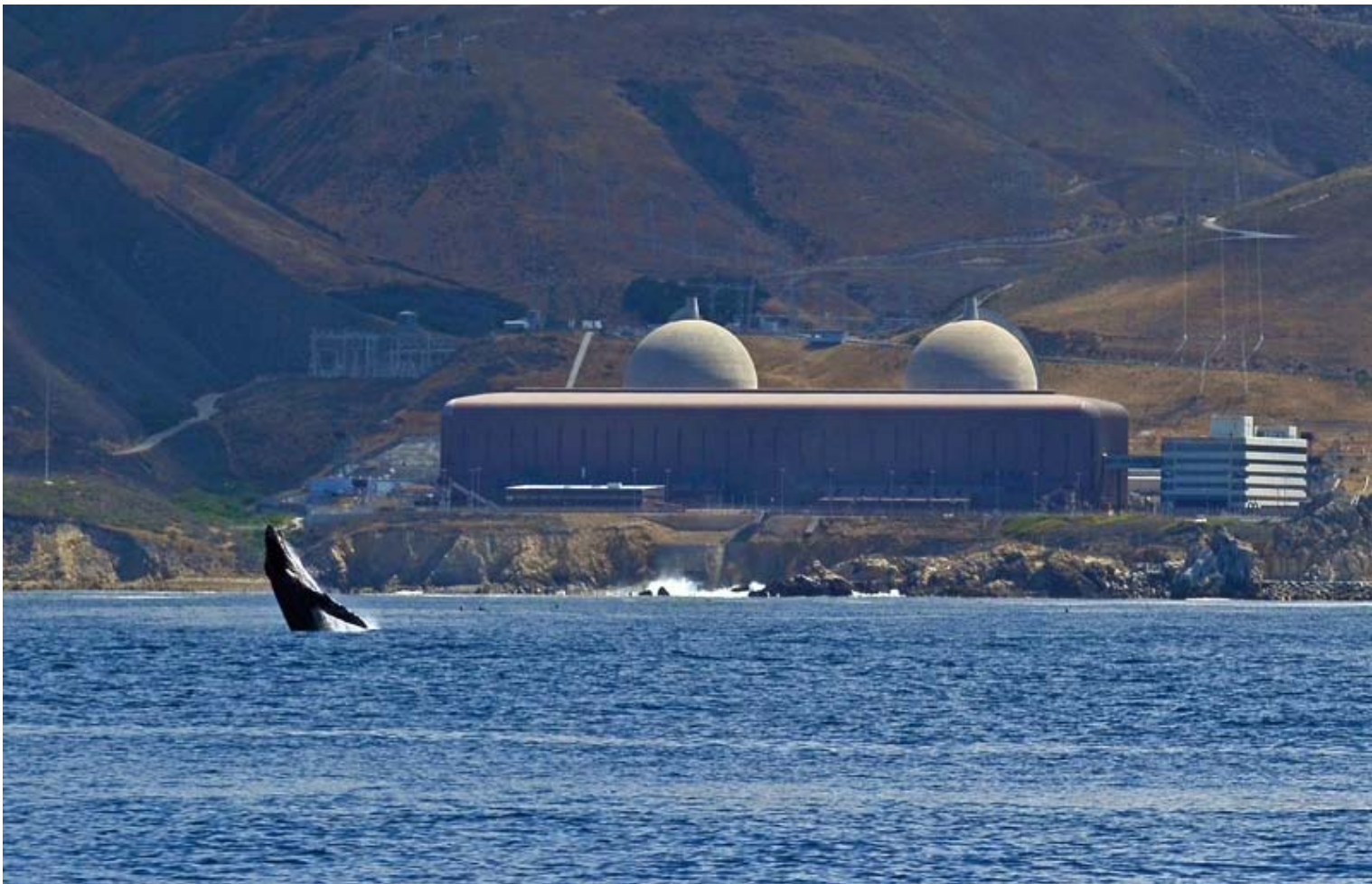


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Diablo Canyon Independent Safety Committee
Twenty-fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant
Operations
July 1, 2014—June 30, 2015



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

Approved: October 20, 2015

Developed by Virtual Silk®

[25th Annual Report](#), Preface

This report covers the activities of the Diablo Canyon Independent Safety Committee (DCISC) for the period July 1, 2014 through June 30, 2015. This is the twenty-fifth 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](#)), DCPD 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 DCPD 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.](#)

[25th Annual Report](#), Executive Summary, Conclusions and Recommendations

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.

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.

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 interested persons. 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.

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. 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 for the period July 1, 2013 to June 30, 2016. Dr. Budnitz continues to serve on the DCISC pending a decision by the Attorney General on his reappointment or replacement.
- 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. On April 1, 2015, Dr. Weisenmiller announced Dr. Lam’s reappointment to another three-year Committee term commencing July 1, 2015 and expiring June 30, 2018.
- On July 9, 2008, California Governor Arnold Schwarzenegger announced the appointment of [Per F. Peterson, Ph.D., PE](#), to a three year term on the Committee through June 30, 2011. Prof. Peterson previously served as a Committee member from September 2, 2004, through October 9, 2007. Governor Edmund G. Brown Jr. reappointed Professor Peterson to a term on the Committee commencing July 1, 2011 through June 30, 2014. On September 10, 2014, Governor Edmund G. Brown Jr. announced Professor Peterson’s reappointment to a three-year term on the DCISC commencing July 1, 2014 and expiring on June 30, 2017.

Overview of Activities during the Current Period

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

August 8, 2014—Public Meeting/Teleconference

October 14–15, 2014—Public Meeting and Public Plant Tour

February 4–5, 2015—Public Meeting and Public Plant Tour

May 14, 2015—Public Meeting (Berkeley, CA)

June 16–17, 2015—Public Meeting and Public Plant Tour

The Committee regularly performs the following activities:

- Three sets of 2-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.
- 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

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 annual reports covered the periods January 1, 1990–June 30, 2014.

This Twenty-fifth Annual report covers the period July 1, 2014—June 30, 2015.

The technical items covered during these 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:

- DCPD performance and operational events
- Refueling outage overviews, plans and results
- Review of DCPD performance indicators
- Human error performance improvement program
- Radiation exposure during refueling outages
- Plant security review for effects on plant safety
- Problem Identification and Resolution Program (Corrective Action Program)
- Operating Experience Program
- Online Maintenance
- Radiological Release Reports
- Transformer malfunctions and oil leaks

- Reactivity Management Program
- Engineering, Operations and Maintenance Organizations
- Emergency Preparedness
- Management Review Committee
- Fire Protection
- Public Outreach
- Equipment Reliability
- Troubleshooting
- Error Prevention tools and Human Performance and Safety Training
- Component Mispositioning
- Containment Fan Cooler Reverse Rotation
- INPO (Institute of Nuclear Power Operations) Evaluations
- Natural Phenomena (earthquakes and tsunamis)
- Office workplace seismic safety
- DCCP Operating Plan
- Quality Verification Organization, Performance Reports and Audits
- DCCP responses to the Fukushima accident & review of NEI FLEX strategies
- Pressurizer weld overlay indication review for the California Energy Commission
- Regular discussions with NRC Resident Inspectors

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

Dr. Peter Lam, a DCISC Member, visited the Chairman of 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 email. Members of the public spoke at each of the three DCISC public meetings held in San Luis Obispo. The DCISC has responded to all of their questions and requests during this period.

Overall Conclusion

The DCISC concludes that PG&E operated DCCP safely during the period July 1, 2014—June 30, 2015.

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, DCPD 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 Committee notes that, although the NRC concluded that, “Overall, Diablo Canyon Nuclear Power Plant, Units 1 and 2, operated in a manner that preserved public health and safety...,” it identified 10 Non-cited Violations of “very low safety significance” and one item of “Low to moderate safety significance.” The number of violations has remained about the same as in the previous period and shows a trend downward ([3.2.2](#)), and DCPD has initiated strong actions to improve its regulatory performance. The number of Licensee Event Reports (LERs) has decreased dramatically ([3.1.7](#)).

The DCISC is following this closely, specifically, review of DCPD NRC regulatory performance during the next reporting period, paying attention to the number of DCPD License Event Reports. ([Section 3.5](#))

2. DCPD Operations Department performance on component mispositions and reactivity management has been good and improving. DCPD’s Chemistry Program is effective and achieving good results. Primary and Secondary System chemistry levels are generally within specifications. Discharge of liquid radioactive waste is well within plant and regulatory limits. Although DCPD has expressed no intent to implement flexible power operation at this time, it has been examining the potential impacts that could arise from such a change to its operating practices, safety, and reliability. Flexible operation will have a different impact on plant safety and reliability than does steady state operation. The DCISC will continue to follow this topic. During this past winter, there were no Pacific Ocean winter storms, which impacted DCPD. DCPD appears to have performed its Operability Decision Making process satisfactorily. follow-up effectiveness evaluations were performed appropriately, concluding that the ODMs were effective. ([4.1.3](#))
3. Considerable management attention is being directed at minimizing maintenance risk and the need for maintenance rework, and improvements appear to be emerging in this area. Likewise, Foreign Material Exclusion Events appear to be more effectively avoided. Delays in taking corrective action to prevent recurrence of identified problems appear to have been a recent, short term problem, but should be of continued focus. 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. The DCPD Trouble-Shooting Program appears effective, and two DCPD troubleshooting cases appeared to have been performed satisfactorily as reviewed by the DCISC. ([4.2.3](#))

4. Overall, DCP's Engineering Program continued to be strong. DCP's Design Quality measures showed satisfactory performance based on scores of final designs released for installation.

DCP's System Engineering Program continued to be active and expanding. The 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. System Engineering continued to provide an effective method for evaluating and tracking system health, for identifying priorities, and for determining, planning, and undertaking needed actions to maintain system health. The significant reduction in Open Engineering Notifications is a reflection of an increased focus by the Engineering Department on addressing identified issues.

DCP appeared to have an active and effective vibration monitoring effort as part of its Predictive Maintenance Program. The number of open vibration issues appeared to be controlled effectively.

The DCP Equipment Qualification Program appeared satisfactory

DCP's reactor vessel material surveillance program appeared satisfactory to support operation through the normal end-of-life as well as for an additional 20 years, should life extension be sought by DCP and granted by the NRC.

Design Quality has been on Quality Verification's top issues lists since its down-rating in Refueling Outage 1R17 which concluded in June 2012. Engineering has performed assessments and implemented corrective actions, which resulted in enough improvement in Outage 2R18 (Fall 2014) that QV changed Design Quality from a "top issue" to "monitoring," Since January 2014, the Design Change Program has shown Green (good) health.

The Plant Health Committee meetings were conducted efficiently and effectively. Members and presenters appeared to be well prepared. Discussion was active, thoughtful, and probing, with a focus on safety.

DCP's Margin Management Program appears to be functional and healthy. Appropriate personnel have been trained. Margin issues have been identified and prioritized.

Licensing Basis Verification Project (LBVP) continues to progress on schedule with a completion date of year-end 2015. (4.3.3)

5. Recent improvements in Human Performance at DCP reflect noticeable resources that the station has devoted to this important topic. The Operations group in particular has achieved commendable improvements in Component Mispositionings. The DCISC will reexamine these performance areas no later than the third quarter of 2016 to determine the degree to which these improvements are being sustained. (4.4.3)
6. DCP is organizationally focused on fostering a safety conscious work environment from the standpoints of both nuclear and industrial safety. The station appears to be in the early stages of implementing an enhanced process for observing station work activities. This includes obtaining feedback from employees being observed, occasionally conducting an

observation with more than one observer, and expanding the amount of data that are retrieved and analyzed. The DCISC will continue to follow this area actively. (4.5.3)

7. DCP's Performance Improvement Program appears to be effective in improving performance at the station. The program meets all requirements of the Nuclear Regulatory Commission and industry guidance. (4.6.3)
8. DCP appeared to have successfully implemented the second and third versions of the Meteorological Information and Dose Assessment System (MIDAS), utilizing seven meteorological towers and several sonic detection and ranging (SODAR) units, which provides more accurate offsite radiation release consequence predictions. The NRC Level III violation on Emergency Preparedness is White, or low-to-moderate level of safety significance. DCP addressed the violation with appropriate corrective actions. (4.7.3)
9. The DCP Probabilistic Risk Assessment (PRA) group's development work today is emphasizing the completion of new PRA models in the seismic and internal-flooding areas. Its applications work continues with applying PRA methods in several safety-significant areas at the plant. The DCISC concludes that the PRA group is doing fine work, as its competence and its recent accomplishments attest. The DCISC will continue to follow developments in the seismic-PRA area closely. On the other PRA topics the DCISC will undertake a further review about a year hence, when the plant anticipates it will have achieved additional major milestones in its PRA development effort. (4.8.3)
10. Attending NSOC meetings is an excellent way for the DCISC to learn about various plant issues, and therefore the DCISC should plan to attend them regularly. The DCISC believes that the DCP Nuclear Safety Oversight Committee is effective in advising plant management on items of nuclear safety and operational improvement. (4.9.3)
11. DCP's 2013 total liquid and gaseous radiological releases were very small fractions of amounts permitted by regulations and Technical Specifications. The Radiological Environmental Monitoring Program confirmed that the operation of DCP had no significant radiological impact on the environment in 2013. The results of the program were also compared to preoperational data and showed no unusual trends. Minute and diminishing traces of radioactivity from the radioactive releases that occurred in the March 2011 accident at Japan's Fukushima Nuclear Plant were detected in one of DCP's four monitoring wells. (4.10.3)
12. The QV audits reviewed by the DCISC Fact-finding Team were clear, detailed, and focused. (4.11.3)
13. DCP's nuclear fuel has continued to function without any fuel failures since DCISC's prior review of this topic in November 2011. Implementation of the Electric Power Research Institute's (EPRI) guidelines for nuclear fuel management appears to have contributed positively to nuclear fuel performance and is aiding the continued preparation for transfer of used fuel to the Independent Spent Fuel Storage Installation. (4.12.3)
14. DCP appears to be sustaining its reduction of Critical Event Clock Resets since October 2012. Only two such resets have occurred since that time.

DCPP has completed its studies for elimination of Single Point Vulnerabilities (SPVs), i.e., those individual components whose failure alone could cause plant trips or greater than two percent power reduction. Items identified as SPVs have either been modified or had their preventive maintenance changed. These studies and DCPP's follow-up actions have resulted in greater reliability and improved operation. (4.13.3)

15. Considerable attention and effort have been devoted during 2014 to enhancing DCPP's Management Observation Program. This includes changing the basic approach from being somewhat critical of observed workers to being more supportive. The cooperative aspect of this program thus far has resulted in the identification of barriers to error free work, which can either be eliminated or addressed during the performance of work. This enhanced program is still in too early a stage to accurately evaluate its effectiveness with respect to worker performance. The results from DCPP Refueling Outage 2R18, which should be available in early 2015, may provide preliminary indications. (4.14.3)
16. DCPP has dealt effectively with most equipment and system problems and is focused on improving system health. Systems that are the sources of emergency electrical power to the station's vital electrical equipment, the station's Emergency Diesel Generators and the 230 kV system that is supplied from the offsite electrical grid, were found to be operational but have been a focus of station and NRC attention. DCPP has been continuing to pursue preventive measures that are designed to strengthen the capabilities of exterior electrical equipment to better withstand the effects of high salinity in the local atmosphere and as aggravated by prolonged dry spells that have been interspersed with periods of light rain. 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. The System Engineer/Component Program continues to be effective. DCPP has improved its performance with Safety System Functional Failures. (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's statistical performance, in general, in refueling outage 1R18 reflected continuing improvement over that of earlier outages. Also, DCPP's intended future outage focus on the reliability of electrical equipment appeared to be reasonable. The DCPP 2R18 Outage Safety Plan, used to assure nuclear safety during the outage, appeared comprehensive and clearly written, assuring the Defense-in-Depth philosophy to prevent accidents and to mitigate the effects of accidents, if they were to occur. DCPP's 2R18 Refueling Outage met essentially all goals and was considered a success by DCPP. The DCISC considered 2R18 to be a success from a nuclear safety perspective. DCPP has a good clearance program, which continues to show effective protection of personnel and components. (4.17.3)
19. The Safety-Security Interface appears to be satisfactorily implemented at DCPP. (4.18.3)
20. The DCISC believes that DCPP is prudent in its planned campaigns to expand its Independent Spent Fuel Storage Installation (ISFSI) and move its spent fuel from the Spent Fuel Pools to the ISFSI in a timely manner. The potential chloride stress corrosion cracking issue in

stainless steel spent fuel casks, which is not an urgent issue, is being addressed by the NRC and nuclear industry. The DCISC plans to monitor this issue. (4.19.3)

21. DCP's progress on resolving its Workplace Personnel Seismic Safety issues has been satisfactory and responsive to the DCISC's concerns. PG&E's technical work on tsunami hazards at the DCP site is well-planned, proceeding very well so far, and working on the correct set of problems. The DCISC concluded that the full DCISC should be engaged in reviewing whether the controversy over the plant's seismic licensing basis raises a safety concern. The DCISC finds that the current project to develop probabilistic seismic hazard information about the Diablo Canyon site is going well. The DCISC will continue to follow the progress of this important work. (4.20.3)
22. DCP appears to be appropriately transitioning from its current "deterministic" Fire Protection Program (FPP) to the new "deterministic and risk-informed" National Fire Protection Association Standard NFPA-805. 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 will follow up on this issue. (4.21.3)
23. The refresher training on Time Critical Operator Actions (TCOAs) for Licensed and Senior Licensed operations personnel was an exemplary training session. The instructor was highly knowledgeable and employed a variety of effective training techniques to keep the students engaged throughout the entire training period. Students from all areas of the classroom actively participated in the training. This training session could serve as a model for other refresher training sessions if the need should ever arise. The engineering training session on DC Power Systems was extensive and detailed. However, the interaction between the new instructor for this topic and the students was subdued, and the training session consumed considerably more time than had been planned for this topic. DCISC's Maintenance Training Program was extensive and rigorous. The number and variety of inputs to training, both in-house and external to DCP, contribute to the rigor of this program. DCISC's future focus will be on individual, or related, issues that arise at DCP and may have ties to training. (4.22.3)
24. During this DCISC reporting period, the DCP License Renewal Project to obtain NRC approval for a twenty-year extension of the operating license for each unit remained on hold for completion in 2015. The DCISC will resume its review upon the restart of Licensing Renewal activities. (4.23.3)
25. The DCISC has found a number of potential nuclear safety issues with the use of cooling towers at DCP. The DCISC intends to follow this issue over the next year or more and to review the operational safety implications of any proposal that would replace Once Through Cooling with cooling towers or different technologies

Being an ocean-sited power plant, DCP is susceptible to salt contamination from ocean

spray. DCPD measurements of contamination levels on outdoor components showed what one would expect: contamination levels were directly proportional to the closeness and exposure to the ocean. Contamination levels ranged from Light to Extra Heavy. (4.24.3)

26. The DCPD responses on Fukushima to NRC and the FLEX Initiative (post-Fukushima analysis and modifications) appeared well resourced, comprehensive, and on schedule to meet NRC and industry requirements. The DCISC will follow up periodically to assess DCPD's progress. (4.25.3)

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. The DCISC concerns are as follows:

1. Electricity load growth in the geographic region around DCPD has resulted in voltage fluctuations on the 230kV system. DCPD is planning to compensate for these voltage fluctuations by installing VAR compensators in the 230kV switchyard on site. However, this load growth has also necessitated that DCPD transfer some nonessential 4kV loads to other power sources in order to maintain confidence that the 230kV system will be able to supply vital loads when called upon. It appears to the DCISC that the issue of 230kV system reliability extends beyond DCPD and also may involve the PG&E corporate organization. (4.15)
2. The discovery in 2008 of a new earthquake fault just west of the plant site, the "Shoreline Fault," has resulted in a multi-year technical effort to understand the fault and its possible effect on the plant's ability to remain safe during a potential earthquake on that fault. The tentative conclusion of the NRC is that the plant's current design is adequate, and the DCISC concurs. However, important technical work is ongoing to provide additional information about this fault and its potential effects. The DCISC has followed this issue from the start and will continue to do so. (4.20)
3. Although the studies examining the possible replacement of a Once Through Cooling capability for DCPD's main condensers are still in progress, the DCISC expressed a significant initial concern regarding the potential impact that such a modification would have on nuclear plant safety and reliability. (4.24)
4. Though DCPD is performing well in implementing Fukushima initiatives, the significant number of changes will be challenging to learn, implement, and operate effectively. (4.25)

Recommendations:

None

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Edward D. Halpin, Senior Vice President Nuclear Generation & Chief Nuclear Officer
P.O. Box 56, Avila Beach, CA 9342
805.545.4100

December 15, 2015

PG&E Letter ISC-15-001

Dr. Per F. Peterson
c/o The Diablo Canyon Independent Safety Committee
857 Cass Street, Suite D
Monterey, CA 93940

Response to the Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations – July 1, 2014 to June 30, 2015

Dr. Peterson:

On November 6, 2015, Pacific Gas and Electric Company's (PG&E) received the Diablo Canyon Independent Safety Committee's (DCISC) Twenty-Fifth Annual Report on the Safety of Diablo Canyon Operations for the period of July 1, 2014, to June 30, 2015. The DCISC made no Recommendation during this report period.

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.

Sincerely,

Edward D. Halpin

mrz/4242

cc/enc:

Dr. Robert J. Budnitz

Dr. Peter Lam

David C. Linnen

Ferman Wardell

Robert R. Wellington

[25th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2014—June 30, 2015](#)

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25th Annual Report, Volume 1, Section 2.0, Public Meetings

The DCISC held three two-day Public Meetings in the vicinity of the plant, two public meetings in other locations, and three public tours of Diablo Canyon Power Plant as part of its public outreach program.

2.1 Public Meetings

During the current reporting period July 1, 2014—June 30, 2015 the Diablo Canyon Independent Safety Committee (DCISC) heard presentations from PG&E on DCPD activities and from Committee Members and Consultants on Committee activities and provided the opportunity for public input at the following DCISC public meetings:

[August 8, 2014, Embassy Suites Hotel, San Luis Obispo, CA \(and at the following teleconference locations: 40 Acacia Avenue, Berkeley, CA, and 1701 Rockville Pike, Rockville, MD\)](#)

[October 14–15, 2014, Avila Lighthouse Suites, Avila Beach, CA](#)

[February 4–5, 2015, Avila Lighthouse Suites, Avila Beach, CA](#)

[May 14, 2015, Hotel Durant Berkeley, CA](#)

[June 16—17, 2015, Avila Lighthouse Suites, Avila Beach, CA](#)

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 Institute in 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 August 8, 2014 Public Meeting

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.16](#)). The meeting agenda is shown in Volume II, [Exhibit B.2](#) and minutes of the meeting are included in Volume II, [Exhibit B.3](#).

2.1.2 October 14–15, 2014 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 B.16](#)). 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 DCPD was conducted during the October 15, 2014 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 8.4](#).

2.1.3 February 4–5, 2015 Public Meetings

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.16](#)). The meeting agenda is shown in Volume II, [Exhibit B.8](#), and minutes of the meeting are included in Volume II, [Exhibit B.9](#).

A public tour of DCPD was conducted during the February 4, 2015 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 8.4](#).

2.1.4 May 14, 2015 Public Meeting

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.16](#)). The meeting agenda is shown in Volume II, [Exhibit B.11](#), and minutes of the meeting are included in Volume II, [Exhibit B.12](#).

2.1.5 June 16–17, 2015 Public Meetings

A Notice of Meeting (see Volume II, [Exhibit B.13](#)) 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.16](#)). The meeting agenda is shown in Volume II, [Exhibit B.14](#), and minutes of the meeting are included in Volume II, [Exhibit B.15](#).

A public tour of DCPD was conducted during the June 17, 2015 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 8.4](#).

25th Annual Report, Volume 1, Section 3.0, Nuclear Regulatory Commission (NRC)

Assessments and Issues

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 DCPD on matters of nuclear safety and security, investigates significant plant events, maintains a set of plant performance indicators, and performs an annual assessment of DCPD 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 Licensee 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.

