.
- A more comprehensive framework or model for looking at human performance/behavior.
- A Strategic Change Plan consistent with, and similar to, the 2002 DCPP Performance Plan.

These recommendations should help align and integrate the multiple change initiatives and provide a more coherent change process to the workers.

R02-3
While the DCISC has not observed any adverse effect of DCPP safety incentives being dependent upon financial incentives, i.e., diminishing of a “safety first” culture, it is recommended that for future years PG&E consider revisions to the plan to ensure that good safety performance is always recognized and rewarded.

R02-4
The DCISC recommends that PG&E share the results of its PRA Human Reliability Analysis, particularly the Performance Shaping Factors, with the Human Performance Coordinator and others who may benefit from the information.

R02-5
PG&E should assure that human performance/behavior is fully considered by qualified people in performing event cause analysis.

R02-6
It is recommended that PG&E increase efforts to resolve communications problems, especially those about radiation, for both normal and emergency situations and arrange drills to better exercise radiological field monitoring teams and public spokespersons.

R02-7

PG&E should review the noise level in the Emergency Technical Support Center and consider taking steps to lower it to prevent communication problems.

R02-8

It is recommended that PG&E consider discussing with the County the respective roles of PG&E and the County at the JMC. For example, it might make sense to have PG&E lead the JMC press conferences to first discuss plant events and information and then have the County present what the County is doing. Even more importantly, PG&E management may wish to ensure that their ability to release information in a timely manner is not inadvertently limited and to ensure that their spokespersons are prepared to deal with and resolve any issues which may arise with the County at the JMC. All PG&E personnel at the JMC, and particularly those who will discuss radiation, should receive better training and more practice in dealing and communicating with the media.

R02-9

It is recommended that PG&E be more thorough in its critiques and assessments of emergency drills to assure effective follow-up on corrective actions on all deficiencies or questions.

R02-10

It is recommended that PG&E review the availability and level of effective plant public spokespersons in the Joint Media Center. These spokespersons should be senior personnel knowledgeable in plant operations, radiological matters, and status of the emergency event. The same individuals should be regularly trained and tested in emergency exercises.

R02-11

There were only three external members on the NSOC as of the writing of this report. External members provide a more independent overview; therefore it is recommended that DCPP add additional external members.

R02-12

Even though the 12 kV System is a non-safety-related system, PG&E should include the 12 kV system as one of the first systems to be reviewed under the Life Cycle Management Plan. PG&E should also review the replacement schedule for Start Up Transformer 1-2 to assure replacement is timely.

R01-1

It is recommended that DCPP develop and implement a method to identify and monitor the entire Engineering Work Load to assure that the necessary work is performed to effectively support safe operation of the plant and to help in ensuring adequate engineering resources are available.

R01-2

Because the predominant cause of events is human error, it is recommended that DCPP more closely coordinate the Corrective Action and Human Performance Programs and utilize training in human characteristics and skills (e.g., interviewing skills, human error characteristics) for personnel preparing root cause analyses and corrective actions.

R01-3

It is recommended that PG&E continue to augment its programs for operator health and aging to consider such areas as operator “aging management”, physical fitness, and...
mental alertness on shift to further improve operator human performance.

R01-4

It is recommended that PG&E management raise its expectations of the Nuclear Safety Oversight Committee internal and external members to take a more aggressive stance in challenging problem solving and the status quo. Additionally, PG&E should consider adding independent external members (not just from STARS plants).

R01-5

It is recommended that NSOC take a more active role in determining the scope of the biennial audit of NQS to give the audit more independence. The DCISC had made a similar recommendation in the previous Annual Report and requests that PG&E reconsider its response of having NSOC only review the audit plan.

R01-6

It is recommended that PG&E take the initiative in dealing with staffing issues by developing a long-term staffing plan.

R01-7

It is recommended that PG&E take actions necessary to improve the employees' perception of the Employee Concerns Program.

R01-8

It is recommended that PG&E apply the normally used Corrective Action Program, Human Performance Program, and System Long Term Plan Program (and possibly others) to Security Services and develop an implementation plan.

R01-9

It is recommended that PG&E develop a plan for how System Health Reports and Long Term Plans should be utilized by Operations and Maintenance.
Used Spent Fuel Storage Program Video

Virtual Silk®
Used Spent Fuel Storage Program Video

Steam Generator Replacement Video

Virtual Silk®