Three LERs were reported during this reporting period as follows:

1. LER 2-2014-001 (issued 7/2/14)—Lightning arrester failure resulted in reactor trip
2. LER 1-2014-004 (issued 3/30/15)—Actuation of six Emergency Diesel Generators due to loss of Offsite Power

3. LER 2–2014–002 (issued 5/7/15)—Unit 2 plant shutdown required by Technical Specifications

None had significant safety significance. DCPD reported on each of these LERs at the three DCISC public meetings, and the DCISC received all LERs and reviewed selected LERs at its nine fact-finding meetings at the DCPD plant. DCPD either corrected the problem/event before it submitted the LERs or documented and tracked their resolution in the DCPD Corrective Action Program

3.1.2 Special Report LERs

There were no special LERs submitted by DCPD 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 was one manual reactor trip reported (Item 1 above). See Section 4.1.2 of this report for a description of this trip.

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

	Number of Trips	
Reporting Period	Automatic	Manual
2010/2011	0	1
2011/2012	0	0
2012/2013	1	0
2013/2014	1	0
2014/2015	0	1

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 with the exception of the March 15, 2015 seismic evaluation (see Section 4.20.2).

3.1.6 LER Trends

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

Time Period	Number of LERs Submitted	
7/1/10–6/30/11	10	(plus 0 voluntary LERs)
7/1/11–6/30/12	6	(plus one voluntary LERs)
7/1/12–6/30/13	12	(plus 0 voluntary LERs)
7/1/13–6/30/14	11	(plus 0 voluntary LERs)
7/1/14–6/30/15	3	(plus 0 voluntary LERs)

During the current reporting period, the reported events were reported within the requirement of within 60 days of event discovery. All of the three LERs were self-evident or were self-identified by PG&E.

3.1.7 DCISC Evaluation and Conclusions

The DCISC recognizes that 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.

Each of the three Licensee Event Reports was investigated by DCPD to determine the plant conditions before and during the event, background and detailed event description, root cause and contributory causes, immediate and preventive corrective action, and previous LERs on identical or similar problems. No LER was significant enough to seriously affect operational safety. No significant cause code trends were observed. LER investigation reports were submitted to all DCISC Members and Consultants for review; DCPD reported on each LER at DCISC public meetings. The DCISC investigated selected LERs at its fact-finding meetings at the plant.

DCPD LER investigations appeared adequate, and corrective actions appeared to be appropriate for all LER events. There appears to be little or no recurrence of the same or similar reportable events. The DCISC will continue to monitor LERs, their causes, and DCPD's actions to correct and prevent them in future fact-finding and public meetings.

The DCISC notes that the number of LERs has remained roughly the same over the previous four reporting periods. For the current period the number has dropped substantially. The LERs during this period had diverse causes, and there were no adverse trends. The DCISC is pleased that the number of LERs is significantly lower and will continue to monitor both the number and significance of DCPD LERs.

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.

- Individual **strengths** are used to point out good practices and **weaknesses** for the licensee's attention for improvement and/or to prevent future problems.
- **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:

1. Emergency Preparedness Annual Inspection Report (IR 2013-502, 7/17/14)
2. Mid-Cycle Assessment Letter (IR 2014-006, 9/2/14)
3. Integrated Inspection Report (IR 2014-003, 8/8/14)
4. Integrated Inspection Report (2014-004, 10/27/14)
5. Problem Identification and Resolution Inspection Report (2014-007, 10/22/14)
6. Focused Baseline Inspection Report (2014-008, 12/15/14)
7. Emergency Preparedness Inspection Report (2014-502, 12/1/14)
8. Emergency Preparedness Annual Inspection Report (IR 2014-501, 1/7/15)
9. Integrated Inspection Report (2014-005, 1/29/15)
10. Emergency Preparedness Inspection Report (2015-502, 2/11/15)

11. Annual Assessment Letter (IR 2014-001, 3/4/15)
12. Integrated Inspection Report (IR 2015-001, 5/5/15)

These ten inspections (plus two assessment letters) are typical of recent previous periods for DCP. 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 DCP 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. DCP 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 DCP 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 Non-Cited Violations 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 category for the violation)
1. NCV (Green)—failure to effectively implement the fire protection program (C-C Aspect H.4c Oversight)
 2. NCV (Green)—failure to evaluate the effects on the Emergency Diesel Generator load capability for maximum combustion air temperature conditions (C-C Aspect P.1(c) Evaluation)
 3. NCV (Green)—failure to evaluate the Auxiliary Feedwater Pump motor capability for the effects of pump maximum brake horsepower conditions (C-C Aspect P.1(c) Evaluation)
 4. NCV (Green)—inadequate procedures for establishing temporary ventilation (C-C Aspect H.2 (d) Facilities)
 5. NCV (Green)—failure to use procedures to perform corrective maintenance on Emergency Diesel Generator 1-1 (C-C Aspect H.4(a) Human Error Prevention)
 6. NCV (Green)—valid Emergency Diesel Generator 2-1 start caused by loss of 4 kV Class 1E Bus G (C-C Aspect H.4(a) Human Error Prevention)
 7. NCV (Green)—Unit 2 reactor trip due to lightning arrestor flashover (C-C Aspect H.1(b) Conservative Assumptions)
 8. NCV (Green)—Auxiliary Feedwater pump actuation due to a Main Feedwater Pump trip (C-C Aspect H.1(a) Planning)

9. NCV (Green)—loss of Control Room Ventilation System due to inadequate design control (C-C Aspect H.2(c) Documentation)
10. NCV (Green)—failure to follow procedure results in inadequate operability assessment (C-C Aspect P.2 Evaluation)
11. NCV (Green)—inappropriate fatigue rule waivers (C-C aspect H.1 Resources)

The history of violations for this and the last four DCISC reporting periods is as follows:

DCISC Reporting Period	Number of Inspections	Violation Severity Level			Violations Total
		III	IV	Non-Cited	
7/1/10–6/30/11	8	–	4	36	40
7/1/11–6/30/12	6	1	–	14	15
7/1/12–6/30/13	6	–	1	19	20
7/1/13–6/30/14	5	–	–	11	11
7/1/14–6/30/15	10	1	–	11	12

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 monitoring any particular Cross-cutting aspects, and that DCPD 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 five or six and has increased to 10 in this period. This relatively low number in previous periods is a result of good regulatory performance as measured primarily by NRC Performance Indicators (see Section 3.5 below). The increase to ten in this period is due to the Level III violation on Emergency Planning (see Section 4.7.2, Emergency Preparedness)

The DCISC heard presentations by DCPD on each non-cited violation, finding and LER at its public meetings and has reviewed each cited violation and DCPD's corrective actions, where applicable. DCPD corrective actions appeared adequate. There were no individual items of significance to warrant DCISC recommendations or actions.

All but one of DCPD's 11 NCVs were classified by the NRC as having very low safety significance (Green). The one Level III White violation, which was mostly a matter of not obtaining NRC approval before making a change to the DCPD Emergency Plan, is being addressed satisfactorily.

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:

Reactor Safety	Radiation Safety	Safeguards
• Initiating Events	• Occupational	• Physical Protection
• Mitigating Systems	• Public	
• Barrier Integrity		
• Emergency Preparedness		

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 DCPD 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 End-of-Cycle Report for 2014 (Annual Assessment Letter March 4, 2015)

NRC generated one annual performance review and assessment letter for DCPD and reported that for the period January 1 through December 31, 2014:

The NRC determined the performance at Diablo Canyon Power Plant, Units 1 and 2, during the most recent quarter was within the Regulatory Response Column of the NRC's Reactor Oversight Process (ROP) Action Matrix because of one White finding in the Emergency Preparedness Cornerstone, for Units 1 and 2. In a letter to you, dated September 2, 2014, the NRC provided its mid-cycle 2014 assessment indicating that the performance at Diablo Canyon Power Plant, Units 1 and 2, was within in the Licensee Response Column of the NRC's ROP Action Matrix, though the NRC was still reviewing unresolved item URI 05000275/2013005-01; 05000323/2013005-01, "Procedures for Recommending Protective Actions for Members of the Public on the Pacific Ocean."

In a letter to you, dated February 11, 2015, the NRC provided its final significance determination associated with an inspection finding in the Emergency Preparedness cornerstone for Units 1 and 2 (relative to the aforementioned unresolved item). The finding, which we concluded was of low to moderate safety significance (White), involved the failure to obtain prior approval for an emergency plan change that reduced the effectiveness of the emergency plan. Specifically, on November 4, 2005, without approval from the NRC, Diablo Canyon Power Plant staff removed instructions in emergency plan implementing procedures for making protective action recommendations for members of the public on the ocean within the 10-mile Emergency Planning Zone, reducing the plan's effectiveness.

Given the significance of the finding referenced above, the NRC determined the performance at Diablo Canyon Power Plant, Units 1 and 2, to be in the Regulatory Response Column of the ROP Action Matrix beginning the fourth quarter of 2014. The NRC plans to conduct a supplemental inspection to review the actions taken to address the performance issues associated with the White finding in accordance with Inspection Procedure 95001, "Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area." The NRC will plan this inspection activity when you provide written notification of your readiness for the inspection.

This supplemental inspection will provide assurance that the root causes and contributing causes of the risk-significant performance issues are understood, that the extent of condition and extent of cause of risk-significant performance issues are identified, and that your corrective actions for risk-significant performance issues are sufficient to address the root and contributing causes and prevent recurrence.

The enclosed inspection plan lists the inspections scheduled through June 30, 2016. Routine inspections performed by resident inspectors are not included in the inspection plan. The inspections listed during the last nine months of the inspection plan are tentative and may be revised at the mid-cycle performance review. The NRC provides the inspection plan to allow for the resolution of any scheduling conflicts and personnel availability issues. 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 security-related inspections, which will be sent via separate, non-publicly available correspondence. Additionally, an NRC audit of licensee efforts towards compliance with Order EA-12-049, “Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design Basis External Events,” and Order EA-12-051, “Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation” is ongoing. This audit includes an onsite component in order for the NRC to evaluate mitigating strategies as described in licensee submittals, and to receive and review information relative to associated open items. This onsite activity will occur in the months prior to the first unit at each site achieving compliance with the Orders, and will aid staff in development of a Safety Evaluation for the site. The onsite component at your site has been scheduled for the week of August 17, 2015. A site-specific audit plan for the visit will be provided in advance to allow sufficient time for preparations.

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

The DCISC concurs with the NRC assessment that, overall, DCP “...operated in a manner that preserved public health and safety...,” and will continue monitoring DCP regulatory performance.

3.4 DCISC Meetings with NRC Resident Inspector

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

June 26, 2014 Volume II, [Exhibit D.1, Section 3.11](#)

Various topics were briefly discussed, including the following:

1. Items of the fact-finding visit
2. Invitation for the NRC RI to speak at the next DCISC public meeting.

August 14, 2014 (Volume II, [Exhibit D.2, Section 3.11](#))

Various topics were briefly discussed, including the following:

- The Senior NRC RI noted that he would be available to make a presentation at the DCISC’s upcoming Public Meeting on October 9–10, 2013. The Fact-finding Team familiarized him with the process used by DCISC regarding Public Meeting presentations and responding to questions raised by persons in attendance.
- Management staffing changes that are scheduled to take place in NRC Region IV.
- New NRC Fire Protection Rule—it was noted that a two-year time frame will apply for compliance, and this will involve DCP obtaining approval of an amendment to its Operating License.
- DCP’s focus on enhancing the reliability of transformers in the switchyard.
- With regard to a trip of Unit 2 due to failure of a lightning arrester, operators showed good patience in

returning the plant to power. They were not driven unnecessarily by a sense of urgency.

- The State of California is interested in reducing the density of fuel bundles in the Spent Fuel Pool. However, there are impediments to doing so that have not been fully analyzed at this time.

November 21, 2014 (Volume II, [Exhibit D.4, Section 3.7](#))

Various topics were briefly discussed, including the following:

- Thanks on behalf of the DCISC to the Senior NRC RI for his presentation at DCISC's October 2013 Public Meeting.
- DCPD has a new Resident Inspector.
- The prior evening's public forum that was held by the NRC, and the forum's topic of Waste Confidence. The meeting had active public participation.
- The flashover of the lightning arrester at Morro Bay and its ramifications to DCPD's 230 kV system.
- Several human performance issues that had recently arisen: e.g. selecting the wrong fuel assembly when moving fuel bundles, and a valve mispositioning.
- Issues related to seismicity and the recent PG&E Workshop that is developing an updated probabilistic understanding of the seismic hazard at the DCPD site using the NRC-endorsed SSHAC (Senior Seismic Hazards Analysis Committee) process.
- Tsunami issues and studies.

January 15, 2015 (Volume II, [Exhibit D.6, Section 3.2](#))

Various topics were briefly discussed, including the following:

- The new Resident Inspector introduced himself and described his background.
- Dr. Lam explained the nature, make-up, and processes of the DCISC.

March 25, 2015 (Volume II, [Exhibit D.7, Section 3.2](#))

Various topics were briefly discussed, including the following:

- Role of the DCISC
- The new RI's professional background
- Containment hatch seismic qualification issue
- San Onofre Nuclear Generating Station steam generator problems and their relevance to DCPD.

April 17, 2015 (Volume II, [Exhibit D.8, Section 3.8](#))

Various topics were briefly discussed, including the following:

- Appreciation for Senior RI's willingness to speak at a DCPD Public Meeting
- NRC held its Annual Public Meeting (December 18, 2014) in San Luis Obispo in which it reviewed the station's performance for 2013. Senior personnel from DCPD spoke. Also, the public was provided the opportunity to ask questions.

- The NRC Annual Assessment Public Meeting was held May 22, 2014, and DCP's regulatory performance during 2013 was discussed. This was actually a meeting between the NRC and the utility, which the Public can observe and ask questions of the NRC. DCISC Member Dr. Per Peterson attended the NRC meeting.

Conclusion: The DCISC meetings with the NRC Resident Inspectors are a good opportunity to review the status 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 DCISC Conclusions and Recommendations

Conclusions: The DCISC received regular reports on the Nuclear Regulatory Commission (NRC) Performance Indicators, DCP 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.

The Committee notes that, although the Nuclear Regulatory Commission (NRC) concluded that, "Overall, Diablo Canyon Power Plant, Units 1 and 2, operated in a manner that preserved public health and safety...", it identified 10 Non-cited Violations of "very low safety significance" and one Level III item of "low-to-moderate safety significance." The number of violations has decreased. DCP appears focused to improve its regulatory performance.

The DCISC is following this closely, specifically, review of DCP NRC regulatory performance during the next reporting period, paying attention to the number of DCP License Event Reports and to the trend in Conservative Assumptions in Decision Making.

Recommendations:

None

Table 3.1 Diablo Canyon 1 2Q/2015 Performance Summary

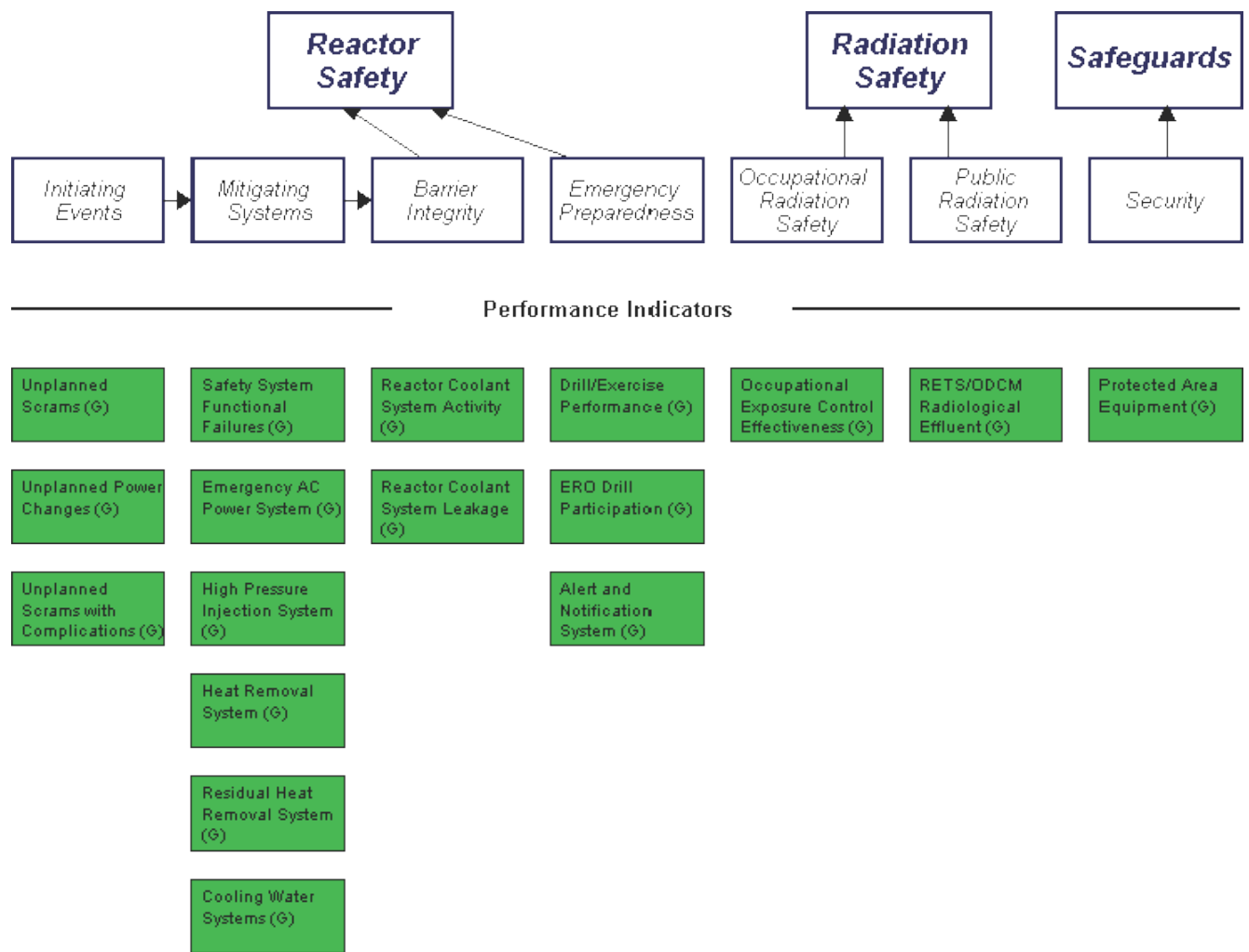


Table 3.2 Diablo Canyon 1 2Q/2015 NRC Most Significant Inspection Findings

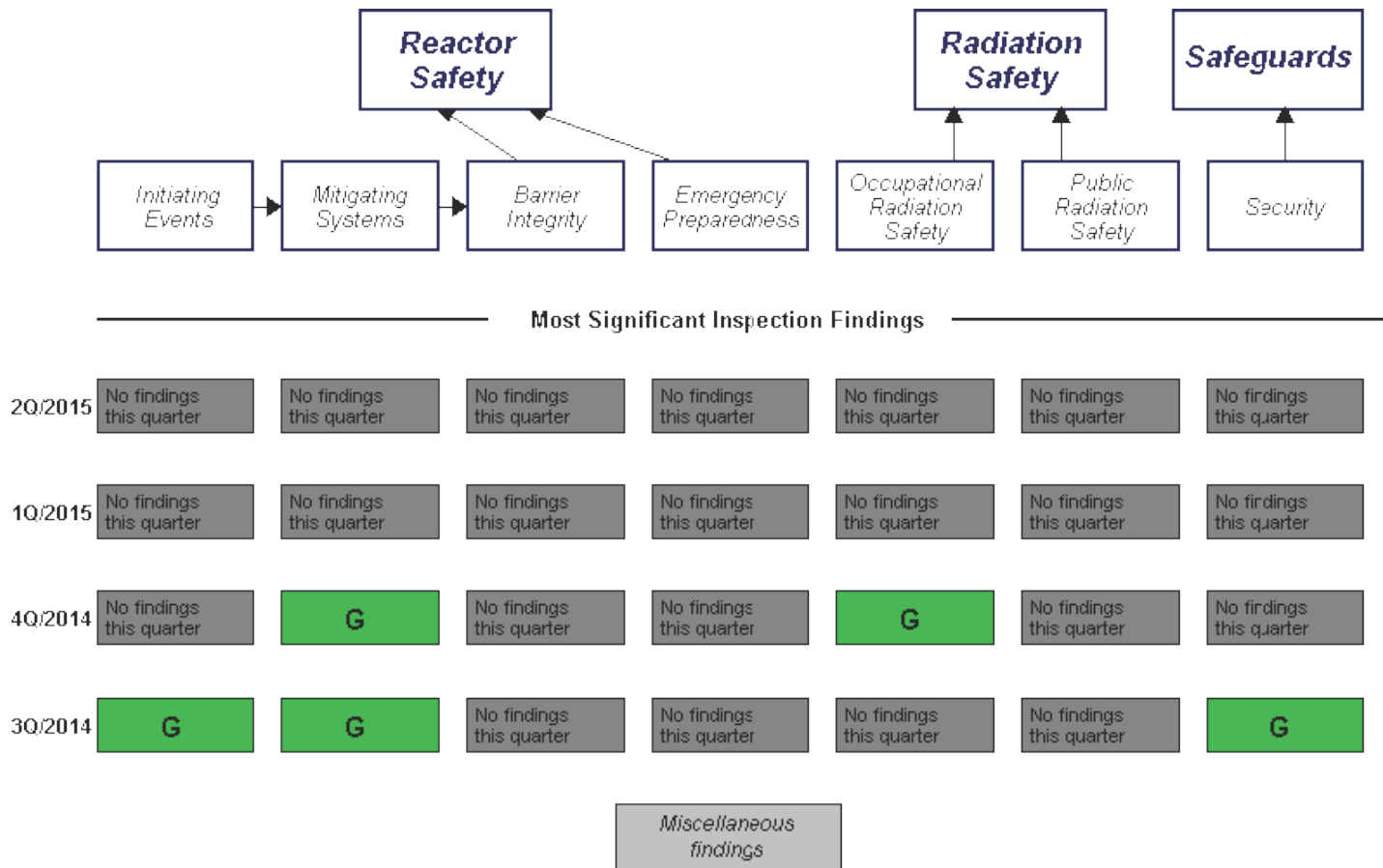


Table 3.3 Diablo Canyon 2 2Q/2015 Performance Summary

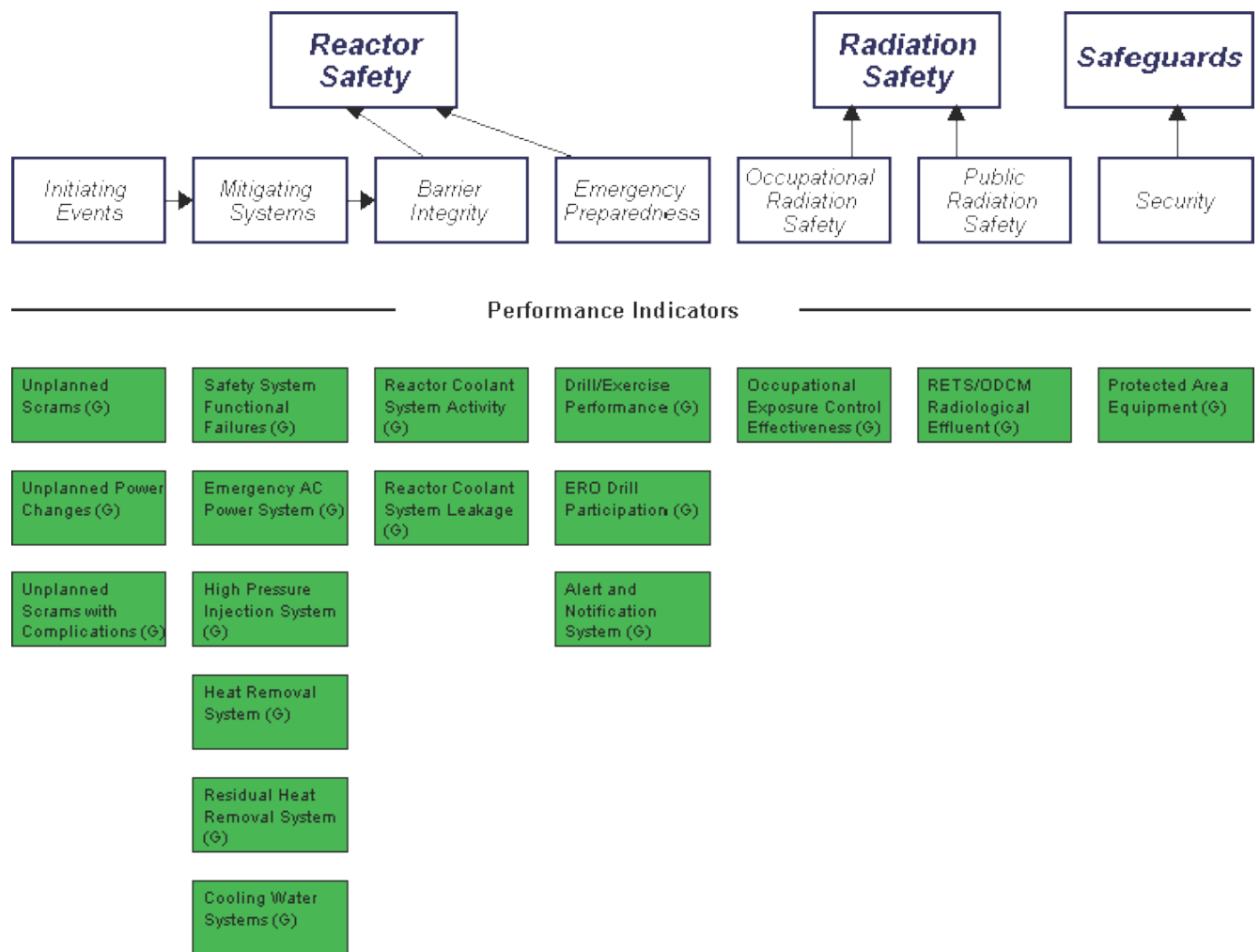
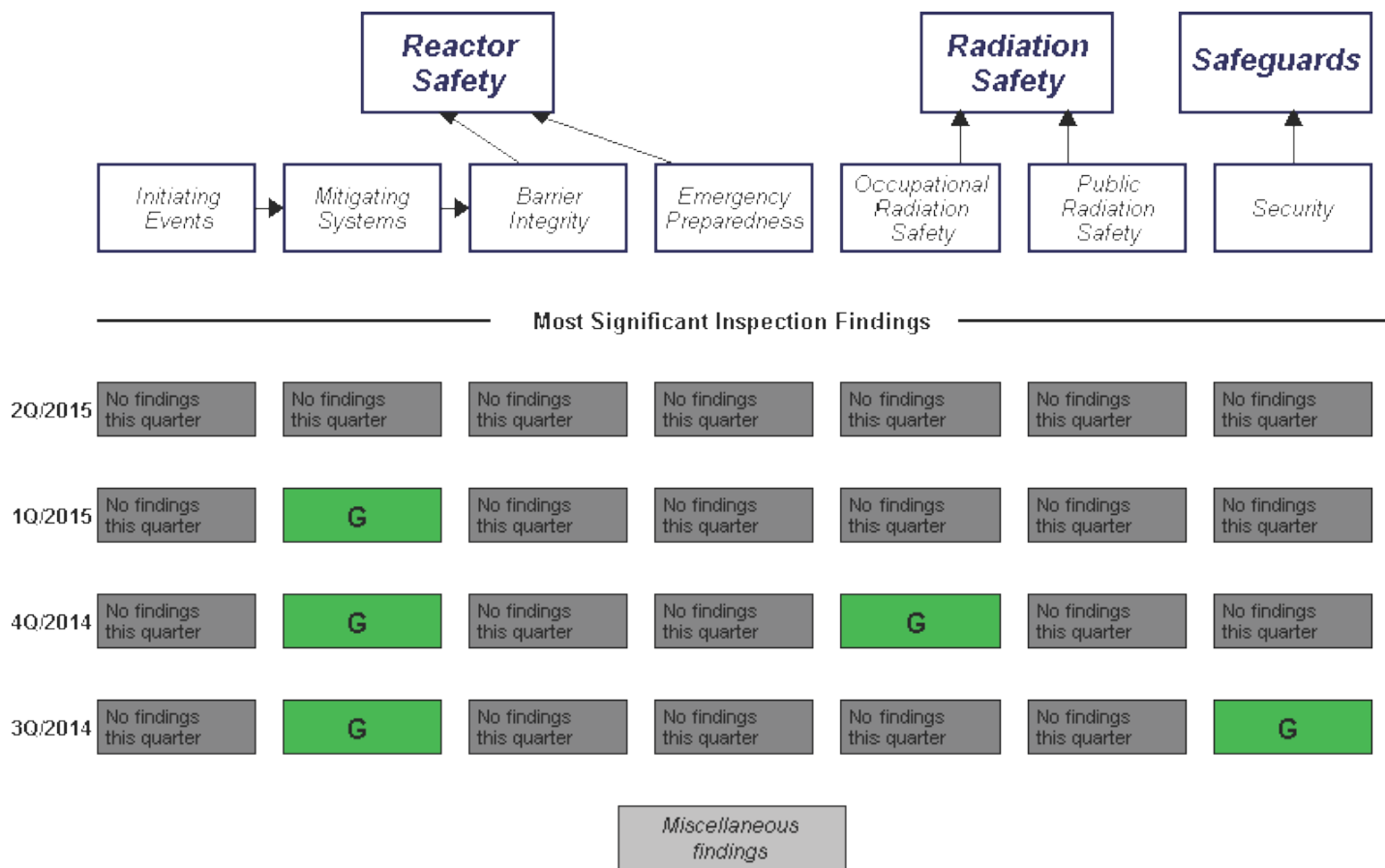


Table 3.4 Diablo Canyon 2 2Q/2015 NRC Most Significant Inspection Findings



- 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.

[25th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2014—June 30, 2015](#)

[Preface](#) | [Executive Summary](#)

[Volume 1 TOC](#) | [Volume 2 TOC](#) | [PG&E Response](#) | [Contact the DCISC](#)

[25th Annual Report](#), [Volume 1](#), Section 4.0, Summary of Major DCISC Review Topics

The DCISC reviews a broad spectrum of topics and issues at DCPD. Detailed reports of these topics are contained in Volume 2, Exhibit B—DCISC Public Meeting Notices, Agendas and Reports and Volume 2, Exhibit D—DCISC reports on Fact-finding meetings. This section contains summaries of these reports along with conclusions and any recommendations.

[25th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2014—June 30, 2015](#)

[Preface](#) | [Executive Summary](#)

[Volume 1 TOC](#) | [Volume 2 TOC](#) | [PG&E Response](#) | [Contact the DCISC](#)

[25th Annual Report](#), [Volume 1](#), Exhibit 5.0, Performance Indicators

DCPP operational performance is reported in Volume II, [Exhibit C](#), “Diablo Canyon Power Plant (DCPP) Operations”.

[25th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2014—June 30, 2015](#)

[Preface](#) | [Executive Summary](#)

[Volume 1 TOC](#) | [Volume 2 TOC](#) | [PG&E Response](#) | [Contact the DCISC](#)

[25th Annual Report](#), [Volume 1](#), Exhibit 6.0, DCISC Open Items List

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 List is updated and reviewed at each public meeting. The Open Items List included in Volume II, [Exhibit F](#) was used at the DCISC [June 16–17, 2015 Public Meetings](#).

[25th Annual Report, Volume 1, Exhibit 7.0, PG&E Actions on Previous DCISC Report Recommendations](#)

The DCISC has made 221 recommendations in its previous 24 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.

PG&E's response to the DCISC recommendation in the 2013–2014 Annual Report was included in Section 9.0 of that report. At its February 12, 2015 Public Meeting the DCISC found the responses acceptable.

The DCISC has no recommendations in this 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.

25th Annual Report, Volume 1, Exhibit 8.0, Public Input

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 three 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-16), 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 receive 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.

8.1 [Telephone Calls and E-mails Received by the DCISC](#)

8.2 [DCISC Internet–Worldwide Web Page Activity](#)

8.3 [Comments Received at DCISC public meetings](#)

8.4 [DCISC Public Tours of DCPD](#)

8.5 [DCISC Evaluation](#)

25th Annual Report, Volume 2, Exhibit C, Diablo Canyon Nuclear Power Plant (DCPP) Operations

1.0 PG&E/DCPP Organizations

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, 2014, through June 30, 2015, Diablo Canyon's Combined "Capacity Factor" averaged 94.1% (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 Summary

During the 12-month reporting period ending June 30, 2015 Unit 1's Capacity Factor was 98.7% (Net Maximum Dependable Capacity). The table below includes descriptions of operating events that impacted Unit 1 generation.

Unit 1 Power Generation Events July 2014—June 2015

Date	Type	Reduced to Power Level	Event
09/06/14–09/06/14	Outage	0%	Manually-initiated outage to perform high-pressure spray-wash of electrical lightning arrestors.
12/05/14–12/09/14	Curtailement	52%	Manually-initiated curtailement for ocean cooling water system tunnel cleaning.
12/05/14–12/06/14	Outage	0%	Manually-initiated outage to perform high-pressure spray-wash of electrical lightning arrestors. Outage occurred during 12/05/14 to 12/09/14 tunnel cleaning curtailement.
12/18/14–12/31/14	Curtailement	93%	Manually-initiated curtailement due to Feedwater Heater 1-5A tube leak.
12/31/14–01/04/15	Outage	0%	Manually-initiated outage to repair Feedwater Heater 1-5A tube leak. Outage included emergent repair of Residual Heat Removal Valve 1-RV-8708 cracked socket weld.
05/29/14–05/29/15	Curtailement	87%	Manually-initiated curtailement for STP M-21C Main Turbine Control Valve Test.

Unit 2 Operating Summary

During the 12-month reporting period ending June 30, 2015 Unit 2's Capacity Factor was 89.5% (Net Maximum Dependable Capacity). This period included a refueling outage.

The table below includes descriptions of operating events that impacted Unit 2 generation.

Unit 2 Power Generation Events July 2014—June 2015

Date	Type	Reduced to Power Level	Event
07/19/14–07/19/14	Outage	0%	Manually-initiated maintenance outage to perform high-pressure spray-wash of electrical lightning arrestors.
08/14/14–08/18/14	Outage	0%	Manually-initiated outage to repair Emergency Diesel Generator 2-3 broken bolt and Fuel Oil Booster Pump

			leak.
10/05/14–11/06/14	Refueling Outage	0%	2R18 refueling outage. Planned duration 33 days.
03/23/15–03/25/15	Curtailement	98%	Manually-initiated curtailement to repair Feedwater 2-2B XS-2-LCV-32 controller.
05/08/15–05/08/15	Curtailement	88%	Manually-initiated curtailement for STP M-21C Main Turbine Control Valve test.

2.0.2 Refueling Outages

The Unit 2 eighteenth refueling outage (2R18) was a significant outage, which included the following major work:

- Core Exit Thermocouples (1 port)
- Steam Generator Sludge Lance / Eddy Current
- RCP 2-2 Motor Overhaul
- RCP 2-3 Seal Package
- CFCU Inlet Damper Modification
- Firewater to Containment Piping Replacement
- Circulating Water Pump Motor Overhaul
- Turbine Extraction Steam Bellows Replacement
- Main Feedwater Pump 2-1 Turbine Overhaul
- 480 V bus G Breaker Replacement
- 500 kV Switchyard Relay and Breaker Upgrades
- Battery and DC Panel 2-2 Replacement

Outage 2R18 began on October 5, 2014 and ended on schedule on November 6, 2014. Outage goals and results were as follows:

Performance Category	Goal	Actual
Recordable & Disabling Injuries	0	0
Nuclear Safety Events	0	0
Human Performance Event Clock Resets	0	0
Outage Duration (Days)	≤33	33
Dose Goal (Rem)	30	30
Significant Foreign Material Events (FME)	0	0

2.0.3 Collective Radiation Dose Equivalent 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 dose for Refueling Outage 2R18 was 30.3 person-Rem versus a goal of 31.0. Dose goals achieved can be attributed to radiation field reduction efforts and improved radiation workplace practices. Non-outage radiation doses typically amount to about eight person-Rem per year.

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. There were no unplanned automatic reactor trips in either unit during this 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 DCP. No actuations occurred during the reporting period.

2.0.6 Chemistry Effectiveness Indicator (CEI)

DCP 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 control as well as contaminant control. The CEI can range from 0 to 100 with a lower value demonstrating better chemistry control. Monthly CEI for Unit 1 for August 2015 was 0.000. Unit 1 18-month composite remains at 0.310 due to feedwater iron from 1R18 startup. This results in 2nd quartile performance (0.071 to 0.770) for all PWRs. DCP expects this to drop to 0.000 in September 2015, returning to the 1st quartile. Monthly CEI for Unit 2 for August 2015 was 0.000. Unit 2 18-month composite remained at 0.000 keeping DCP in the 1st quartile performance (≤ 0.070) for all PWRs.

2.0.7 Fuel Reliability

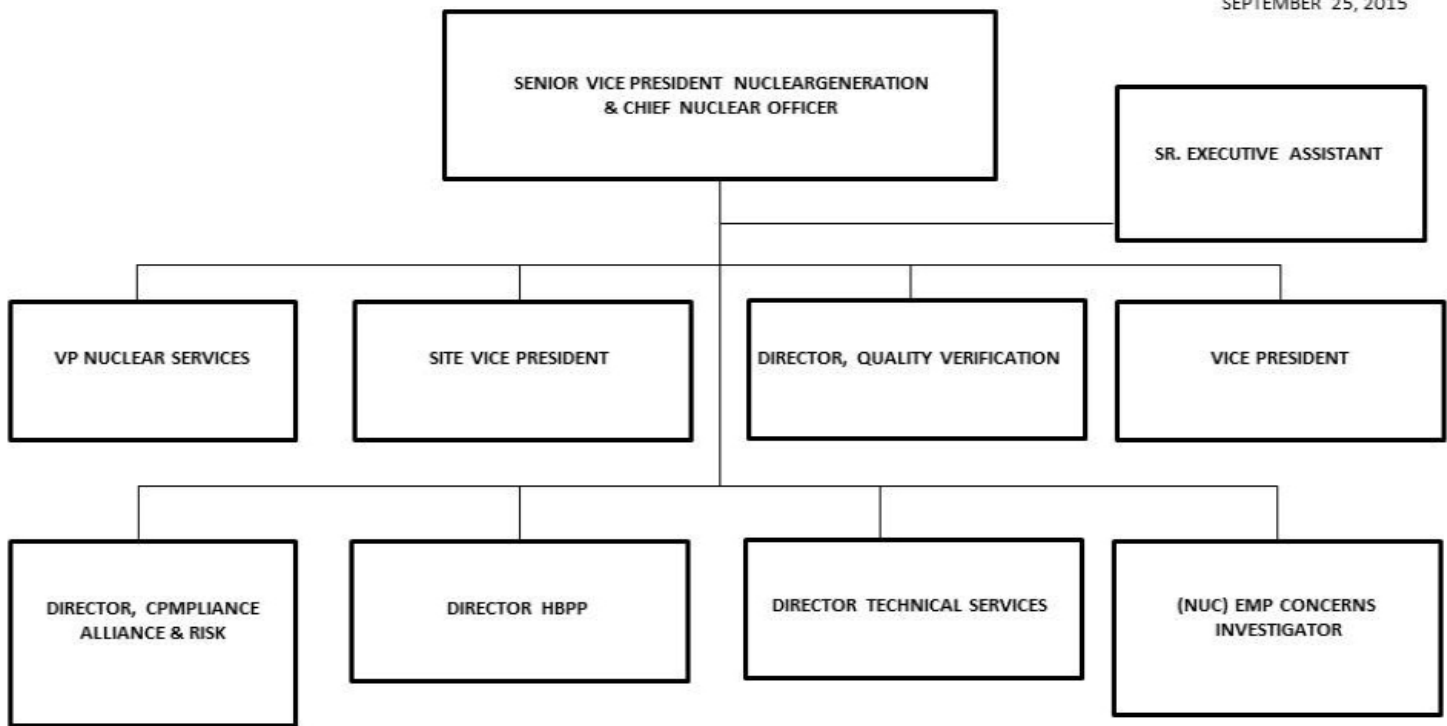
The purpose of the fuel reliability indicator is to monitor progress in achieving and maintaining high fuel integrity. Failed fuel represents a breach in the initial barrier for preventing offsite release of fission products. Such failure also has a detrimental effect on operations and increases the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

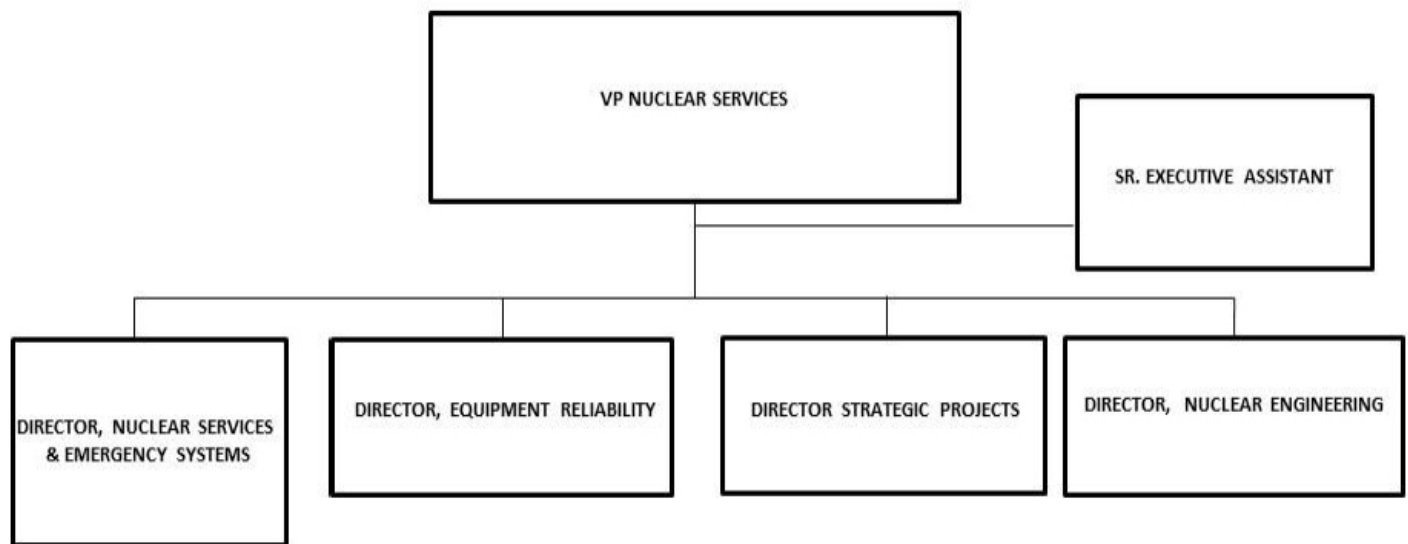
Organizational Charts

Senior Vice President Nuclear Generation and Chief Nuclear Officer

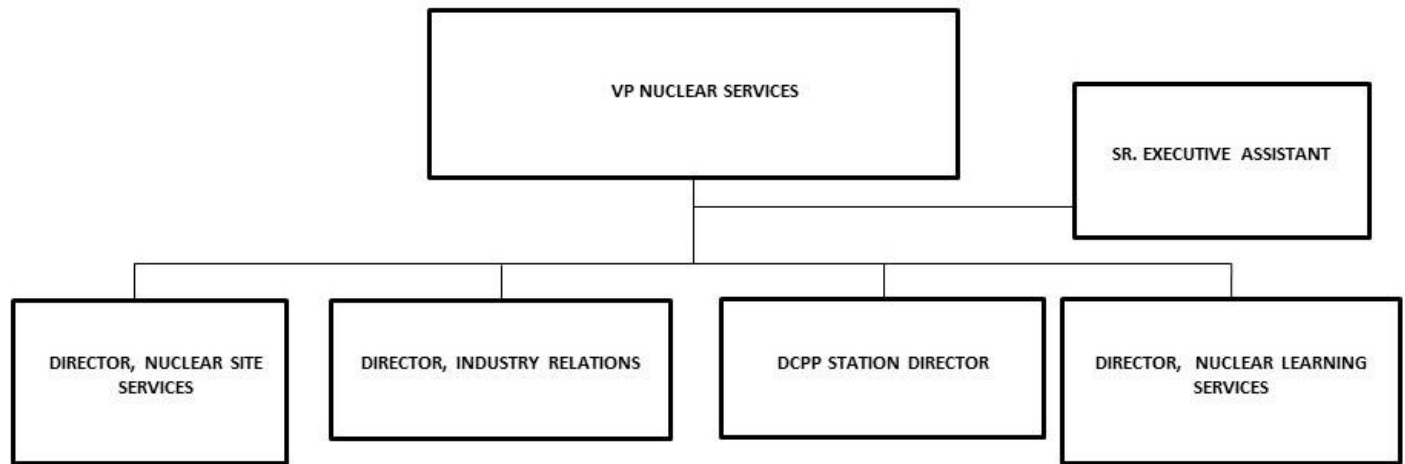


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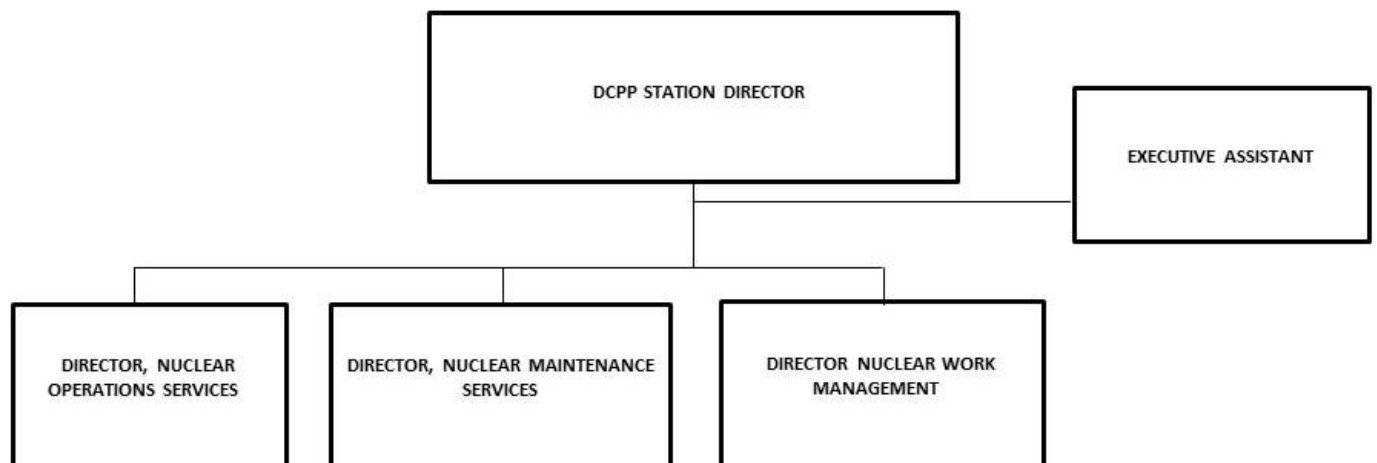
Vice President Nuclear Services



Vice President Nuclear Services



DCPP Station Director



25th Annual Report, Volume 2, Exhibit E, DCISC Plant Tours of Diablo Canyon Nuclear Power Plant

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 DCP (Through June 2014)

Area No.	Location	System-Area	Tour No(s) (See Table 2) (Bold = Public Tour)
TB-1	TB—Buttress Area	Condensate Polishing System	, 09-9
TB-2	TB—El 73 NH-SH (U1&2)	Condensate Pumps	, 09-8
		Condensate Cooler	
TB-3	TB El 85 NH	Oily Water Separator Room	
TB-4	TB—El 85 NH-SH (U1&2)	Condensate Booster Pumps	
		Letdown Storage Tanks	
		Main Feedwater Pumps	.06-6, 07-11, 09-8, .07-9, 14-2
		Condenser Water Box	
		Plant Air Compressors	15-6
		Service Water HX	
		Lube Oil Storage Tanks	11-1
		Component Cool. Water HX	
TB-5	TB El 85 (U1&2)	Emergency Diesel Generators	07-7, 09-5, 09-8, 09-9, 10-2, 10-7, 14-2
TB-6	TB El 85 (U1&2)	4 kV & 12 kV Non-vital Switchgear	07-2
TB-7	TB Buttress El 104 (U2)	Technical Support Center	07-4, 10-3

TB-8	TB El 104 (U1&2)	4 kV Vital Cable Spread. Rms.	
		Isophase Bus Cooling System	
TB-9	TB El 104 (U1&2)	Main Lube Oil Resvr. - Cooler	11-1
		Feedwater Heaters	
		Mid-condenser & Hoods	
		Seawater Evaporators	
		Steam Jet Air Ejectors	
TB-10	TB El 119 (U1&2)	4 kV Vital Switchgear	14-2
		Switchgear Ventilation Fans	
TB-11	TB El 119 (U1&2)	Isophase Busses	
		LP Cond. Exhaust Hoods	
		Moisture Septrs. /Reheaters	
		Tech. Maintenance Shop	
TB-12	TB El 140 (Turbine Deck) (U1&2)	Main Turbines, Generators & Steam Leads & Valves	, 06-9, 08-7, 10-2, 10-5, 10-7, 14-5, 15-4, 15-8
TB-13	TB El 140 NH	Outage Coordination Center	08-8, 09-8
TB-14	U1 TB 140 NH	Operations Support Center	14-7
AB-1	AB El 55	Pipe Tunnel Area	
AB-2	AB El 64 (U1&2)	Boron Injection Tanks	
		Residual Heat Removal Pumps	
		Gas Decay Tanks & Cmpsr.	09-1
		Radwaste Monitor Tanks	09-1
		Liquid Radwaste Storage Tanks	09-1
AB-3	AB El 73 (U1&2)	Residual Heat Removal HXs	
		Compnt. Cool. Water Pumps	
		Charging Pumps	
		Containment Spray Pumps	
		Boron Injection Tanks	

AB-4	AB El 85 (U1&2)	Penetration Area	
		Post-LOCA Sampling Station	
		Waste Gas Analyzer	09-1
AB-5	AB EL 85(U1&2)	Safety Injection Pumps	
		Boric Acid Evap.	
		Aux. Control Board	11-7
		Let down & Seal Return HX	
AB-6	AB EL 85	Chemistry Offices & Labs	
		RP Offices & Labs	
		RCA Access Control	06-4, 06-9, 09-1, 09-9, 09-1
		Hot Showers & Laundry	
AB-7	AB El 85	Auxiliary Boiler	
AB-8	AB El 100 (U1&2)	Penetration Area	
AB-9	AB El 100 (U1&2)	Aux. Feedwater Pumps	07-6, 12-1
		Volume Control Tank	
		Demineralizers	
		Boric Acid Transfer Pumps	
AB-10	AB El 100 (U1&2)	480 V Vital Bus	
		Hot Shutdown Panel	09-9, 10-2, 10-7, 11-7, 14-2
AB-11	AB El 115 U1&2)	Penetration Area-MS & FDW	
		Radwaste Processing Area	15-2
		Ion Exchangers	09-1
AB-12	AB El 115 (U1&2)	Vital Batteries, Chargers & Inverters	11-6
		Rod Control Cabinets	
AB-13	AB El 115 (U1&2)	Plant Ventilation System	
AB-14	AB El 128 (U1&2)	Cable Spreading Room	
AB-15	AB El 140 (U1&2)	Control Room Area	07-7, 08-7, 08-8, 09-9, 10-2, 10-5, 11-7, 13-4, 14-2, 14-5, 15-4, 15-8
AB-16	AB El 140 (U1&2)	SG Blowdown Tank	
		Containment Equipment & Personnel Hatches	
FH-1	FH El 85 (U1&2)	Fuel Handling Supply Fans & Radiation Monitoring	

FH-2	FH El 100 (U1&2)	Spent Fuel Pool Pumps-HXs	10-8
		Spent Fuel Ventilation Sys.	
FH-3	FH El 140 (U1&2)	Spent Fuel Pool	06-1, 07-10, 08-8, 09-9, 10-8, 11-7, 15-5
		Cask Decon (El 115)	09-9
		New Fuel Storage	09-6, 10-8
		Firewater Pumps (El 115)	
FH-4	FH El 140 NH-SH	Hot Machine Shop	09-9
		Hot Tool Room	
C-1	Containment (U1&2)	Containment Area	06-4, 11-7
		Reactor Coolant System	
		Accumulators	
		Pressurizer Relief Tank	
		Cont. Sump - Screen	
		Refueling Canal	
		Containment Fan Coolers	
A-1	Admin. Bldg. El 128	Communications Rooms	
		Computer Center	
		Security Access Control	, 06-7, 07-3, 07-8, 07-12, 08-2, 08-6, 08-9, 10-4, 10-6, 10-9, 11-4, 11-5, 11-8, 12-3, 12-5, 12-8, 13-2, 13-6, 13-8, 14-3, 14-6, 14-8, 15-1, 15-4, 15-8
T-1	Training Building	Training Building Simulator	06-3, 06-7, 07-3, 07-8, 07-12, 08-2, 08-6, 08-9, 09-4, 09-7, 09-10, 10-3, 10-4, 10-6, 10-9, 11-1, 11-3, 11-4, 11-5, 11-8, 12-3, 12-5, 12-8, 13-2, 13-3, 13-5, 13-6, 13-8, 14-3, 14-6, 14-8, 14-7, 15-1, 15-4, 15-8
T-2		Maintenance Training Facility	09-4, 12-5, 13-7, 14-1, 14-3
I-1	Intake Structure Area (U1&2)	General Area & Overlook	06-3, 06-7, 07-1, 07-3, 07-8, 07-12, 08-2, 08-6, 08-9, 09-4, 09-7, 09-10, 10-4, 10-6, 10-9, 11-4, 11-5, 11-8, 12-3, 12-5, 12-8,

			14-3, 14-6, 14-8, 09-2, 13-2, 13-6, 13-8
		Traveling Screens	09-2, 06-2
		Circulating Water Pumps	
		Auxiliary Saltwater Pumps	
O-1	Outside TB El 85 (U1&2)	Main & Auxiliary Transformers	,06-9, 09-2, 09-9, 10-2, 10-7, 14-2
O-2	Outside FH and Yard (U1&2)	Condensate Storage Tank,	, 07-6, 08-5, 08-7, 09-8
		Primary Water Storage Tank,	
		Refueling Water Storage Tank	
O-3	Outside TB (east side)	Diesel Fuel Oil Storage Tank (buried)	
O-4	Warehouse Area	Main Warehouse	09-3
		Warehouses A&B	
O-5	Outside (U1&2)	Cold Machine Shop	09-9
O-6	Outside, Radwaste Area	Radwaste Storage Facility	09-1
		Radwaste Storage Tanks	
		Laundry Facility	
O-7	Plant Overlook Area	Waste Water Holding & Treatment System Facilities	12-3, 12-5, 12-8, 14-3, 14-6, 14-8
		Polymetrics Sys. - Reservoir	
O-8	“Patton Flats” Area	Hydronautics System	
		Biology Lab	
		Hazardous Waste Stor. Bldg	
		Fire Protection System	09-6
		Plant Sewage Treatment Fac	
		Paint Facility	
O-9	500 kV Switch yard	500 kV Switchyard &	
		Control Building	06-3, 06-8, 13-2, 13-6, 13-8, 14-3, 14-6, 14-8
O-10	230 kV Switchyard	230 kV Switchyard & Control Building	, 06-3, 06-8, 13-2, 13-6, 13-8, 14-3
O-11	Discharge Structure	Discharge Structure	, 06-3, 08-2, 08-6, 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
OS-1	Offsite	Emergency Operations Facility	07-4, 10-3, 11-1, 11-3, 12-6, 13-3
		Joint Information Center	07-4, 08-3, 10-3, 11-1, 11-3, 12-6, 13-3, 14-7
Other		Other Specific Areas:	
	AB	Asset Team Work Area	
	AB	Elect. Asset Team Work Area	
	AB	Fire Pumps, Piping & Equipment	09-6
	AB	Security System Components & SAS	
		Seismic Gap Modifications	
		Expansion Joint Failures	
		Temporary Jumpers	08-4, 09-5
		Human Performance	09-1
		Simulation Lab	
		Radiation Monitoring System	06-10
		Outside Control Area, Firing Range, Protected Control Area (including selected alarm stations, delay barriers, check points, vehicle barriers, gun ports, watch stations, and overall visible security features)	06-3, 06-10, 07-4, 07-6, 08-2, 08-6, 08-9
		ISFSI Site	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
		Admin Bldg Tall Bookcase	12-7, 15-3, 15-7
		Seismic Bracing	10-8, 12-7
		Control Room Ready Room	12-7
		Tall Bookcase Seismic	10-8, 12-7

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 DCPD Tours (through June 2015)

Tour No.	Date(s)	Participants	Locations-Components Observed
05-4	1/14/05	ADR, JEB	Control Room, Emergency Diesel Generators, Main Yard
05-5	2/16/05	Public Tour	Plant Overlook, 230 kV & 500 kV Switchyards, Control Room Simulator, Intake Overlook
05-6	4/7/05	PFP, RFW	Outside Control Area, Firing Range, Protected Control Area (including selected alarm stations, delay barriers, check points, vehicle barriers, gun ports, watch stations, and overall visible security features).
05-7	5/3/05	WFC, RFW	Turbine Building (operating deck and lower levels), Control Room, Emergency Diesel Generator (EDG) Room, Cable Spreading Room
05-8	6/2/05	Public Tour	Plant Overlook, 230 kV & 500 kV Switchyards, Control Room Simulator, Intake Overlook
06-1	9/8/05	PFP, JEB	Spent Fuel Building
06-2	9/21/05	WFC, RFW	Auxiliary Salt Water System in Intake Structure
06-3	10/13/05	Public Tour	Plant Overlook, 230 kV & 500 kV Switchyards, ISFI Site, Control Room Simulator, Intake, Outfall
06-4	11/10/05	PFP, RFW	Containment, Unit 2 Turbine Deck & RCA
06-5	12/20/05	PFP, JEB	EDG

06-6	1/19/06	ADR, SS, RFW	Compressed Air System
06-7	2/16/06	Public Tour	Control Room Simulator, Security Building, Intake
06-8	3/22/06	PFP, JEB	230 & 500 kV Switchyards
06-9	5/4/06	ADR, JEB	Turbine Deck, Spent Fuel Pool, RCA, Auxiliary Building, Outside Yard
06-10	6/1/06	PFP, RFW	ISFSI Construction, Security Force-on-Force Drill
07-1	8/3/06	ADR, JEB	Intake Structure
07-2	9/6/07	WFC, SS, RFW	12 kV System
07-3	10/18/06	Public Tour	Control Room Simulator, Security Building, Intake
07-4	10/25/06	PFP, RFW	Simulator, Technical Support Center, Emergency Operations Center (EOC), Media Center, ISFSI Site
07-5	11/28/06	WFC, JEB	Make-up Water System
07-6	12/14/06	PFP, RFW	Auxiliary Feedwater System, Pumps, Piping, Valves and Condensate Storage Tank
07-7	1/17/07	ADR, JEB	Control Room, Turbine Deck and Emergency Diesel Generator Rooms and ISFSI
07-8	1/31/07	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
07-9	3/21/07	WFC, RFW	Component Cooling Water System Components
07-10	4/18/07	ADR, WFC	Spent Fuel Pool
07-11	5/30/07	PFP, RFW	Main Feedwater System Control System
07-12	6/13/07	Public Tour	Control Room Simulator, Security Bldg, Intake, Overlook, ISFSI
08-1	8/21/07	WFC, RFW	I&C Components in Various Locations in AB, CR & TB
08-2	10/24/07	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
08-3	9/18/07	ADR	Joint Media Center
08-4	11/13/07	WFC, VSB, RFW	Human Performance & Safety Simulation Lab
08-5	12/19/07	ADR, JEB	New Steam Generator Storage Area
08-6	1/23/08	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
08-7	2/27/08	RJB, JEB	Control Room, Turbine Floor & SG Work in Yard
08-8	3/10/08	ADR, JEB	SG Work in Yard, Fuel Handling Bldg., Control Room, Outage Meeting
08-9	6/25/08	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
09-1	7/16/08	WFC, RFW	Radwaste Processing & Storage, CVCS Filter Gallery, LRWS Ion Exchange Cubicles, Unit 2 Equipment Drains & Tank, LRWS & GRWS Discharge

			Radiation Monitors, Unit 2 Waste Gas Compressor and Decay Tank, Chemical Drain Tank, L&HS Tank, B.5.b Equipment Storage
09-2	8/27/08	RJB, JEB	Intake Structure, ASW Pump, Main Bank Transformer
09-3	9/16/08	PFP, RFW	New Unit 1 SG Storage, Warehouse
09-4	10/7/08	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
09-5	11/5/08	RJB, RFW	Human Performance & Safety Simulators, Unit 2 Turbine Building, EDGs 2-1 & 2-3
09-6	12/17/08	PFP, JEB	Fire Protection Equipment
09-7	2/11/09	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
09-8	3/3/09	RJB, JEB	SG Replacement, Turbine Building, EDG 1-2, MFW Pumps, CDN Pumps, Condensate Storage Tank, Outage Control Center
09-9	5/19/09	PFP, DCL, RFW	Turbine Building, EDG 1-3, Control Room, Intake Area, Discharge Cove, RCA Portal, SFPs 1 & 2, Hot-Cold Machine Shops, Yard Area, Transformers
10-1	7/22/09	PFP, DCL, JEB	ISFSI, Admin. Building Protective Window Film
10-2	8/10/09	PL, WFC, RFW	Turbine Building (all levels), Emergency Diesel Generator Room, Control Room, Alternate Shutdown Panel, Plant Yard, Main Transformers, Ocean Intake & Discharge
10-3	9/2/09	RJB, JEB	Control Room Simulator, Technical Support Ctr, Emergency Operations Ctr, Joint Information Ctr
10-4	12/9/09	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
10-5	12/16/09	PFP, RFW	Turbine Deck Units 1 & 2, Control Room
10-6	2/10/10	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
10-7	3/16/10	RJB, RFW	Control Room Simulator, Turbine Building, Alternate Shutdown Control Panel, Emergency Diesel Generator Room, Plant Yard, Main Transformers, Main Steam Safety Valves
10-8	5/12/10	PFP, RFW	Units 1 & 2 Spent Fuel Pools, SFP Pump, SFP Cleanup System, SFP Heat Exchanger, Training Building Tall Bookcase Seismic Bracing, Operations Ready Room Tall Bookcase Seismic Bracing
10-9	6/2/10	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI

11-1	7/6/10	PFP, DCL	Simulator, EOF, JIC
11-2	8/4/10	RJB, JEB	Main Lube Oil Room, CARDOX System
11-3	8/11/10	PFP, RFW	Simulator, EOF, JIC
11-4	11/17/10	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
11-5	2/15/11	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
11-6	4/19/11	PL, RFW	Unit 1 Vital Batteries and Racks, Battery Chargers, Switchgear, Vital Inverters and one train of Non-Vital Batteries and Chargers.
11-7	5/25/11	PFP, DCL	Auxiliary Building Control Panel, Control Room, Unit 2 Spent Fuel Pool, Containment, AB, TB
11-8	6/22/11	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
12-1	8/10/11	RJB, RFW	Observe Licensed Operator Training in Training Bldg.
12-2	11/16/11	PL, RFW	Turbine-Driven Auxiliary Feedwater Pumps
12-3	11/4/11	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
12-4	12/13/11	PRF, RFW	Compressed Air System Components
12-5	2/9/12	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
12-6	3/14/12	PL, RFW	Control Room Simulator, Emergency Operations Center, Joint Information Center
12-7	5/22/12	PFP, RFW	Control Room, Turbine Building All Levels, Yard, Cold Machine Shop, I&C Shop. Outage Coordination Center
12-8	6/20/12	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
13-1	8/17/12	PFP, RFW	Emergency Auxiliary Saltwater Pump
13-2	10/10/12	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
13-3	11/7/12	RJB,DCL	Control Room Simulator, Emergency Operations Center, Joint Information Center
13-4	12/5/12	PRC, RFW	Control Room Area, I&C Lab, Admin. Bldg.
13-5	1/16/13	PL, DCL	Control Room Simulator
13-6	2/6/13	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
13-7	4/9/13	PFP, RFW	Mechanical Maintenance Shop
13-8	6/5/13	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI

14-1	9/10/13	PFP, RFW	Mechanical Maintenance Training Facility
14-2	9/12/13	PFP, RFW	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
14-3	10/9/13	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
14-4	11/20/13	RJB, DCL	Control Room, Turbine Building
14-5	12/11/13	PFP, RFW	Main Administration Building, Engineering Offices
14-6	10/12/13	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
14-7	5/21/14	PFP, RFW	Simulator, Alternate Operations Support Center, Emergency Operations Center, Joint Media Center
14-8	6/11/14	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
15-1	10/15/14	Public Tour	Control Room Simulator, Security Building, Intake, Overlook, ISFSI
15-2	11/19/14	RJB, RFW	Liquid & Gaseous Radioactive Waste Systems
15-3	12/2/14	PFP, DCL	Training Building 2 nd Floor
15-3	12/3/14	PFP, DCL	Independent Spent Fuel Storage Facility (ISFSI)
15-4	2/4/15	Public Tour	Control Room Simulator, Main Turbine Deck, Control Room View, ISFSI
15-5	3/30/15	RJB, DCL	Unit 2 Spent Fuel Area
15-6	3/30/15	RJB, DCL	Outdoor Air Compressor Pads
15-7	5/29/15	PFP, DCL	Administrative Building 5 th Floor
15-8	6/17/15	Public Tour	Control Room Simulator, Main Turbine Deck, Control Room View, ISFSI

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

Legend:

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

25th Annual Report, Volume 2, Exhibit F, Open Items List

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

Item No.	Type	Open Item Category/Description	Last Actions	Next Action
CO		Conduct of Operations (CO)		
CO-5	M	Clearance Process Performance & Improvements. [Reviewed Outage 1R18 results at May 2014 FF and 2R18 at 1/22/15 FF: no clearance problems.]	5/14FF 1/15FF	1R19
CO-7	M	Review DCCP storm response experience and strategy every two years [or as necessary] during or after annual winter storm season. [Reviewed at 4/15 FF—no significant storms]	4/14FF 4/15FF	2Q16FF <i>if any</i>
CO-8	M	Monitor all reactor trips—automatic and manual (review trip LERs at public meetings). [Reviewed two reactor trips at 1/14 FF: satisfactory.] [Reviewed the commonality of three 2013–2014 trips caused by flashovers at 8/14FF—satisfactory.]	7/11FF 1/14/FF 8/14FF	Post-trip FFs & PMs
CO-9	F	Reactivity Management—review every 18 months. [Found satisfactory 5/10 & 8/11 FFs]. [Reviewed Reactivity Management 8/14FF—satisfactory.]	1/13FF 8/14FF	1Q16FF
CO-10	M	Mispositioning Errors (Equipment Status)—monitor the status of mispositioning errors and actions to resolve. [Reviewed 1R17 performance at 8/12FF—satisfactory.] [Reviewed 2R17 performance at 6/13 PM—satisfactory.] [Reviewed Jan 2014FF:	6/13PM 1/14FF 6/14FF	4Q15FF 1R19

		Reviewed 6/14FF—satisfactory]		
CO-11	M	Operator concerns and issues—review periodically the status of operator concerns and issues. The fact-finding team suggested that future review by the Committee focus on selected aspects of Operation’s Block and Tackle Action Plan rather than the entire plan [6/12 PM]. [Reviewed 11/12FF—satisfactory. Reviewed time critical operator actions 12/12FF—satisfactory.] [Reviewed 3/14FF: satisfactory]	3/10 FF 11/12FF 12/12FF 3/14FF	4Q15FF
CO-12	M	Assessment of Flexible Power Operation. Dr. Peterson observed that the anticipation of DCPD having to reduce generation output periodically in response to market demands is a matter the DCISC should review. Dr. Peterson stated there will be studies on this issue [flexible operations] performed at DCPD and the DCISC should follow this issue closely. {Reviewed at 12/13FF and 12/14FF—continue to monitor.]	10/13PM 12/13FF 12/14FF	Pending new actions
CM		Conduct of Maintenance (CM)		
CM-7	I	Review PG&E’s progress in complying with the amendment to 10CFR50.55a, which provides the requirements for ISI of containment structures (degradation). [Reviewed Unit 2 inspection at 7/12FF—satisfactory]	2/12 PM 7/12FF	Next inspection
CM-10	M	On-line Maintenance: review the implementation of on-line maintenance bi-annually, including the 12-week Rolling Maintenance Schedule about how well it is working & impacting risk. Review trend of amount of on-line maintenance. DCPD Assessment of Maintenance Risk and On-Line Maintenance Risk Procedures have been substantially upgraded with the addition of an Integrated Risk Review Team [Reviewed On-Line Mnt 6/14FF—satisfactory]	1/12FF 9/13FF 6/14FF	2Q16FF
CM-13	M	Review Maintenance Department performance measures, staffing, etc. approximately annually. [Reviewed	10/13PM 3/14FF 6/14FF	1Q16FF Trouble-shooting

		Troubleshooting 3/14FF—satisfactory.]		
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: Next Action changed to “Regularly.” and systems reviewed are listed with dates at the end of the Open Items List.]	12/14FF 1/15FF 3/15FF	Regularly
EN-19	F	Review every 12–18 months major Engineering Programs, including Configuration Management, Aging Management, System Engineering (system health & long-term plans), Valve Testing, Margin Management, Staffing, etc. [Note: Next Action changed to “Regularly,” and programs reviewed are listed with dates at the end of the Open Items List.]	11/13FF 8/14FF 11/14FF 1/15FF	Regularly
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.]	9/13 FF 12/13FF	Regularly
EN-29	F	ACE 600117543, “Adverse Trend in Licensing Basis Issues”. The DCISC should monitor DCP’s Licensing Basis Verification Project. [Reviewed at the 11/12 FF—found satisfactory, continue to monitor.] Review seismic—RJB.	6/14PM 5/15FF	1Q16FF
EN-30	F	Design Quality issues [Reviewed at 12/12FF. Several 1R17 major mods with quality issues. Review semi-annually until resolved.] A [Process Control System Design Quality] root cause evaluation was performed and the corrective actions identified will be reviewed for effectiveness following 1R18. [Reviewed Design Quality Effectiveness Review at 8/14FF—effective but still some problems.] [Reviewed effectiveness eval. at 4/15FF—better but not satisfactory. Next eval. after 1R19.]	12/12FF 5/14FF 8/14FF 4/15FF	4Q15FF after 1R19
HP		Human Performance: Human Errors and Improving Safety & Efficiency of Plant Performance		

HP-1	M	Review human performance & human behavior items (including error reduction programs, HP PIs, aberrant behavior statistics, FFD, stress reduction programs, Personnel Accountability Policy, Human Performance Steering Committee & Subcomm, Centers of Excellence, Org. Development).	1/14FF 6/14PM 3/15FF	2Q16FF
HP-18	M	Review biennially operator aging, physical fitness, “No solo” issues, attention enhancement, stress management, & incentives for operator focus. [Reviewed “No solo” at 3/14FF: good trend.]	8/11FF 3/14FF	1Q16FF
HP-25	M	Further observations and improvements in the Management Observation Program should be reviewed by DCISC. [Reviewed as part of INPO AFI actions with Station Director at 12/13FF. Significant increase in frequency & intensity.] Reviewed 12/14FF—satisfactory.]	12/11FF 12/13FF 12/14FF	1Q16FF
HS		Health, Nuclear Safety Culture and Safety Conscious Work Environment		
HS-6	F	Follow DCPD progress in establishing/improving its safety culture (and its subset Safety Conscious Work Environment, including Safety Culture Monitoring Panel, and including Employee Concerns & Differing Opinion Programs). [Reviewed Passport to Knowledge Program 5/14FF—pgm. sat. but not implemented well.] [See Item 15 in 2/15PM section below.]	8/12FF 5/14FF 3/15FF	3/16FF
PI		Performance Improvement Programs		
PI-1		DCPD Performance Improvement Programs: Corrective Action, Self-Assessment, Operating Experience [and line use of OE], Benchmarking, etc. Review DCPD’s improving the Corrective Action Program to make it very easy for any employee to enter an issue into the Corrective Action Program and issues may now be entered on an anonymous basis [2/14PM]. [Note: Next Action changed to “Regularly,” and programs reviewed are listed with dates at the end of the Open Items List.] Reviewed PI	1/14FF 9/14FF 1/15FF	Regularly

		overall 1/15FF—satisfactory.		
EP		Emergency Preparedness (EP)		
EP-2	M	Attend and observe DCPD emergency drills and exercises annually [including Hostile Action Based Exercises], paying special attention to JMC communications to the media and public, including radiation release communications to the public, coordination of information release with SLO County, and extension of drills to better exercise FMTs & JMC. Consider public participation in drills. [Observed the May 21, 2014 Hostile Action Based Exercise. Good DCPD performance.] [EP drill schedule shown in FFPM.]	11/12FF 12/12FF 2/13PM 5/14FF	Next Exercise
EP-4	F	Emergency Preparedness: coordinate with Fukushima review item BDB-6.	10/12PM	Ditto
EP-5	F	DCPD use of social media for emergency response. [Reviewed SLO social media and precautionary actions at 9/13FF and 12/13FF—satisfactory.] [No observed use of social media at 5/21/14 exercise.] Look at NEI & National Academy before next drill observation.	12/13FF 5/14FF	9/15 ERO Exercise
RA		Risk Assessment and Management (RA)		
RA-5	M	Review overall PRA program annually. Include Fire PRA Upgrade & Shutdown Analysis in next review. Much work underway (including plant specific shutdown risk analysis). Review PRA Group resources/capabilities. Turbine Bldg. (CCW & Condenser) internal flooding. PRA status reviewed 3/15FF.	6/13FF 8/14FF 3/15FF	1Q16FF
RA-6	F	Monitor Seismic Fragility Analysis progress. [Reviewed at 8/14FF—satisfactory.]	8/14FF	3Q15FF RJB
NS		Nuclear Safety Oversight and Review (NS)		
NS-5	M	Monitor NSOC meetings periodically to observe their processes and their review of nuclear safety issues. [Reviewed at 1/19/11 FF - satisfactory] [Note: Beginning 1/13 NSOC meetings will consist of two-hour exits following four-day member investigations. Members should each attend one per year. [RJB & RFW observed 11/14FF—satisfactory.]	1/09FF 1/11FF 4/13FF 11/14FF	See FFPM for dates

		See FFPM for 2015 dates.		
NS-9	M	Monitor DCCP's program to track INPO Areas for Improvement. Review with DCCP INPO Coordinator. Review after mid-cycle review. [Reviewed DCCP Strategic Performance Improvement Plan at 5/14FF: sat.] Biannual INPO Evaluation August 2015.	12/13FF 5/14FF	4Q15FF
RP		Radiation Protection (RP)		
RP-3	M	Regularly review outage RP performance. [Reviewed Annual Rad. Release Report 6/14FF—satisfactory.] Radiation goals met in Outages 1R18 and 2R18.	4/13FF 6/13PM	4Q15FF (1R19)
RP-12	M	Review annual DCCP radiological release report each year. Review at Summer or Fall FFs. [Reviewed at 7/12 FF: acceptable.] [Reviewed public release of rad info. 3/13FF.] [Reviewed Tritium monitoring 4/13FF—OK.]	4/13FF 6/14FF	8/15FF
RP-13	F	The PHC also reviewed the Radiation Monitoring System, which is white status for Unit-1 (U-1) and in yellow status for Unit-2 (U-2) because of equipment reliability problems due to aging. The PHC expects to review a long-term strategy to address these issued by mid-2014. Reviewed 11/14F—little progress.	2/14PM 11/14FF	3Q15FF
QP		Quality Programs (QP)		
QP-3	M	Review the activities and results of QV audits as well as PG&E's outside biennial audits, including timeliness of corrective actions. Review annually—include 4th quarter QPAR with yearly results. [QV & QPAR presented at 10/13PM.] [Reviewed recent QV Audits at 9/14FF—sat.]	5/13FF 10/13PM 9/14FF	3Q15FF
QP-9	F	Software QA Program: SQA Program determined satisfactory in Sept. 2006 FF meeting. [Reviewed at December 2010 FF—satisfactory.] [Reviewed SQA and Cyber Security 12/13FF—satisfactory.]	12/10FF 12/13FF	4Q15 FF
QP-10	F	Dr. Budnitz observed that the DCISC should review the reorganization of the QV department in the next one or two years.	10/13PM	4Q15FF or earlier
NF		Nuclear Fuel Performance (NF)		

NF-9	M	Nuclear Fuel Performance & Issues (review annually). [Reviewed fuel performance 6/14FF: satisfactory.]	6/14FF	4Q15FF 1R19
ER		Equipment Reliability and Life Cycle Management (ER)		
ER-5	M	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 Equipment Clock Resets & SPV 6/14FF—satisfactory.]	1/14FF 6/14FF	4Q16FF
OE		Organizational Effectiveness & Development (OE)		
OE-1	F	Review DCPD Operating Plan each year after development.	4/14FF	2/16PM
SE		System and Equipment Performance/Problems (SE)		
SE-26	M	Review reactor pressure vessel compliance status after next set of surveillance samples is analyzed and effective vessel lifetime projections are updated. [Reviewed specimen status at 10/10 FF: satisfactory.] [RV Coupon status 5/13FF.] [Reviewed Pressurized Thermal Shock Rule 8/13FF—satisfactory.] [Reviewed 1/15FF—satisfactory.]	8/13FF 1/15FF	F1Q16FF
SE-38	F	Add Containment Fan Cooler Unit (CFCU) modifications to enable reduced maintenance for future FF review. Coordinate with BDB-1 (Fukushima) review. [Reviewed 3/12 FF—needs follow-up following 1R17.] [Reviewed at 8/12FF—satisfactory but needs follow-up.] [Reviewed 4/13FF—coupling damage—follow up.] [A root cause evaluation [of CFCU motor shaft couplings is being conducted. Review the results when it is concluded.] [6/14PM: There is more work to be done on the CFCUs including adjusting the timing sequence to address the anti-rotation device problem and in the meantime the CFCUs are run only in low speed. Design changes are also required to the CFCU cooling coils to upgrade and	3/12FF 8/12FF 4/13FF 11/14FF	12/15FF Review Vibration Monitoring Program too

		replace the current coils. Mr. Welsch stated that along with replacing the cooling coils, the plant will implement design changes to the inlet dampers to the CFCUs to meet the requirements of the cooling coils.		
SE-39	F	Review and tour the inspections and repairs of concrete Intake Structures following selected refueling outages. [Reviewed at 7/09 FF—satisfactory.] [Reviewed at 6/26/13 FF—satisfactory.]	7/09FF 6/13FF 11/14FF	Following 2R19
SE-40	F	Monitor the status of transformers & leakage, failures, corrective actions. Follow status of transformer protection barrier. [Reviewed at November 2010 PM—satisfactory & follow after 1R16.] [Large transformers 9/11FF] [Reviewed large transformers 4/13FF—satisfactory, but wall schedule delayed until R21 outages. DCISC follow-up needed.] [Reviewed 12/14FF—satisfactory.]	9/11FF 4/13FF 12/14FF 12/15PM	4Q16FF
SE-42	F	Safety System Functional Failures—review annually. [Reviewed at 7/12FF—satisfactory.] [Reviewed 9/13FF—not satisfactory—follow up needed.] DCPD continues to have safety system functional failures and that, while redundant systems and components remain available, progress in addressing this issue has been less than desired. DCPD has now commenced an augmented program and Mr. Wardell stated the DCISC should review the results of these efforts during the third or fourth quarter of 2014 [Reviewed 3/14FF: no improvement. Review again 3Q14FF.] [Reviewed 11/14FF—no improvement—initiate DCISC recommendation.]	7/12FF 9/13FF 10/13PM 3/14FF 11/14FF	3Q15FF
SE-45	F	Control Room Ventilation System Issues. This (Control Room Ventilation System licensing basis change) is expected to be completed by the end of 2015. Mr. Wardell suggested the DCISC review this issue when DCPD submits its license amendment (LAR) to the NRC and following NRC approval of the LAR. [Mar 2014 FF Report: new licensing	6/13PM 3/14FF	1Q16FF

		basis for CRVS expected by EOY 2015.]		
SE-47	F	The DCISC concluded the station continues to set high performance goals and is maintaining effective control of secondary water chemistry and is responding proactively to identify issues. Accordingly, unless problems emerge the DCISC should conduct its next review of this topic [Feedwater and Steam Generator chemistry] no earlier than mid-2015.	10/13PM	3Q15FF
SE-48	F	Voltage stability issues with the 230 kV System should be pursued at least annually not only with the plant but also with the appropriate group in the PG&E corporate organization. [Reviewed 6/14FF—satisfactory.]	6/14FF	3Q15FF
SE-49	F	Emergency Diesel Generators (EDGs)—3/14 FF Report: DCPD expects to return the EDGs to White (healthy) status in mid-2015. The DCISC should review the EDGs at that time.	3/14FF 4/15FF	7/15FF (6/10/15)
SG		Steam Generator Performance (SG)		
SG-6	M	Review Steam Generator performance metrics & inspection results after refueling outages and the 5-year tube inspections. [Tube inspections 11/10PM, SG performance 6/11PM] [Reviewed 5/12 FF & 6/12PM—satisfactory—continue to monitor.] [Reviewed at 8/13FF—satisfactory.] [Reviewed 11/14FF—SG tubes in good shape.]	6/12PM 8/13FF 11/14FF	Following 2R19
OM		Outage Management (OM)		
OM-3	M	During outages, monitor Outage Coordination Center, Control Room, and containment walkdown/inspection (end of outage). Review outage turbine work. Dr. Peterson would welcome an opportunity to observe a containment closure drill during a future outage. [Per & Maureen should schedule this.]	5/11FF 5/12FF	4Q15FF (1R19)
OM-4	M	Review Outage Safety Plan, safety margin trends, and plans for mid-loop operation for each outage. Review outage results following each outage at FFs and PMs.	12/13FF 6/14FF 8/14FF	3Q15FF 1R19

		[Reviewed Outage Planning and Execution Action Plan at 6/14FF—sat.][Reviewed 2R18 outage safety plan at 8/14FF—satisfactory.]		
OM-5	F	DCPP has determined that it needs to do a better job of foreign material exclusion (FME) and this resolution appeared satisfactory to the DCISC team but Mr. Wardell recommended the DCISC follow up on this issue following 2R18. [Reviewed 12/14FF—satisfactory.]	1/12FF 12/14FF	Following 2R19
SEC		Security (SEC)		
SEC-3	M	Monitor interaction of Security and Operations, Engineering, Maintenance, and Emergency Preparedness for effects on nuclear safety. [Reviewed Cyber-Security April 2011 FF: satisfactory. Review specific mods to see how handled with new NRC regs. [Reviewed Safety-Security Interface 8/14 FF—satisfactory.]	12/11FF 12/12FF 8/14FF	4Q15FF
SF		Independent Spent Fuel Storage Installation–ISFSI (SF)		
SF-1		Monitor ISFSI operations, including cask transfer. [Reviewed ISFSI video March 2010 FF—satisfactory. Video was shown at June 2010 PM: well done.] [Reviewed at December 2010 FF—satisfactory.] [Reviewed loose ISFSI hold-down bolts at 4/12 FF—satisfactory.] [Reviewed at 8/13FF, 10/13PM, 2/14PM, and 12/14FF—satisfactory.]	2/14PM 12/14FF	Next campaign
SF-2	F	Follow technical advances of relative risks of cask and pool storage. NRC Staff study and Commissioners’ vote. Monitor needs for opening casks to inspect fuel. Monitor SONGS spent fuel transfer plans. Include corrosion of metals [reviewed 5/15FF].	6/14PM 5/15FF	As things progress
SC		Seismic & Tsunami (SC)		
SC-3	M	Long-Term Seismic Program: review periodically. Review significant seismic events as they occur. Reviewed at 6/09 PM. [Reviewed 3/10 FF—progress satisfactory. Continue to monitor.] DCPP Seismic study reviewed 3/15 FF & to be presented by DCPP at 6/15PM. Shoreline Fault—follow activities and events with the Shoreline Fault. Review	3/10FF 11/10PM 3/15FF	6/15PM RJB

		NRC's Review Report within several months.		
SC-4	M	Monitor new DCPD risk-based Probabilistic Tsunami Hazard Analysis. [PG&E has completed. [Coordinate with BDB-1, Fukushima review.] Review DCPD tsunami design and licensing bases. Reviewed at 3/15 FF—satisfactory. DCPD presentation at 6/15 PM. Dr. Sewell presentation at 10/15PM?	8/11FF 11/13FF 3/15	6/15PM RJB
SC-5	F	Review DCPD seismic safety program for workspace personnel safety and bracing of furniture, and tour the plant to inspect for potential seismic hazards associated with tall furniture. Review at a minimum of 3 FFs and each PM until resolved. [Coordinate with BDB-1 (Fukushima) reviews.] [	2/14PM 12/14FF 5/15FF	12/15FF & 2/16PM
SC-9	F	Review Robert Sewell Tsunami Report (Budnitz). Sewell presentation at October 2015 PM?	10/14FF	10/15PM
SC-10	F	Review the probability of tornadoes and potential for “firenadoes”. (Budnitz).	10/14PM	11/15FF (RJB)
FP		Fire Protection (FP)		
FP-5	M	Review Fire Protection Program and Systems every two–three years, including QV audits and NRC triennial inspections. Review the health and correction of degraded systems every six months. [3/15FF: review pipe & pump replacement & tank refurbishment by mid-2016.]	11/12FF 6/14PM 3/15FF	2Q16FF
FP-6	M	Monitor DCPD's process of converting to the National Fire Protection Association's Regulation 805 (NFPA 805) standard. NRC Triennial NFPA 805 Transition Audit in October 2012—review at 1Q13 FF. Fire protection issues reviewed 11/12FF—satisfactory. [Reviewed at 8/14FF—satisfactory.]	4/12FF 3/13FF 8/14FF	4Q15FF
FP-7	F	Mar 2014 FF Report: Ten remaining fire doors have been included as highest priority in the Plant Door Life Cycle Management Plan. This plan was presented in April 2014 to the Plant Review Committee & received 2015 funding.	3/14FF 11/14FF 3/15FF	1Q16FF
LD		Learning & Development Programs (LD)		

LD-3	M	Review non-license technical, operations & accredited training programs at least annually. [Reviewed Maintenance Training Programs 12/14FF—satisfactory.]	6/14FF 12/14FF	4Q15FF
LD-6	F	Observe operator license, re-qualification, classes periodically in FF meetings. Include Enhanced Simulator Training.] [Reviewed licensed operator training program status at 11/12FF—satisfactory. Reviewed simulator training 1/13FF—satisfactory. [Reviewed NRC license requal. exam 5/13FF.] [Reviewed ATWS simulator trng. 8/13FF—satisfactory.	5/13FF 8/13FF	3Q15FF
OT		Overtime Control (OT)		
NR		Nuclear Regulatory Commission Items (NR)		
NR-3	M	Monitor the Non-Cited Violation Tracking & Trending Program annually at the Jan/Feb Public Meetings. [Reviewed NRC NCV & allegation trends at 3/12 FF—improvement noted.] [Reviewed 230 kV & CR Habitability issues at 8/12FF—satisfactory but continue to follow.] [Reviewed NRC 3-Month Inspection Report at 9/12FF—sat.] [Trend in Crosscutting Aspect H.4(a), “Work Practices —Human Error Prevention” on 6/14FF agenda.]	1/07PM 8/12FF 9/12FF 6/14PM	Public Meetings
NR-4	F	Meet with NRC Resident Inspectors regularly. [Note: Next Action changed to “Regularly.”]	12/14FF 1/15FF	Regularly
NR-6	F	The [11/13] DCISC fact-finding team concluded that future reviews [of NRC cross-cutting issues] by our Committee should be dictated by station performance rather than being conducted on a routine, periodic basis. [Reviewed at 6/14FF—satisfactory.]	10/13PM 6/14FF	Future FFs as needed
LR		License Renewal (LR)		
LR-1	F	CEC: The Committee should conduct an evaluation of issues and make recommendations for any mitigation plans related to reactor pressure vessel integrity... in connection with PG&E’s application for a 20-year license renewal (LR) and should consider reactor vessel	11/10PM 2/11FF 8/13FF	On hold for DCPD LR re-start

		surveillance reports in context of changes predicted to the predicted seismic hazard in the vicinity of the plant site. [Reviewed at 2/11FF: satisfactory. Continue to review.]		
CL		Closed Loop Cooling (CL)		
CL-1	M	Monitor DCP's responses and actions to the EPA proposed regulations on closed loop cooling (best technology available) for thermal power plants. [Reviewed at December 2010 FF—DCPP feasibility study satisfactory.] [Reviewed at 12/11 FF—satisfactory.] [Reviewed at 9/12FF—satisfactory.] Dr. Peterson commented the DCISC needs to monitor issues with respect to safety evaluation of any such possible modifications and the transition that might occur from the elimination of the once-through cooling system now used by DCP [6/12PM]. [Reviewed at 5/14FF, continue to follow.] [Reviewed 12/14FF—nothing new.]	12/11FF 9/12FF 9/13FF 10/13PM 5/14FF 12/14FF	When new action known
CL-2	F	Monitor response to DCISC input sent to SWRCB and its Nuclear Review Committee. Bechtel is performing the safety review.) [RJB attended SWRCB meeting on July 17, 2013 in Sacramento.] (DCISC 9/5/13 Bechtel evaluation report to SWRCB.)	6/11PM	Monitor
CL-4	M	Monitor salt deposition on external equipment, systems, EDG, ventilation systems, transformers, etc. [Check with DCP on data availability beforehand.]	6/14PM 4/15FF	2Q16FF?
BDB		Beyond Design Basis Events (e.g, Fukushima Event)		
BDB-6	F	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 seismic FLEX submittal to NRC]. [See Item 16 in 2/15PM section below regarding portable generators.]	8/14FF 1/15FF 4/15FF	4Q15FF
O		Other Items (O)		
O-1	F	Perform observations of evolutions (work processes) within the plant periodically.	11/13PM	3Q15FF

		[Performed observation of Turbine Building rounds 11/13FF—satisfactory. Continue with these about annually.]		
Public Meeting Items (PM) (Reference: Public Meeting Minutes Pages)				
10/14 PM 2	F	Dr. Peterson commented that the environmental permitting requirements which pose an impediment to actually testing the system in the ocean seem unnecessarily burdensome in context of nuclear safety, particularly as DCPD pumps millions of gallons of ocean water through its cooling systems on a daily basis. He stated the DCISC should follow up on the Emergency ASW permitting issue. [EASW permit application submitted.]	10/14PM	3Q15FF
3	F	Mr. Wardell observed when the Emergency ASW was tested in May 2014 two pumps experienced problems and he recommended the DCISC follow up on future tests of the Emergency ASW pumps and State water permits. [A DCISC Fact-finding Team learned at its 1/15FF visit that all new pumps were purchased. Review testing of new pumps.] [Reviewed at 4/15FF. DCPD has four new pumps, which will be tested individually, not connected with piping system.]	10/14PM	Next EASW Pump Test
7	F	Dr. Peterson stated the Committee would review the ERRA [Energy Resource Recovery Account] Proceeding briefs cited by Ms. Becker.	10/14PM	3Q15FF
9	F	Linnen: Nevertheless, considering the significance of this safety system (Auxiliary Feedwater), it was felt that DCISC should conduct its next review of the AFW system prior to the end of 2015.	10/14PM	4Q15FF
10	F	The DCISC team [Linnen] suggests that the Committee follow up on an audit finding that the station's performance with respect to entries into Limiting Conditions of Operation had been "Red," or unsatisfactory for most months since June 2013.	10/14PM	3Q15FF
2/15 PM	F	Drs. Peterson and Lam's comment that the Committee will continue to monitor PG&E's	2/15PM	3Q15FF

1		actions in response to R14-1: DCPD 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.		
8	F	There have been reliability and availability problems with the Radiation Monitoring System and corrective actions have been taken and a long term strategy is now being developed and is due for completion in April 2015. The system is currently in White health status and Mr. Wardell recommended the DCISC follow up on the long term strategy for this system in the third quarter of 2015.	2/15PM	3Q15FF
9	F	Mr. Wardell suggested the DCISC again review FLEX in November 2015 regarding its implementation for U-1.	2/15PM	11/15FF
10	F	The DCISC team reviewed the new [Performance Improvement] procedures which appear to be sound but the team recommends a future fact-finding be held to review implementation of the program and its results in order to determine its effectiveness.	2/15PM	4Q15FF
11	F	Mr. Wardell recommended that the DCISC monitor the installation of the new RCP seals at a future fact-finding.	2/15PM	4Q15FF
15	F	In response to a question from Consultant Wardell, Mr. Harbor and Mr. Overland agreed to provide data on the current activity levels for both the ECP and the DPO programs during a future fact finding.	2/15PM	3Q15FF
16	F	In response to Dr. Peterson's inquiry concerning plans to tie-in portable generators in the event of severe damage to the electrical switchgear areas, Mr. Summy stated that this was a complex subject which should be discussed in context of a presentation on DCPD's post Fukushima emergency planning efforts and Dr. Peterson requested that this topic identified for future follow up during review of FLEX. [Now included in Open Item BDB-6]	2/15PM	4Q15FF

DCPP Systems Reviewed (EN-16)

4 kV—Aug 2013
230 kV—Dec 2014
500 kV—Dec 2014
Aux Feedwater—Jun 2014
Aux Feedwater Pumps—Nov 2011
Aux Saltwater—Mar 2014
Aux Bldg Ventilation—May 2014
Component Cooling Water—Apr 2014
Compressed Air—Mar 2015)review prior to 3Q16)
Condensate—Mar 2013
Containment—Sep 2010
Containment Spray—Jun 2013
Control Room Ventilation—Mar 2014
Digital Systems—Dec 2013 & Oct 2014 PM
DC Power—Sep 2014
EDG—Mar 2014 & Apr 2015
High Pressure Injection—May 2012
Low Pressure Injection
Plant Protection—Dec 2013
Radiation Monitoring—Nov 2014
Radwaste Processing—Nov 2014
Reactor Coolant—Sep 2014 (review again 4Q15FF)
Reactor Coolant Pumps—Jan 2015
Refueling Equipment—Jun 2013
RCS Process Control—Jun 2013
RHR—Dec 2014
Safety Injection Pumps—Mar 2015
Spent Fuel Pool—Mar 2015 & Apr 2015
Steam Generators—Nov 2014

DCPP Programs Reviewed (EN-19 & PI-1)

AOV—Jun 2013

Benchmarking—May 2015 (review biennially)

Boric Acid Corrosion Control—Apr 2014 (review biennially)

Buried Piping & Tanks—Jan 2014 & Jun 2014 PM

Chemistry—Aug 2014

Cranes—May 2013

Configuration Management—May 2013

Corrective Action—Jan 2014

Door Life Cycle Management Plan—Mar 2014

Environmental Qualification—Nov 2014

Fire Doors—Nov 2014

Fire Protection—Jun 2014 PM

Flow Accelerated Corrosion—Apr 2014

FME—Dec 2014

Large Motors—Jun 2013

Margin Management—Sep 2014

MIDAS—Mar 2015

Nuclear Fuel Program—Jun 2014

On-Line Maintenance—Sep 2013

Operating Experience—May 2015 (review biennially)

Operational Decision Making—Apr 2015

Quarterly Performance Review Meeting—May 2015

Plant Health Committee—May 2015

Reactivity Management—Aug 2014

Safety-Security Interface—Aug 2014

Self-Assessment—Sep 2014

Single Point Vulnerabilities—Jan 2015

Seismically Induced System Interactions—May 2015 (review biennially)

System Engineering—Mar 2015

Transformers, Large—Dec 2014

Trending Analysis—Jan 2014

Troubleshooting—Jan 2015

[25th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2014—June 30, 2015](#)

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[25th Annual Report](#), [Volume 2](#), [Exhibit G](#), DCISC Public Contacts

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 [295 page PDF file]

[Exhibit G.3 Comments Received at Public Meetings](#)

25th Annual Report, Volume 2, 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 & DCPD Responses from Last Reporting Period (7/1/2013–6/30/2014)

Cumulative Rec. No.	DCISC Recommendation	Recommendation Reference	PG&E Response/ Action	PG&E Response/ Action Reference	Status
221	Recommendation R14-1: DCPD 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. Basis: DCPD's extensive and thorough Root Cause Evaluation of the Loss of Power to Unit 2 4 kV Bus G during refueling outage 2R17 clearly discusses in detail the roles that both Operations and Maintenance personnel played in planning for the replacement of Unit 2 Bus G	Recommendation R14-1, 2013/2014 DCISC Annual Report, Section 4.1.3.	PG&E Response: As a nuclear licensee, PG&E's highest priority is to safely operate and protect the health and safety of the public. DCPD acknowledges the role of Operations personnel in the Loss of Power to Unit 2 4 kV Bus G during refueling outage 2R17. For example, the process Operations personnel used to evaluate the risk of this outage	2013/2014 DCISC Annual Report, Section 9.0, PG&E Response to DCISC Recommendations February 4, 2015 DCISC Public Meeting (Exhibit B.6)	Closed

potential fuse UA-2. At the same time, the Root Causes of the Event as determined by the station focused on the inadequacies of Maintenance personnel without any mention of Operations. Although Unit 2 was shut down and defueled at that time, the Operations group nevertheless plays a key role in Unit status control. It appears that this role, on a par with that of the Maintenance organization, could have been better exercised throughout the planning, preparation, and execution phases for this maintenance activity.

emergent work could be improved. Although not specific to Operations, the root cause and the associated corrective actions for this event corrected this gap in how Operations personnel evaluate the risk of outage emergent work and the potential impacts to the operating unit. In order to ensure that all aspects of the role Operations personnel played in the loss of power to 4 kV Bus G during 2R17 have been addressed, a detailed review of the root cause evaluation will be performed. This review will ensure that the root cause, contributing causes, corrective actions to prevent

			recurrence and corrective actions to address contributing causes address all aspects of Operations role in preventing the loss of 4 kV Bus G during 2R17. This review will be documented in the corrective action program. Each cause and corrective action will be documented as to the effect on Operations processes and how these changes addressed Operations role in the loss of power to 4 kV Bus G. Any gaps to excellence identified will be documented in the corrective action program.	

[25th Annual Report](#), [Volume 2](#), [Exhibit I](#), DCISC Informational Brochure

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 direct PG&E personnel. The Committee shall conform in all respects to applicable federal laws, regulations and Nuclear Regulatory Commission policies”

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 commencing 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 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 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

On July 9, 2008, California Governor Arnold Schwarzenegger announced the appointment of Per F Peterson, Ph.D. P.E. to a three-year term on the Committee through June 30, 2011. Prof. Peterson previously served as a Committee member from September 2, 2004 through October 9, 2007. On March 22, 2012, Governor Edmund G. Brown Jr. announced Professor Peterson's reappointment for a term on the Committee commencing July 1, 2011 through June 30, 2014. On September 10, 2014 Governor Brown announced Professor Peterson's reappointment to a three-year term on the DCISC expiring on June 30, 2017.

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.

[25th Annual Report](#), [Volume 2](#), Exhibit J, Glossary of Terms and Definitions

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 DCP'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 in 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 DCPD 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. DCPD 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.

[25th Annual Report, Volume 1, Section 1.2.1, Appointment of Committee Member Robert J. Budnitz](#)

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. 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 for the period July 1, 2013 to June 30, 2016. Dr. Budnitz continues to serve on the DCISC pending a decision by the Attorney General on his reappointment or replacement.

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 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, 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.

[25th Annual Report, Volume 1, Section 1.2.3, Appointment of Committee Member Peter Lam](#)

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. On April 1, 2015, Dr. Weisenmiller announced Dr. Lam's reappointment to another three-year term on the Committee commencing July 1, 2015 and expiring June 30, 2018.

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 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 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 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.

Dr. Lam served as DCISC Vice-Chair during this report period, July 1, 2014 through June 30, 2015.

[25th Annual Report, Volume 1, Section 1.2.3, Appointment of Committee Member Per F. Peterson](#)

On July 9, 2008, California Governor Arnold Schwarzenegger announced the appointment of Per F. Peterson, Ph.D., PE, to a three year term on the Committee through June 30, 2011. Prof. Peterson previously served as a Committee member from September 2, 2004, through October 9, 2007. Governor Edmund G. Brown Jr. reappointed Professor Peterson to a term on the Committee commencing July 1, 2011 through June 30, 2014. On September 10, 2014, Governor Edmund G. Brown Jr. announced Professor Peterson’s reappointment to a three–year term on the DCISC commencing July 1, 2014 and expiring on June 30, 2017.

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 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 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, 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.

Dr. Peterson served as the DCISC Chair for this report period, July 1, 2014 through June 30, 2015.

25th Annual Report, Volume 1, Section 4.1 Conduct of Operations

4.1.1 Overview and Previous Activities

The following are operations-related items the DCISC reviewed at the previous reporting period:

- Low Temperature Overpressure Event
- Quality Verification's (QV) Audit of Chemistry
- DCISC Observation of Turbine Building Rounds
- Unplanned Reactor Trips
- Operator Concerns Update
- Operations Performance
- Winter 2013–2014 Storm Response

The DCISC concluded the following during the previous reporting period:

DCPP's Operations Function appeared to be effective during the period July 1, 2013 through June 30, 2014. Station response to a Low Temperature Overpressure Event was prompt and effective. QV's audit of Chemistry yielded no findings. DCISC's observation of a Turbine Building Operator conducting his rounds noted appropriate and effective operator behaviors and a clean and safe Turbine Building. Unit 1 had an excellent record of avoiding unplanned reactor trips, with its most recent unplanned automatic trip having occurred on June 3, 2002. Regarding the three automatic reactor trips of Unit 2 that were experienced between January 1, 2011 and December 31, 2013, the causal analyses and corrective actions to prevent recurrence appeared reasonable. Cooperation between represented operators and station management appeared to be good. Human error rate was an area of continuing focus. Efforts devoted to minimizing department level events during refueling operations had achieved commendable results. DCPP's winter 2013–2014 storm experience was moderate with little impact on intake equipment.

4.1.2 Current Period Activities

During the current period, the DCISC had presentations on conduct of operations at four Fact-finding meetings. The following topics were reviewed:

- Component Mispositions
- Reactor Trip Commonalities
- Reactivity Management
- DCPP Chemistry Program
- Flexible Power Operations
- Winter 2014 2015 Storm Experience
- Operational Decision Making (ODM)

Component Mispositions (Volume II, [Exhibit D.1, Section 3.11](#))

A “Mispositioned Plant Component” is defined as follows: “Any positionable component placed or left out of the required position for existing plant conditions when the component’s required position is tracked by one or more of the following status control tools: procedures, clearances, work management process (e.g. orders), other similar authorizing documents that align or re-align components, any positionable component placed or left out of the required position or existing plant conditions due to inadequate or incorrect status control tools described above. This includes situations where a lack of process exists that should have controlled the configuration of the component”.

Operations has overall responsibility for the program. The program defines five levels of significance for mispositioned components. An identified mispositioned component is documented in the DCPD Corrective Action Program (CAP), corrected for correct positioning, investigated (and analyzed as appropriate) for prevention of recurrence, reviewed by the Operations Director, and recorded in the Mispositioned Component Trend Record. DCPD’s mispositioning performance has fluctuated in past years and, accordingly, has continued to be a performance area that has received management focus.

DCPD reports and tracks plant mispositionings on a monthly basis, and each mispositioning is color coded to designate the department that was responsible for the mispositioning. As would be expected, the preponderance of mispositionings occur in Operations.

Each mispositioning is assigned a level of significance. Levels 1 and 2 constitute mispositionings that have “Severe” and “Major” consequences for the plant respectively. Level 3 mispositionings have “Minor” consequences. Level 4s are those that are immediately identified and have minimal or no impact. Levels 5s are those that were imminent or possible but were averted. During 2008, the station became more conservative with regard to what constitutes a less consequential mispositioning. In that year the lower grouping in the tabulation below was expanded to include Level 4 and 5 mispositionings that were not identified or tracked in prior years. The table below provides a history of the number of mispositionings reported by year from 2008 through April of 2014.

	2008	2009	2010	2011	2012	2013	2014 (thru April)
Levels 1&2	3	0	0	0	2	2	0
Level 3-5	48	35	26	26	17	9	5

The station has made good progress in steadily reducing the number of lower level (i.e. Level 3-5) component mispositionings during the past seven years. It also should be noted that, while it might appear that a setback could be occurring in 2014, mispositionings have typically occurred most frequently during refueling outages, and the station has already had a refueling outage in 2014. A second refueling outage is scheduled for the Fall of 2014. For comparison, DCPD had only one refueling outage in each of 2012 and 2013. Great emphasis was placed on avoiding component mispositionings during the recent refueling outage 1R18. Two mispositionings involved a toggle switch on a battery charger being bumped by a contractor, and Operations removing the wrong battery charger from service (i.e. one that was not required by station Technical Specifications). Emphasis is also placed on avoiding mispositionings in general. Training activities, pre-job briefings, and shift briefings contain elements with respect to avoiding mispositionings. Accountability is taken to the worker level, even to the point of temporarily suspending an individual’s qualification if such is felt to be warranted. All Level 1 and 2 mispositionings are thoroughly evaluated, and actions are taken to prevent recurrence.

The station’s approach to avoiding component mispositionings appears to be sound. DCPD has steadily and markedly reduced the number of lower level (Level 3 to 5) component mispositionings since 2008. Continued attention is needed to avoid the more significant mispositionings.

Reactor Trip Commonalities (Volume II, [Exhibit D.2, Section 3.6](#))

DCPP had three flashover reactor trip events as follows:

October 2012	Flashover of Unit 2 CCVT (Capacitive Coupled Voltage Transformer) due to insulator gap short due to gap creep age
July 2013	Flashover of Unit 2 insulator bushings during routine hot wash caused by wind blown moisture over insulator
February 2014	“Flashover” due to failure of Unit 2 lightning arrestor during a rainstorm (this insulator was designed to flash over as it did to relieve the electrical force experienced)

DCPP performed a Root Cause Evaluation [reported in the DCISC January 15–16, 2014 Fact-finding Report referenced above]. Also, to determine whether the three events have a common cause and to prevent future events, DCPP hired MPR Associates to review documentation and evaluate the events and provide recommendations for corrective actions. MPR’s June 2014 report concluded that the commonality between the events is “very heavy, non-uniform contamination [salt, dirt and Emergency Diesel Generator combustion products] present on the insulator[s]” following periods of wet and dry weather with Unit 2 being the more affected than Unit 1. Recommendations included the following:

1. Minimize the generation of airborne dust and dirt onsite
2. Characterize the contamination constituents by sampling
3. Conduct insulator breakdown tests
4. Develop a model to characterize the impact of wind conditions
5. Establish an in-service functional performance requirements for bushings and insulators in accordance with industry standards
6. Determine the feasibility of returning to porcelain insulator surge arresters
7. Evaluate alternative actions to prevent future flashover events

DCPP is taking the following actions:

- Performing “cold” washes during outages instead of “hot” washes at power on 500 kV Main Bank Transformers
- For high voltage bushings installing polymer bushings, which are better at managing contamination
- Replacing lightning arresters with greased ceramic devices
- Moving the 500 kV CCVT to a more-protected location in the 500 kV switchyard (already completed)

DCPP is satisfactorily addressing the commonalities among the three reactor trips caused by flashovers of insulators and lightning arresters. The common cause was contamination by dirt, dust and salt. Corrective actions include replacement of susceptible materials and changes to how the contamination is removed.

Reactivity Management (Volume II, [Exhibit D.2, Section 3.9](#))

Reactivity is defined by DCPP 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.

The goal of the Reactivity Management Program is to prevent reactivity events as follows:

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.

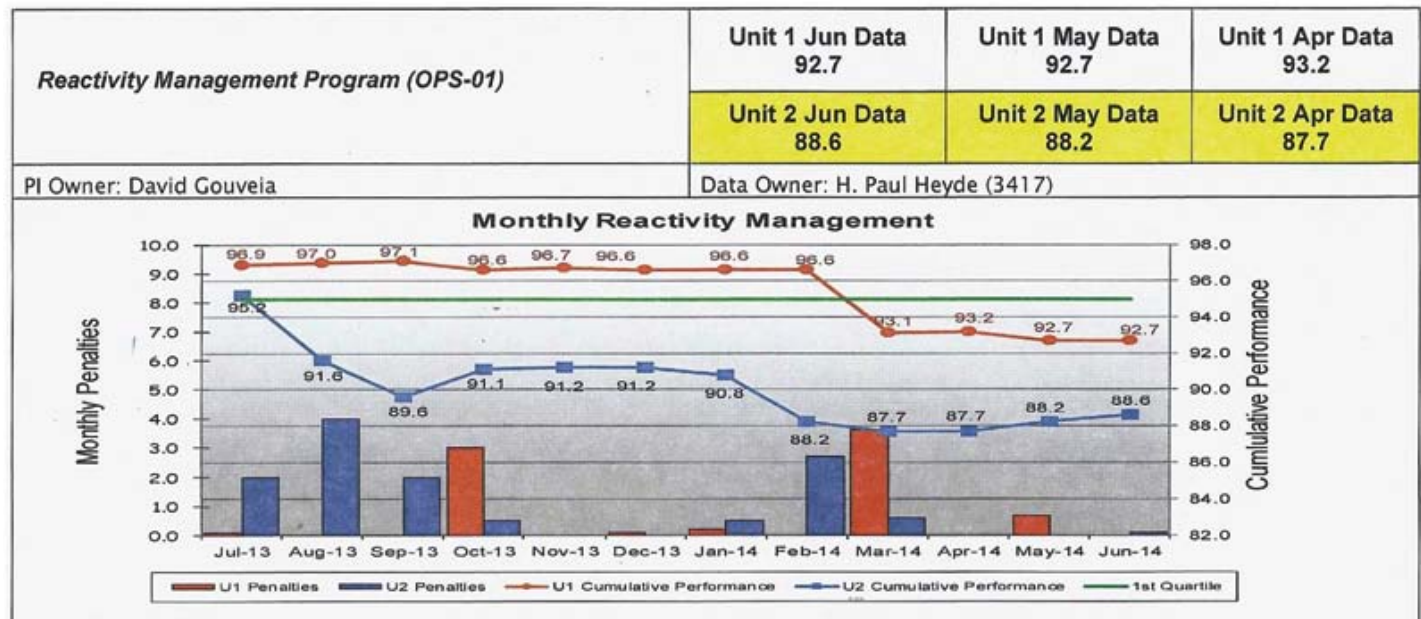
Reactor Operators (ROs) and Senior Reactor Operators (SROs) are responsible for fulfilling the requirements of the Reactivity Management Program, including (1) ensuring that expected responses to a reactivity change are identified and fully understood prior to initiating any action that affects reactivity, (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.

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 beginning of a shift reactivity brief 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.



DCPP maintains tight controls on Reactivity Management, a direct measure of nuclear safety. Unit 1 is in a healthy state according to DCP's measures, and Unit 2 needs improvement; however, Unit 2's lower performance was caused by events other than Reactivity Management per se. They were reactor trips caused by 500 kV switchyard problems, which, though causing reactor trips, which significantly affect reactivity, were not directly in the purview of the Reactivity Management Program.

DCPP Chemistry Program (Volume II, [Exhibit D.2, Section 3.12](#))

The Chemistry Department is responsible for determining which chemicals, and in what amounts, and processes (e.g., filtration, ion exchange resin, polishing, evaporation, etc.) to use to maintain desired chemistry levels. Chemistry or Operations makes the necessary adjustments to keep system chemistry within tolerances.

Chemistry measures its performance with a DCP Chemistry Effectiveness Index (CEI). The CEI is a performance measure based on an 18-month rolling composite that is reflective of the time spent operating outside of industry defined action levels and established limiting values for a representative set of primary and secondary chemistry parameters. The CEI range is from 0 representing ideal performance to 100 representing worst performance.

Unit 1 CEI was rated Green (industry first quartile), and Unit 2 was Yellow (second quartile). The factor affecting both ratings was the amount of Iron showing up in the Steam Generators when coming back to power following refueling outages, specifically Outages 1R18 and 2R17. At that time DCP expected Unit 2 Iron to drop to approximately 0.050 in September 2014 for an industry top quartile rating.

Other measured Chemistry performance indicators are for the following systems/components:

Primary (RCS) System:

- Lithium Hours
- Hydrogen Hours
- Radionuclides (Dose Equivalent Iodine 131)

Secondary (Feedwater/Steam/SG) System

- Feedwater Copper and Iron
- Steam Generator Sulfate and Sodium
- Condenser Salt In-leakage

Closed Cooling Water Systems:

- Intake Cooling Water
- Service Cooling Water
- Component Cooling Water

Chemistry is also responsible for the amount of Liquid Radioactive Waste (LRW) discharged. This amount is limited by DCPD Technical Specifications and NRC Regulations. Additionally, DCPD submits annual reports to NRC of both the amount of radioactive discharges and the results of any radionuclides measure in soils, water, marine life, and vegetation. The DCISC reviews these reports each year and has found that the amounts are far below DCPD Technical Specifications and NRC regulatory limits.

Chemistry's Biofouling Control Team publishes a weekly "DCPD Biofouling Status Report", which includes the following information:

- Expected ocean swells and currents
- Ocean conditions for salp/jellyfish
- Intake conduit sodium hypochlorite and sodium bromide injection levels
- Kelp presence and harvesting activities
- Intake bar rack observations

DCPD's Chemistry Program is effective and achieving good results. Primary and Secondary System chemistry levels are generally within specifications. Discharge of liquid radioactive waste is well within plant and regulatory limits.

Flexible Power Operations (Volume II, [Exhibit D.5, Section 3.11](#))

The term "flexible operation" refers to varying the output of an electric generating plant in response to the varying electric loads on the electric grid. This is distinguished from the current method of operating DCPD, as well as operating many other U.S. commercial nuclear power plants, which involves operating consistently at full 100% power to serve the "base load" on the electric grid.

At this time PG&E has made no decision to change its operations of DCPD; it is their largest base load generation facility. Nevertheless, a contractor has examined the performance of some German plants, and a plant in the state of Washington has been engaged in varying power output to what appears to be a limited extent. Also, the French electric power system relies on nuclear power for a majority of its total electricity needs.

Currently, during high demand periods, some transmission lines can become congested and some generation can be paid substantially higher prices. Conversely, during low-demand periods of the year, transmission lines are relatively open and free of congestion, and all generators are paid similar price ranges. Nevertheless, during extremely low-demand periods there may be excessive generation, and some generation may be paid negative

prices (i.e. the generator pays the user) if they cannot reduce generation output. For California, periods of low demand can be expected to be particularly common during the spring, when substantial hydroelectric generation may be available during non-drought years. Also, the contribution of fossil plants to flexible operations diminishes the need for nuclear to modify its approach toward flexible operation.

Westinghouse pressurized water reactors can be cycled up and down in power, and DCPD has had experience with periodically curtailing power to 50% for short periods of time during winter storms as a precautionary measure. However, routine cycling of power raises potential issues with the reliability of the plant. Also, flexible operations will result in greater demands on water treatment (e.g. boration and deboration) and chemical polisher operation.

In addition, the cycling of nuclear power plants can cause thermal and other stresses on plant equipment, and make it more difficult to detect changes in plant parameters that can provide early indication of emerging equipment and system problems, such as detecting coolant inventory changes caused by small leaks. Also, there would be an expected impact on a plant's nuclear fuel cycle, and on the timing of refueling outages. Therefore, the implementation of flexible operations must be performed carefully to avoid negative impacts on plant reliability and safety.

Although DCPD has expressed no intent to implement flexible power operation at this time, it has been examining the potential impacts that could arise from such a change to its operating practices, safety, and reliability. Experiences at other stations, including those in France, have provided input to this examination. Flexible operation will have a different impact on plant safety and reliability than does steady state operation. The DCISC will continue to follow this topic.

Winter 2014–2015 Storm Experience (Volume II, [Exhibit D.8, Section 3.10](#))

Station Procedure OP O-28, "Intake Management", provides direction with respect to mitigating the effects of short-term debris loading on the intake traveling screens and condensers. The procedure directs appropriate Operations, Maintenance and Security personnel to the intake to evaluate whether systems and equipment are operating at maximum capacity. Engineering may be directed to develop a plant rampdown plan, and Learning Services may prepare for training for Operations to practice ramping down the units on the Plant Simulator.

The procedure defines and addresses high swell forecasting, high swell warning, and Operations response to high swell warning. Pre-job briefs would be conducted for the Control Room operators as well as for the intake operators who would be expected to monitor intake conditions frequently. Maintenance and Security personnel would be directed to the intake along with Operations personnel to help ensure that systems and equipment (e.g. intake screens and wash pumps) are able to be operated at maximum capacity. Engineering could become involved, as appropriate, in developing a plant ramp plan and Learning Services could prepare training in which operators could practice ramping the units on the plant simulator. The response, when appropriate, would include operating the intake screens manually, controlling the screen speed appropriately, and manning the intake with two operators.

During this past winter, there were no Pacific Ocean winter storms which impacted DCPD.

Operational Decision Making (ODM) (Volume II, [Exhibit D.8, Section 3.11](#))

DCPD Procedure OP1.ID7 is the controlling procedure for ODM. According to the procedure, the purpose of ODM is to "provide a systematic method for evaluating technical and operational issues at the station and making effective decisions that affect plant operations, safety, reliability, and material condition when faced with degraded conditions".

Degraded conditions may involve reductions in operating/safety margins or encroachment on system/component reliability that occur over days or weeks. Examples include:

- Increased primary system or containment leakage that remains below operational or licensed limits
- Step changes in vibrations that remain at alert levels
- Numerous or long-term valve or pump leaks
- Fuel defects or increased corrosion rates
- Chronic or aggregate equipment material deficiencies
- Degraded conditions requiring a Prompt Operability Assessment
- Potential challenges to Technical Specification equipment

The Station Director is the Decision Maker (or assigns a Decision Maker) for decisions that involve outage extensions of > 24 hours, potential NRC Notice of Enforcement Discretion, decisions that involve changes in mode or power level, short duration action statements, or changing curtailment schedules. The Decision Maker typically assigns a Decision Team, which is composed of individuals with expertise in diverse areas applicable to the decision at hand. For evolutions that involve a significant reduction in reactor safety, an individual with a Senior Reactor Operating License will be designated to lead the Decision Team.

The Decision Team meets and follows a prescribed process to collect and analyze data and formulate a decision. When its decision is made, the Decision Team obtains final approval from the Station Director who reports the decision to the Site Vice-President. The decision is communicated to plant personnel and is implemented. An effectiveness review is performed about six months after completion of the ODM.

The DCISC reviewed the following three ODMs:

1. The block valve to a Pressurizer Power Operated Relief Valve was declared to be inoperable due to excessive leakage. This required entering Technical Specification 3.4.11, Action A, which states that when one or more PORVs is inoperable and capable of being manually cycled, close and maintain power to associated block valve. This would temporarily remove the stroke test requirement and leave the PORV available if needed. The valves would remain in this state until repairs were made in an outage.
2. Unit 2 experienced a reactor trip due to tie-line differential relay operation. The cause of the differential relay operation was a single line-to-ground fault on the A Phase CCVT (Capacitive Controlled Voltage Transformer) due to an insulator flashover. The Decision Team was asked to consider options with a goal to develop a way to ensure that Unit 1 could operate safely without flashover until the next refueling outage. The solution was to continue to monitor the CCVTs performance with high power optics and camera during the next rain storm and plan for a unit curtailment later for contaminant cleansing.
3. A Trouble-shooting Team was first initiated to determine the location of a small Reactor Coolant System leak on Unit 2. The leak was determined to be in the Reactor Coolant Pump 2-3 seal leak-off lines. A Decision Making Team was then assembled to determine a course of action, including shutting down the unit to repair the seal. The Team decided to continue to monitor the leakage, and if leakage were to increase beyond 0.4 gallons per minute (gpm), then the unit would be shut down for repair. Reducing the seal flow injection stabilized the leak to an acceptable level of < 0.1 gpm.

The DCISC also reviewed the three following effectiveness evaluations for other ODMs which were more than six months old:

1. Unit 1 Condenser delta-P (pressure drop) exhibited an increasing trend, which signified that intake tunnel cleaning would be needed sooner than originally scheduled. This was evaluated and performed successfully while avoiding unit curtailment and reactor scrams or transients; challenges to nuclear safety or to related systems, structures or components; or entry into Equipment Control Guidelines or Technical Specifications.
2. An ODM was performed to assess and decide what course of action to take for a grounding problem in the Plant Process Control System. This problem could have adversely affected the plant's Appendix R Fire Protection analysis. The ODM selected having a temporary modification made to correct the ground problem. The temporary modification would be in place until a permanent modification could be implemented. An effectiveness evaluation concluded that this ODM was effective because there were no shorts or other plant problems due to the temporary grounding modification.
3. An ODM was written to install the SALP bubble curtain in June 2014 to prevent jellyfish-like SALP from entering the plant intake during high SALP months of July and August and cause plant power curtailment or shutdown. The effectiveness evaluation concluded the ODM was effective because no significant amount of SALP entered the intake and there were no other adverse impacts on the plant.

DCPP appears to have performed its Operability Decision Making process satisfactorily. Follow-up effectiveness evaluations were performed appropriately concluding that the ODMs were effective.

4.1.3 Conclusions and Recommendations

Conclusions:

DCPP Operations Department performance on component mispositions and reactivity management has been good and improving. DCPP's Chemistry Program is effective and achieving good results. Primary and Secondary System chemistry levels are generally within specifications. Discharge of liquid radioactive waste is well within plant and regulatory limits. Although DCPP has expressed no intent to implement flexible power operation at this time, it has been examining the potential impacts that could arise from such a change to its operating practices, safety, and reliability. Flexible operation will have a different impact on plant safety and reliability than does steady state operation. The DCISC will continue to follow this topic. During this past winter, there were no Pacific Ocean winter storms, which impacted DCPP. DCPP appears to have performed its Operability Decision Making process satisfactorily. Follow-up effectiveness evaluations were performed appropriately, concluding that the ODMs were effective.

Recommendations:

None

25th Annual Report, Volume 1, Section 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:

- On-Line Maintenance (OLM) Program
- Troubleshooting

The DCISC concluded the following during the previous reporting period:

DCPP On-Line Maintenance Risk Management and Integrated Maintenance Risk Management appeared to be strong processes in determining and controlling the risk of maintenance work involving removing equipment from service to perform maintenance on and in working on or near sensitive equipment. Program health was Green (good). DCPP troubleshooting has taken a positive step forward with a new, improved procedure with more clearly specifies responsibilities and process steps.

4.2.2 Current Period Activities

During the current period, the DCISC had a presentation on conduct of maintenance at three Fact-finding meetings. The following topics were reviewed:

- On-Line Maintenance Risk
- Maintenance Department Performance
- Foreign Material Exclusion Program
- Trouble Shooting Program

On-Line (OLM) and Integrated Maintenance Risk (Volume II, [Exhibit D.1, Section 3.3](#))

The DCISC has been following OLM for a number of years as DCPP has been engaged in replacing its computerized ORAM (Outage Risk Analysis—Maintenance) program, a qualitative on-line risk assessment program, with Safety Monitor, a quantitative computer program for on-line risk assessment. Safety Monitor is now fully functional 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.

During plant operation, the DCPD Integrated Risk Review Team (IRRT) 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, and Security. Normally, DCPD's Work Control Manager or Outage Manager serves as chair. 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.

DCPD's Work Week Manager develops a 12-week rolling work cycle for its pre-planned OLM, using inputs from PRA assessments of the planned maintenance to assist in scheduling. By knowing which equipment is to be taken out of service 12 weeks ahead of time, DCPD can determine the related risk of core damage. DCPD has rules on what levels of risk are acceptable during maintenance work windows. Risk is minimized by the following rules:

- Performing only those maintenance items on-line required to maintain the reliability of the component.
- Limiting the number of at-power Maintenance Outage Windows (MOWs) in an operating cycle.
- Minimizing the total number of items out-of-service (OOS) at the same time.
- Minimizing the risk of initiating plant transients, which could affect safety systems.
- Avoiding higher risk combinations of items OOS by using Probabilistic Risk Assessment (PRA) insights.

Assessment of Maintenance Risk

Whereas the above OLM Risk Management is focused on nuclear safety for on-line maintenance, DCPD 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

Recurring work is pre-screened by risk factor in the procedure, as follows, including actions required to accommodate the risk level:

- Low Risk

- No additional actions required—follow station policies and procedures

- Medium Risk

- Follow station policies and procedures
- Perform and document a look-ahead analysis

- High Risk

- Follow station policies and procedures
- Perform and document a Risk Management Plan
- Obtain review and approval from all department involved
- Prepare risk briefing materials and management oversight
- Obtain approval from the Risk Management Challenge Board
- Hold and document a post-job critique

- Very High Risk

- Implement the actions above for Medium and High Risk work
- Perform contingency planning
- Obtain review and approval from a Readiness Review Board (chaired by a Director)
- Hold and document a post-job critique

Processes are also included for the following types of work:

1. Recurring Task Risk Evaluation
2. On-line Emergent Work Risk Assessment
3. Outage Emergent Work Risk Assessment
4. Performing Work on Protected Equipment
5. Entering a Protected Area to Perform Nonintrusive Work

The focus on risk has become 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.

DCPP's Plant Performance Improvement Report issued for the period May 2013 through April 2014 indicated that DCPP's On-line Maintenance Risk Management Program was rated as Green, or Good, for every month during 2014. Each month's reported performance is a composite of DCPP's cumulative performance over the most recent six months.

DCPP's program for managing on-line maintenance risk appears to be well-structured, and its implementation appears to be effective. Reported performance has been rated as healthy for the first four months of 2014.

Maintenance Department Performance (Volume II, [Exhibit D.3, Section 3.1](#))

DCPP has been taking substantial action at the manager and director level to achieve and maintain a high level of maintenance performance at the worker level. Station directors and managers each observe workers on a predetermined area of performance associated with a scheduled work activity one day out of every eleven, and the results are discussed with other managers and the training group, as appropriate.

An evaluation of the effectiveness of the training that was provided to improve maintenance performance was planned to be conducted after Refueling Outage 2R18 (September–October 2014). Such an evaluation is routinely conducted at appropriate times after this type of training is provided.

Human Performance, Nuclear Professionalism, and management of Risk and Reliability have been important areas with continuing emphasis throughout the station. Certain events such as the failure of bushings on high voltage systems have further elevated the focus on these aspects of plant operation and maintenance.

The following is a comparison of Outage Rework Events that focused on the outages since early 2011, as follows:

Refueling Outage	Number of Outage Rework Events
2R16 (Spring 2011)	63
1R17 (Spring 2012)	92
2R17 (Spring 2013)	26
1R18 (Spring 2014)	19

The following Performance Indicators related to Maintenance were examined:

- Maintenance performance with respect to the station's Corrective Action Program had received a Green (top grade) rating since the beginning of 2014 but had dropped to Yellow (needing improvement) during June and July. This rating is a composite of 12 related

individual indicators, one of which, Corrective Actions to Prevent Recurrence that are greater than 12 months old, was the primary contributor to the Yellow rating of this composite indicator.

- Approved Deferrals of Unit 1 Preventive Maintenance Activities was rated Red (Unsatisfactory) in recent months and was Yellow (Deficient) for Unit 2. All of the deferrals were cited as being outage related.
- Performance has been good with respect to Foreign Material Exclusion (FME), that is, the prevention of unwanted debris and materials from entering open plant systems during maintenance, inspection, or modification activities. The monthly performance ratings have been Green, the highest rating, for every month of the past 12 months except one. The one month exception was February 2014, during which Refueling Outage 1R18 was in progress. Although there were a number of FME events during 1R18, they represented a 60 percent reduction from the number during the preceding refueling outage 2R17.
- The volume of backlogs for Maintenance Procedure Revisions has been rated Green (top grade) throughout most of 2014, including the most current month.

Considerable management attention is being directed at minimizing the need for maintenance rework, and improvements appear to be emerging in this area. The numbers of rework events during the two most recent refueling outages, 2R17 and 1R18, were considerably lower than in preceding outages. Likewise, Foreign Material Exclusion Events appear to be more effectively avoided. Delays in taking corrective action to prevent recurrence of identified problems appear to have been a recent, short term problem, but should be of continued focus.

Foreign Material Exclusion (FME) Program (Volume II, [Exhibit D.5, Section 3.2](#))

The purpose of the FME Program is to prevent the undesired and potentially harmful intrusion of foreign materials into closed systems or other plant environments. The vast majority of FME problems occur during plant outages when many system repairs, modifications, inspections, and tests are performed. DCPD has incorporated aspects of FME techniques in DCPD's Human Performance Training that is conducted in a training facility specifically designed to address human performance issues.

Personnel are encouraged to report any conditions or aspects of performing their work in the plant that they feel need to be addressed, including those from an FME standpoint. One example is that welding on an open system can result in very thin, scale-like byproducts that can adhere to the internals of the pipe. This was identified during boroscopic examination of some piping internals. Another involved plugging of tubes in the main condenser where the "pop-it" tube plug positioner and washer had been installed on the insertion tool while the worker was inside the main condenser. This led to a worker dropping the positioner and washer into the lower part of the condenser, requiring hours of lost time to recover the items. One solution was to install those devices on the positioner prior to entry into the condenser. Another was to install a "catcher" throughout the entire condenser, whereas the "catcher" had previously been installed around the specific work area.

The increased emphasis in reporting has received great support by and participation of station workers. At first a temporary increase occurred in reported FME issues, but this was accompanied by more detailed worker input on the nature of the FME issue. Of the 16 FME issues that were reported during refueling outage, 2R18, only 5 or 6 were caused by human performance, while the others were caused by equipment/system issues.

Significance of FME is reflected on a point scale agreed upon throughout the nuclear industry as follows:

- FME Significant Event (Level 1) = 21 points
- FME Threat (Level 2) = 10 points
- FME Condition (Level 3) = 1 point

The overall health of the FME program is then measured by the Key Performance Indicator (KPI) for the station, given by:

- $KPI = 100 - n(21 \times \text{Significant Events} + 10 \times \# \text{ Threats} + 1 \times \# \text{ Conditions})$

In the above formula, $n = 0.5$ for DCPD to make the KPI a per unit indicator for DCPD. Overall, FME performance is then graded on the following scale:

- Green = 95 to 100
- White = 90 to < 95
- Yellow = 80 to < 90
- Red = Below 80

From the above tables and the KPI grading formula, it can be seen that for the station to earn a Green rating in a given month, it must have zero significant FME Events; and if it experiences one FME Threat in a month, it must experience no FME Conditions in that month to earn a Green rating. Also, one FME Significant Event in a month would drive the overall performance indicator to Yellow for that month. Because the vast majority of FME issues occur during outages, FME performance is also graded and graphed over rolling 6 month periods.

At the time of this Fact-finding Visit, the most recent FME Performance Report was for the monthly periods including October 2013 through October 2014. During this period, the rolling six-month FME indicator was Green for all but three of the months and that indicator was White for the three other months. This compares to a nine month period, March 2011 through November 2011, (which was examined during the DCISC's prior review of this topic), where the rolling six-month indicator fell to Yellow or White during four of the nine months.

The vast majority of FME issues occur during refueling outages, when plant systems are opened for maintenance or modification. DCPD has been actively engaging the work force in this regard.

Workers have been strongly encouraged to report impediments to error free work. When a problem emerges, the challenge becomes to identify why the problem arose. One example was the corrective action taken with respect to the tube plug positioner discussed earlier with respect to work in the Main Condenser.

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.

Trouble Shooting Program (Volume II, [Exhibit D.6, Section 3.7](#))

DCPP developed a new interdepartmental procedure, which more clearly defines Maintenance as the Troubleshooting Owner with Engineering as support. A formal lead is now to be identified for each troubleshooting activity. The new procedure also now ties into the DCPP Risk Procedure, "Assessment of Integrated Risk", which establishes the process for integrated risk management associated with work activities performed on or around power plant equipment during Modes 1 through 6 and No-Mode (defueled), and during any work in an outage that could affect the operating unit. This procedure provides direction on identifying and classifying risk in the following areas:

- Industrial Safety
- Nuclear Safety
- Radiological Safety
- Chemistry and Environmental Safety
- Regulatory Compliance and Plant Operation
- Security

The risk assessment procedure appeared comprehensive and easy to implement with many specific examples of risk-significant activities and configurations. The overall effect is to determine, with Operations input, the risk of the problem to be addressed and to direct one to the appropriate of three levels of troubleshooting for that problem.

The procedure directs that Troubleshooting (TS) Plans be put into the DCPP Work Planning Process that generates Work Orders, which are reviewed by Operations. Then once the problem has been identified, a new Work Order is initiated to accomplish the repairs. The plant believes that using the Work Planning Process will add better structure to troubleshooting investigations and repairs.

DCPP decided to not include the Engineering causal processes to the TS procedure to keep the procedure simple and focused on Maintenance; however, Engineering is available for technical support when requested, along with the Engineering causal processes.

Below are two completed actual cases:

1. Troubleshoot Pressurizer Heater Group 1–2

This December 2014 troubleshooting plan provided instructions for Level B troubleshooting of Pressurizer Heater Group 1-2, which failed to energize on demand from the Control Room. The troubleshooting team determined that, upon visual inspection and exercising the toggle switch in the applicable breaker, Contact 4 was misaligned. Maintenance then generated another work plan and aligned Contact 4 and satisfactorily tested the breaker.

2. Troubleshoot Generator Differential Relay

This October 2014 troubleshooting operation was used to determine the cause of a problem with the Unit 2 Main Generator Differential Overcurrent Relay 87G2, which was suspected of incorrectly maintaining the trip bus energized. The troubleshooting team performed visual and voltage tests and determined that replacement and bench test calibration was necessary.

A new work plan was written for those operations in accordance with the manufacturer's equipment manual. The replacement relay could not be satisfactorily calibrated. Troubleshooting was resumed with another work plan; however, additional testing was inconclusive, and the relay was returned to the shop for further evaluation.

A new work plan was written for further bench testing of the relay. Initial testing was inconclusive, and Engineering was requested to provide new relay setpoints. The relay then tested satisfactorily. A new work plan was written to replace the relay in the breaker cabinet and perform a final in-place test. This was satisfactorily achieved and the breaker cabinet returned to service.

Each of the troubleshooting work plans addressed clearances and physical barriers necessary to protect personnel and adjacent equipment when the components were taken out of service. Foreign material exclusion and housekeeping requirements were included. References were made to specific procedures and manuals to perform testing and adjustments. Procedure place-keeping, independent verification, and supervisor concurrence were apparent in the procedure signoffs.

The troubleshooting, testing, and corrective actions appeared to have been properly carried out and documented to the DCISC FFT. There were no formal effectiveness reviews required to be performed on troubleshootings such as are done on Root Cause Evaluations; however, this was acceptable because the effectiveness of troubleshooting is apparent when the problem is seen to be resolved before the troubleshooting is concluded.

Two DCPD troubleshooting cases appeared to have been performed satisfactorily as reviewed by the DCISC Fact-finding Team.

4.2.3 Conclusions and Recommendations:

Conclusions

Considerable management attention is being directed at minimizing maintenance risk and the need for maintenance rework, and improvements appear to be emerging in this area. Likewise, Foreign Material Exclusion Events appear to be more effectively avoided. Delays in taking corrective action to prevent recurrence of identified problems appear to have been a recent, short term problem, but should be of continued focus. 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. The DCPD Trouble-Shooting Program appears effective, and two DCPD troubleshooting cases appeared to have been performed satisfactorily as reviewed by the DCISC.

Recommendations:

None

25th Annual Report, Volume 1, Section 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:

- Boric Acid Corrosion Control Program
- Buried Tanks and Piping Program
- Air Operated Valve Program
- DCPD Response to New Pressurized Thermal Shock Rule
- Licensing Basis Verification Project
- Flow Accelerated Corrosion Program
- Design Quality

The DCISC concluded the following during the previous reporting period:

The Boric Acid Control Program's current rating of "Needs Improvement", was driven by the number of identified minor boric acid leaks in need of repair. Progress was made in this regard, during the most recent refueling outage, 1R18, especially when compared to historical trends, but more effort was needed and was planned. DCPD's Buried Tanks Program and Air Operated Valve Program appeared satisfactory. DCPD's response to the new Pressurized Thermal Shock (PTS) Rule appeared to be well structured. Both reactor vessels have sufficient specimens to demonstrate the capability of each reactor vessel to withstand the effects of PTS through their 40-year licensed lifetimes as well as the proposed 20-year extensions. Work continued to progress on DCPD's Licensing Basis Verification Project (LBVP). As was clearly noted by DCPD, although the project's commitment for submitting updated documents to the NRC by December 31, 2015 is expected to be met, the completion of related design changes and the approval of License Amendments Requests are expected to extend beyond that date. DCPD's Flow Accelerated Corrosion (FAC) Program appeared to be well structured and effectively implemented. The DCPD Design Change Program was rated as White, Satisfactory.

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.

- Design Quality Status

System Engineering Function

- Margin Management Program
- Vibration Monitoring Program
- Equipment Qualification Program
- Reactor Vessel Material Specimens and Fracture Toughness
- System Engineering Program
- Plant Health Committee Meeting
- Licensing Basis Verification Project

Design Quality Status (Volume II, [Exhibit D.2, Section 3.5](#) and [Exhibit D.8, Section 3.5](#))

The Design Quality issue was about erroneous designs released for construction. During Refueling Outage 1R17 (Spring 2012), there were three major modification designs with errors released for implementation. The reason for the error determination was the large number of Field Changes required after design package release for the modifications to be implemented. Three design packages were issued incomplete (“managed exceptions”) due to vendor issues and late scope additions, counting on the Field Change Process (FCP) to add information to complete the packages; however, the FCP did not include the same discipline and rigor as the full Design Change Process (DCP). Approximately one-third of the FCs were due to design errors. Adding to the problem was the fact that each of these designs was begun late and performed on a compressed time schedule.

DCPP had investigated the design quality problems and developed a plan of corrective action, which included, in addition to tighter controls of Field Changes, improved project communications, augmented pre-release design reviews, and additional training of engineers on the design change process. A Root Cause Evaluation (RCE) identified the root cause as “... the organization failing to recognize the risk and complexity of this first-time Process Control System (PCS) project, and therefore not assuring that an adequate organizational structure and project oversight were in place (i.e., did not designate it as a strategic project or Engineering major project). This ultimately created an environment that promulgated a human error-likely environment.”

Corrective actions were implemented and an effectiveness evaluation was performed following Outage 1R18 in June 2014. The conclusion stated, “A review of the performance of modification since implementation of the Process Control System (PCS) Root Cause Evaluation (RCE) has determined that the corrective actions have been effective”. This was based on the successful installation and one cycle of performance of the PCS (one of the problematic modifications on Unit 1) upgrade in Outage 2R17 as compared to its installation in Outage 1R17.

QV disagreed with the effectiveness review based partly on two problematic modifications out of ten completed for Outage 1R18: Unit 1 Containment Fan Cooler Unit Dampers and Single Point Vulnerability (SPV) on the Main Bank Transformers projects. Reviews of causes for these problems showed that they were unique to these projects and different than the previous 1R17 project

problems. These were among the following Green-scoring projects:

- Unit 1 Polar Crane
- Motor Operated Valve Control Circuit Logic
- Rod Control Cluster Assembly Replacement
- Auxiliary Feedwater Vent Line
- And six others

Upon further analysis, Engineering agreed with QV and performed an additional evaluation of 64 major and minor projects and modifications over the course of the last three refueling outages and determined that approximately 92% were well-devised designs. When problems do occur, DCPD uses Root Cause Evaluations, Apparent Cause Evaluations, and Lessons Learned reviews to determine the causes for corrective actions and improvements.

Design Quality improved enough in Refueling Outage 2R18 that it is now off QV's Site Status Report Top Issues List and Issues and Trends List; however, it remains a QV Concern, and QV is monitoring it. An Effectiveness Evaluation of Design Quality will be performed following Refueling Outage 1R19, which begins in October 2015. QV will be reviewing this evaluation, as should the DCISC. The plant's Design Change Program health, a major measure of Design Quality, has been rated Green (good) since January 2015.

DCPD Design Quality has been on Quality Verification's top issues lists since its down-rating in Refueling Outage 1R17 which concluded in June 2012. Engineering has performed assessments and implemented corrective actions, which resulted in enough improvement in Outage 2R18 (Fall 2014) that QV changed from a top issue to monitoring. Since January 2014, the Design Change Program has shown Green (good) health. QV will perform an Effectiveness Evaluation following Outage 1R19 near the end of 2015. The DCISC should continue to monitor Design Quality.

System Engineering Program (Volume II, [Exhibit D.3, Section 3.4](#) and [Exhibit D.7, Section 3.10](#))

DCPD's approach to maintaining the "health" of plant systems has been to assign specific engineering personnel the responsibility of essentially being the resident experts and caretakers for the specific system or systems assigned to them. This includes monitoring the "health" of their system(s), recommending appropriate actions to be taken in order to maintain system health, taking or facilitating those needed actions, and tracking those actions to completion. In doing so, the System Engineers track and maintain the "health" of their systems.

DCPD system engineers are responsible for the following:

- Support Operations and Maintenance
- Resolution of System Problems
- Design Change Process Project Team Member

- Perform Routine Technical Reviews and Evaluations
- System Health Reporting
- Support of the Plant Health Process
- System Performance Monitoring
- System Testing (test lead or test performer)
- System Design and Licensing Basis Owner
- Operating Experience Reviews

System Engineers maintain Health Reports for their respective systems, each of which contains the following information:

- Scorecard
 - Executive Summary
 - Scores (includes points for each of the following items)
 - Reliability
 - Maintenance
 - Material/Equipment Condition and Corrective Actions
 - Operations Concerns
 - Performance Monitoring
 - Design
 - Score Override Justification
 - Indicator Description
 - Indicator Override Justification
- Indicator Comments (e.g., critical component failures, aging issues, adverse trends, design deficiencies, etc.)
- Action Plan (to return to healthy status—see below)
- Operating Experience
- Predictive Parameters
- Contacts
- Analysis

The four levels of system health are as follows:

Healthy

- Green indicates the system has minor or no performance issues.
- White indicates all actions to correct major performance/health issues complete, or interim corrective actions are in place, and performance is trending towards a goal or target.

Unhealthy

- Yellow indicates the system has major performance/health issues with interim and/or final corrective actions scheduled for implementation.
- Red indicates the system has major performance/health issues and actions are being developed, but not approved by the PHC.

Formal Action Plans include the reason for the problem condition, Action Plan Owner, Corrective Action Program (CAP) Notification number, tracking number, action type, status, due date, responsible individual, last updated date, whether required for healthy, and whether in Top 10 plant action items. The reports have proven to be useful tools for tracking system performance, needs, and actions planned and being taken to address those needs.

The usefulness of the above mentioned CAP tools and the initiative taken by the station were reflected in a sharp and significant decrease in the number of Open Engineering Notifications, from over 500 open Notifications in early 2013 to being maintained at about 300 since mid-2014. The station has surpassed its initial goal of reducing the number of open Notifications to 400.

A Plant Health Committee, consisting almost exclusively of Director and Manager level personnel, meets weekly, except during outages, for System Engineers to review Health Reports of plant systems. Information that is routinely examined and discussed includes:

- System health and factors/issues affecting health
- Action Plans for addressing issues
- Information from the industry that is related to systems at DCP
- Station priorities to ensure safe and reliable plant operation

The process for calling attention to the need for action is initiated by submitting a document referred to as a “Notification.” Beginning in late 2012, DCP experienced an undesirable increase in the number of Open Engineering Notifications, which grew to over 500 in early 2013. Since then, a concerted effort has focused on accelerating actions to address the needs identified in these Notifications, and during the past two years the number has declined to less than three hundred. In order to help ensure that DCP is, in fact, able to concentrate attention on issues of the greatest significance, a “Top Ten Equipment Issues” list is developed and reviewed collectively during a meeting of Managers from Maintenance, Engineering, Operations, and Work Management (MEOW). Input for this listing initially comes from the Operating crews, supported by Maintenance as well. This is a new concept and is therefore in the early stages of implementation.

The listing of DCP's Top Ten Equipment Issues below was provided to the DCISC Fact-finding Team during the Fact-finding Visit:

1. Increase Emergency Diesel Generator (EDG) Load Margin. Issue Design and Implement for the Watt Recorder: Expected Completion Date (ECD)—8/30/15
2. Increase EDG Load Margin. Issue Design and Implement for Day Tank Level Switch : ECD—8/30/15
3. Implement Containment Fan Cooler Unit Coupling Time Modification: ECD—5/30/15
4. Address On-line Breaker Cycling Issue: ECD—1R19, 2R19
5. Identify the Maintenance Strategy for the U1/U2 500 kV Standoffs to Prevent Unit Shutdowns Mid-Cycle: ECD—1R19/2R19
6. Implement Root Cause Evaluation Corrective Actions to Prevent Recurrence in Mini-Maintenance Outage Windows for EDG Inlet for Fuel Header Capscrews: ECD—U1 Completed, U2 7/15/15
7. Implement Insulator Replacements to Address 2R18 Unit 2 230 kV Yard Flashover Causes: ECD—9/30/15
8. Implement Spent Fuel Bridge Crane Reliability Improvements for Units 1 and 2: ECD—Completed for Both Units
9. Eliminate Service Cooling Water Heat Exchanger Fouling: Conduct Study and Implement Corrective Actions: ECD—U1: 9/30/15; U2:6/30/16
10. Eagle 21—Replace Fans to Avoid Trip Risk: ECD—5/15/15

The DCISC will consider focusing a future Fact-finding Topic on the Top Ten Equipment Issues List at that time for the purpose of reviewing the impact of those listed items on plant safety and reliability, and/or on the results of station actions taken to address system/equipment issues.

Units 1&2 System Health Charts were reported in DCP's February 2015 Plant Performance Improvement Report. The information pertaining to the systems that were rated as "Unhealthy", i.e. Red or Yellow, is as follows:

Unit 1			
System	Color	Months Unhealthy	Expected Return to Healthy
Reactor Coolant	Yellow	10	Nov 2015
Emergency Diesel Generators	Yellow	50	Nov 2015
HVAC – Control Rm/Containment	Yellow	38	Nov 2015
120V	Yellow	18	1R20
Residual Heat Removal	Red	2	May 2015
Aux/Fuel Handling Bldg	Red	1	May 2015

Ventilation			
Fuel Handling Equip	Yellow	1	July 2015
Unit 2			
System	Color	Months Unhealthy	Expected Return to Healthy
Reactor Coolant	Yellow	13	2R19
Emergency Diesel Generators	Yellow	49	Nov 2015
120 V	Yellow	19	2R19
Fuel Handling Equipment	Yellow	1	July 2015

DCPP's System Engineering Program continued to be active and expanding. The 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 will review 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 will consider examining DCP's effectiveness in reducing the number of open Engineering Notifications. Health of the Emergency Diesel Generators (EDGs) remained a prolonged issue, which the DCISC continues to monitor.

Margin Management Program (Volume II, [Exhibit D.3, Section 3.11](#))

Margin is defined as the conservatism (i.e. safety factor, design factor, buffer, or cushion) included in the design and analysis of every plant system, structure, and component (SSC) in order to accommodate normal wear and aging of every plant system, structure, and component, instrument drift, variations in material properties, differences in maintenance practices, uncertainties in analytic methods, etc. The purpose of DCP's Margin Management Program (MMP) is to ensure that each SSC is managed with knowledge of margin concepts, such that design and operational margin is not unknowingly diminished over time. The goals of the MMP are the identification and evaluation of Margins that Matter (MTM), i.e. those margin issues having the highest potential for causing negative consequences in plant safety or reliability.

Effective margin management relies mainly on the following programs:

- Configuration Management
- Design Control
- Modification Control
- Materials Control
- Setpoint Control
- Nuclear Oversight Program
- Corrective Action Program

Operations Management

The DCP System, Structure, Component (SSC) Engineers are responsible for consulting with design engineers, operations, and maintenance personnel so as to understand the identified margin issues.

When margin issues are identified, the SSC Engineers are responsible for working with the plant health organization to formulate remediation plans. The SSC Engineers are responsible for documenting the current margin for their assigned SSCs on the “Operating and Design Margin Issue Score Sheet” in accordance with a prescribed process and documented in the plant margin reference database. The following documents and resources are used to assess margin:

- Final Safety Analysis Report Update
- Design Criteria Memoranda
- NRC Reactor Oversight Program
- Equipment Control Guidelines
- Technical Specifications
- Engineering Codes and Standards
- Setpoint Documents
- Calculations: (Electrical Load, Seismic and Floor Loading, Fire Loading, Design and Engineering)

The Plant Health Committee provides oversight of the program. At the working level, the Margin Management Subcommittee (MMSC) meets regularly (at least quarterly) and is responsible for reviewing the low margin SSCs, those ranked Red or Yellow, prioritizing issues based on significance for placement on the Top Margin Issues List, and they may assign courses of action to the affected to resolve low margin issues, and maintaining the Top Margin Issues List. The MMC also reviews Margin Management Program (MMP) metrics that are prepared and maintained by the MMP Owner. The MMSC is composed of a broad representation of engineering and operations personnel in order to bring appropriate perspectives to the issues that are reviewed and discussed by the Committee. Each member of the DCP engineering staff receives training in margin management and system and component engineers receive additional training.

Operators maintain operating margins so that they do not exceed the operating limits specified in Technical Specifications, Equipment Control Guidelines, Operating Procedures, and Surveillance Tests, and they have also received training in margin concepts and management.

The DCISC Fact Finding Team was provided with the Program Health Report for the third quarter 2014 (showing Green health) and a listing of top margin issues including issue owners, high-level summaries of actions needed, and specific completion horizons approved by the Margin Management Subcommittee Committee.

DCPP's Margin Management Program appears to be functional and healthy. Appropriate personnel have been trained. Margin issues have been identified and prioritized. The Margin Management Subcommittee appears to be functioning effectively.

Vibration Monitoring Program (Volume II, [Exhibit D.3, Section 3.7](#))

As part of its Reliability Centered Maintenance program DCPD has a Predictive Maintenance Program (PMP) to enhance plant safety and reliability through early detection and diagnosis of equipment degradation prior to equipment failure. The Predictive Maintenance Organization does this through use of installed and portable diagnostic tools, which monitor selected equipment parameters. The organization maintains a data base of identified equipment and parameters for which they establish base lines, set alert points and coordinate predictive maintenance activities. The Engineering Director has overall responsibility for the PMP. The PMP utilizes the following techniques:

- Vibration Monitoring
- Lubrication Analysis
- Infrared Thermography

Three personnel perform the Vibration Monitoring function, a fourth individual supports Lubrication Analysis, and a fifth person supports Infrared Thermography. DCPD has permanent vibration sensors with remote Control Room readouts on its Reactor Coolant Pumps, Turbine Generators, and Main Feedwater Pumps. Another approximately 300 components are monitored mostly monthly with portable vibration detecting equipment. The latest acquired data are compared with previous data for trends, and if significant degradation exists, a Notification is initiated, and components considered "degraded" are placed on a "Watch List." Not only does the Vibration Analyst identify the fault, but is also expected to provide a corrective action Recommendation. Following corrective action by Maintenance, a confirmatory vibration survey is performed to assure the correction was effective.

The Predictive Maintenance Watch List dated September 14, 2014 contained several dozen items/conditions that needed to be addressed and that had been identified through Vibration Monitoring, Lubrication Analysis, or Infrared Thermography. Less than a third of the listed items pertained to vibration. The few vibration issues of any significance are listed below:

Item	Date Identified	Estimated Completion
Cyber Diode Limits RCP Vibration Monitoring	2/7/13	10/10/15
Containment Fan Cooler Unit 1-2 Vibration	4/23/14	8/26/14
Main Feed Pump 1-2 Vapor Extractor Vibration	4//29/14	10/1/15
Gland Exhaust Fan 2-1 Vibration Increase	10/30/13	12/22/14

DCPP appears to have an active and effective vibration monitoring effort as part of its Predictive Maintenance Program. The number of open vibration issues appears to be controlled effectively.

Equipment Qualification Program Update (Volume II, [Exhibit D.4, Section 3.8](#))

The EQ Program is part of the Electrical Engineering Department. It is an industry-wide program. At DCPP it is controlled by Procedure CF3.ID3, “Environmental Qualification (EQ) Program”, 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 as 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, or steam conditions, etc. The procedure specifies or references the following: 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.

At the time of this Fact-finding Visit, the only current I&C (Instrumentation and Controls) engineer qualified for EQ determinations had retired, his replacement had also left, and a new engineer was in training to become fully qualified prior to the retirement. The DCISC Fact-finding Team was provided with the two following training documents:

1. Task Qualification Guide “Perform Tasks Associated with Performing Environmental Qualification (EQ) Related Engineering Activities”
2. Task Qualification Guide “Perform EQ Maintenance Activities”

The guides include all aspects of EQ, e.g. EQ Program scope, EQ Master List, requirements for various equipment, vendor qualification, EQ-related calculations, and EQ files. These two guides, which included both training and mentoring by a qualified engineer, appeared comprehensive and appropriate.

Some current activities underway include the following:

1. Testing and evaluation is being conducted to qualify switchgear in the 4 kV Switchgear Room for High Energy Line Break (Main Steam Line Break) conditions, primarily steam and high humidity. This is a legacy issue.
2. Rosemount Transmitters are being replaced because they are near their end of life. DCPD is qualifying the new transmitters for particular environmental conditions.
3. As part of the Life Extension Program, Raychem splices are being reviewed for replacement. Although their end-of-life is not close, they are being replaced along with the particular end-of-life component which incorporates them.

The Unit 1 EQ life extension review has been completed and the report is being written. The DCISC should review the report in a future fact-finding meeting.

The EQ Program requires the EQ Program Coordinator to prepare a self-assessment (S-A) report following each Unit 2 refueling outage. The most recent report dated March 18, 2014 covers the period October 4, 2012 through January 13, 2014. The S-A serves as the program “health card.” The report focused on significant work items “replaced/reworked due to corrective maintenance” rather than recurring items such as transmitter calibrations and scheduled EQ component or equipment replacements such as position switches and solenoid valves. The S-A concluded that “... there were no identified adverse trends in the qualification or in the maintenance of EQ equipment.” The S-A also concluded that the program complies with the NRC EQ regulation 10CFR50.49. The following major issues were identified:

- EQ trained personnel have reduced to two qualified personnel in Design Engineering due to staff reduction and re-assignments and an additional two qualified personnel in other plant assignments.
- System engineering EQ qualified component engineers have reduced to one qualified Electrical Engineering engineer and non I&C component engineers.
- There were 23 open Notifications that have EQ related issues or EQ file maintenance activities. None was considered urgent.

DCPD believes that they will need to develop a “Field Guideline for EQ Inspection and Walkdown” for the younger, less experienced engineers as the experienced engineers are retiring. Developing the field guide will be resource intensive.

One significant challenge for EQ involves the Containment Fan Cooler Unit (CFCU) cooling coils. The

CFCU's function is to cool the Containment during normal operation and accident conditions. The coils will be replaced between the 2R18 and 2R20 refueling outages. Replacement of the coils will change the Containment environment temperature, which may require re-qualification of instruments inside Containment. This work will be performed by a contractor.

Also, the CFCU fan motors need replacement because their mechanical capability is considered poor. Qualified motors are available but will require an economic and engineering evaluation and an executive decision to move forward.

The following are S-A identified and reviewed EQ devices replaced or reworked due to corrective maintenance:

1. Reactor Vessel Vent Valve RCS-2-8078C&D exhibited a failed seat leak test during a shop test and was repaired.
2. Reactor Coolant System (RCS) Loop 1 Temperature Monitor TM-413A failed low reading, and a temporary modification was issued until the Resistance Temperature Detector was replaced in Outage 1R18.
3. RCS Loop 3 temperature element TE-433A exhibited an erratic reading, and a temporary modification was issued until TE-433A was replaced in Outage 1R18.
4. Rebuild of the valves on RCS-SOV-5 spool piece was performed because the valves failed their stroke test. A repaired spool piece was installed in Outage 2R17.

The S-A concluded that the above activities were properly performed.

The DCPD Equipment Qualification Program appeared satisfactory. Because of an upcoming retirement, a new engineer was being qualified for the process.

Reactor Vessel Material Specimens and Fracture Toughness (Volume II, [Exhibit D.6, Section 3.6](#))

The DCPD Reactor Vessel Surveillance Program (RVSP) manages loss of fracture toughness of reactor vessels due to neutron embrittlement in reactor materials exposed to neutron fluence exceeding 1.0×10^{17} neutrons/cm² for neutron energies above 1.0 MeV (Million Electron Volts). Capsules of RV material are periodically removed from the vessels during the course of plant operating life. Neutron embrittlement is evaluated through capsule testing and evaluation, ex-vessel neutron fluence calculations, and actual measurement of reactor vessel neutron fluence. Data resulting from the program are used to determine RCS pressure-temperature limits, minimum temperature requirements, and end-of-life fracture toughness requirements. Fracture toughness relates to the ability to withstand Pressurized Thermal Shock.

Pressurized Thermal Shock (PTS) is a concern for pressurized water reactors due to its potential to rupture the Reactor Vessel as a nuclear plant ages and neutron impingement hardens or embrittles the Reactor Vessel. If the vessel, which normally operates at approximately 600 degrees F and 2200 pounds per square inch of pressure (psi), were to experience a cold-water shock from inadvertently

injecting cold water into the vessel while at operating pressure, it is possible that existing cracks in the vessel could rapidly enlarge, resulting in a vessel rupture. Such a rupture could make it difficult to safely shut down the reactor and/or to maintain core cooling. This phenomenon is a concern only for vessels embrittled by years of high-energy neutron flux. Nuclear plants are designed and analyzed to be able to withstand such a shock without damage during their operating lives. For this reason DCP's reactors have a system, LTOP (Low Temperature Overpressure Protection) System, which prevents pressure increases above a selected point when at lower temperature upon increasing or decreasing power.

The DCISC Fact-finding Team was informed that DCP possesses enough metallic coupons, either in the reactor itself or already removed and in the Spent Fuel Pool, to support the plant's need to determine the capability of the reactor vessel to withstand the effects of pressurized thermal shock out to the full 40-year lifetime of the plant, as well as the proposed 20-year extension, if NRC grants a license extension. DCP is able to rely on additional backup information on tests conducted on specimens from another nuclear plant because the reactor vessel at that plant, and the accompanying metallic specimens, were fabricated from the same batch of metal as was the reactor vessel at DCP. DCP's two reactor vessels are slightly different in composition. Hence, they have slightly different metallic properties, slightly different susceptibilities to PTS, and different specimens for testing.

In January 2010 the NRC approved a final rule to provide alternate requirements for protection against pressurized thermal shock events in nuclear power plant reactor vessels. The NRC indicated that the rule, "Part 61a of Title 10, Code of Federal Regulations", increases the realism of calculations used to examine a Pressurized Water Reactor's (PWR's) susceptibility to PTS. Plants like DCP can choose whether to abide by the new rule or the earlier rule, known as "Part 61." Updated analysis methods allow PWR licensees to better account for some effects of aging on their reactor vessels. The NRC's announcement regarding this rule noted that the revised approach was derived using data from research on currently operating PWRs. This research was in three different areas: (1) the types of scenarios, and the likelihood of such scenarios that might lead to PTS, (2) the thermal and thermal hydraulic conditions that would occur during the various scenarios, and (3) the metallurgical properties of the vessels and welds and of their responses to PTS types of events.

Also noted was that the data indicate the overall risk of PTS-induced reactor vessel failure after 60 years of operation is much lower than previously estimated. If plants choose to adopt the new approach, the rule requires PWR operators to perform detailed analyses of both reactor vessel surveillance data and the results of regular reactor vessel inspections. If the analyses' findings exceed certain limits, the operator must take steps either to limit the reactor vessel's exposure to neutron radiation or to determine how the reactor's systems can be modified to prevent PTS-induced vessel failure.

DCP has chosen to address PTS by abiding by the old rule as well as the new rule, the latter of which would be used to increase design margin to permit more relaxed temperature-pressure curve operating restrictions.

Several coupons that have been removed have already received the equivalent of 55 Effective Full Power Years, which replicates 60 calendar years of plant operation because the units do not run continuously at full power throughout their lifetimes but rather shut down periodically for refueling and maintenance. These specimens are subjected to a testing process that verifies their ability to withstand the forces of PTS. The test used to determine fracture toughness is the well-known and standardized “Charpy V-Notch” test.

For Unit 1 the last capsule is expected to be withdrawn during the 1R23 refueling outage in 2022 after it has accumulated a fluence equivalent to 94.2 years of operation. The remaining four standby capsules have low lead factors and will remain in the vessel throughout the vessel lifetime to be available for future testing. There are no capsules remaining in the Unit 2 vessel. All capsules were removed because high lead factors produced exposures comparable to the fluences at the end of the period of extended operation.

DCPP’s reactor vessel material surveillance program appears satisfactory to support operation through the normal end-of-life as well as an additional 20 years, should life extension be sought by DCPP and granted by the NRC.

Licensing Basis Verification Project (Volume II, [Exhibit D.8, Section 3.9](#))

The purpose of the Licensing Basis Verification Project (LBVP) is to perform an objective evaluation to ensure the DCPP’s licensing basis has been adequately maintained, and to resolve any identified discrepancies. This is a voluntary effort by PG&E to ensure safe and reliable continued operations, and in this effort the LBVP is aligned with NRC. The goal is to provide the best possible Final Safety Analysis Report (FSAR) and the most accurate current licensing basis (CLB) determination to enhance technical evaluations going forward. Additional key goals are to provide and enhance knowledge transfer of the CLB. The FSAR is a summary document of DCPP’s commitments to the NRC which documents the plant’s design basis. When changes are made to DCPP they are reviewed against the licensing basis and the FSAR to ensure continuing compliance. The FSAR is required to be updated and the updated FSAR is submitted to the NRC at the conclusion of each U-2 refueling outage.

The main scope of the LBVP is as follows:

- To evaluate the facility and analyze changes made since completion of the original FSAR in 1980 through the current FSAR and to resolve any licensing basis discrepancies discovered.
- To update the FSAR, including technological hyperlinks to its source documents (e.g., correspondence with the NRC, safety evaluations, etc.) and to create a Google-like search tool.
- To improve the current licensing basis database full-text search capabilities.
- To perform corrective actions for issues identified. The project is staffed to do evaluations, operability assessments, calculations, etc.

- To enhance knowledge transfer by rotation of engineering and operations staff onto the project.
- To perform component design bases reviews, after the licensing basis has been validated, of five risk-significant systems (Component Cooling Water, 230 kV, 500 kV, Emergency Diesel Generator, and Auxiliary Feedwater). These reviews are modeled after NRC inspection procedures around component design basis inspections.

DCPP has made a commitment to the NRC to complete the LBVP by December 31, 2015. Completion of the LBVP includes:

- All licensing basis review reports
- System review reports
- FSAR updates
- Component design basis review reports
- Electronic database upgrades
- Implementation of new current licensing basis search tools
- Resolution of licensing basis discrepancies that do not require prior NRC approval

The DCISC was interested in one particular LBVP issue in this meeting: the Hosgri seismic and LOCA (Loss of Reactor Coolant Accident) load requirements for the new Reactor Vessel Head and new DCPP Steam Generators. Apparently, the DCPP-specific requirements for procurement of these components had been overlooked when ordered as replacements; however, the components had been designed to generic industry requirements. This discrepancy was originally identified by the LBVP Project as reported to the DCISC in its November 20-21, 2013 Fact-finding meeting (Reference 6.10). As reported at that time, a Prompt Operability Assessment (POA) was completed permitting continued operation and a seismic re-analysis was initiated. This work is expected to be completed and approved by September 30, 2015, and the related Westinghouse concrete load report by October 20, 2015.

Regarding the overall status of the LBVP, the following was reported to the DCISC:

1. System reviews and FSAR updates are to be completed by June 30, 2015
2. All FSAR reviews and section updates (excluding corrective actions) are to be completed by December 31, 2015
3. All corrective actions are to be completed in 2016

DCPP's Licensing Basis Verification Project (LBVP) continues to progress on schedule with a completion date of year-end 2015. An issue identified by the Project, incorrect specification of the seismic and loss-of-coolant accident loads on the new reactor vessel heads and steam generators, is being re-analyzed, and is expected to be completed by September 2015.

4.3.3 Conclusions and Recommendations

Conclusions

Overall, DCP's Engineering Program continued to be strong. DCP's Design Quality measures showed satisfactory performance based on scores of final designs released for installation.

DCP's System Engineering Program continued to be active and expanding. The 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. System Engineering continued to provide an effective method for evaluating and tracking system health, for identifying priorities, and for determining, planning, and undertaking needed actions to maintain system health. The significant reduction in Open Engineering Notifications is a reflection of an increased focus by the Engineering Department on addressing identified issues.

DCP appeared to have an active and effective vibration monitoring effort as part of its Predictive Maintenance Program. The number of open vibration issues appeared to be controlled effectively.

The DCP Equipment Qualification Program appeared satisfactory.

DCP's reactor vessel material surveillance program appeared satisfactory to support operation through the normal end-of-life as well as for an additional 20 years, should life extension be sought by DCP and granted by the NRC.

Design Quality has been on Quality Verification's top issues lists since its down-rating in Refueling Outage 1R17 which concluded in June 2012. Engineering has performed assessments and implemented corrective actions, which resulted in enough improvement in Outage 2R18 (Fall 2014) that QV changed Design Quality from a "top issue" to "monitoring." Since January 2014, the Design Change Program has shown Green (good) health.

The Plant Health Committee meetings were conducted efficiently and effectively. Members and presenters appeared to be well prepared. Discussion was active, thoughtful, and probing, with a focus on safety.

DCP's Margin Management Program appears to be functional and healthy. Appropriate personnel have been trained. Margin issues have been identified and prioritized.

Licensing Basis Verification Project (LBVP) continues to progress on schedule with a completion date of year-end 2015.

Recommendations:

None

[25th Annual Report](#), [Volume 1](#), Section 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 “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 (2013–2014) the DCISC reviewed the following human performance-related items:

- Human Performance Program Update

The DCISC concluded during the previous reporting period that there were Three Station Level Human Performance Event Clock Resets during the fourth quarter of 2013, causing the station’s 18-month indicator for such Resets to become Yellow (deficient). Two of these three events involved Operations personnel. Operations performance with respect to human error rate has been Red (Unsatisfactory) since July 2013. Component mispositioning appears to be a contributor. The DCISC will examine Operations’ efforts with regard to plant status control and component mispositioning during the next reporting period. The DCISC will continue periodic reviews of human performance as dictated by station events and overall performance.

4.4.2 Current Period Activities

During the current period (2013–2014) the DCISC reviewed the following human performance-related item:

- Human Performance Program Update

Human Performance Program Update (Volume II, [Exhibit D.7, Section 3.8](#))

As early as July 2012, DCP’s Quality Verification Department had identified Human Performance as a concern and carried it as such throughout most of 2013. During the fourth quarter of 2013 DCP experienced three Human Performance Clock Resets, which are considered to be significant departures from expected performance. These Resets were discussed during DCISC’s January 2014 Fact-finding Visit and are included in DCISC’s Report on that Visit.

One purpose of this Fact-finding Visit was to review DDPP performance since January 2014 and gain an understanding of actions taken and planned by DCPD to achieve improvement. The other purpose was to examine Operations Performance since January 2014. The station recognized that increased focus and greater effort needed to be applied to human performance. In early 2014 DCPD performed a Root Cause Evaluation on an “Adverse Trend in Human Performance Resulting in Plant Events”. The Root Cause of the situation was determined to be inadequate personal accountability that was reflected in a culture that did not drive human performance to meet expected standards. Two other factors were also identified as contributing to this situation: 1) over dependence on one individual to implement the program, and 2) weaknesses in causal evaluations that tended to focus overly on the individual involved with the problem and consequently overlooked possible organizational and programmatic factors. DCPD’s analysis examined not only the three events that were reportable to the NRC but other station occurrences that involved human performance.

All actions arising from the 2014 Root Cause Evaluation have been completed. Those corrective actions involve:

- Performance Improvement Coordinators formerly reported to their respective departments, but now report directly to the HP Program Manager. This helps to avoid situations in which the Coordinators could be diverted to other tasks within their respective departments.
- Establishing a set of rewards and reinforcement practices that drive a culture of self-accountability at the worker, supervisor, manager, and senior leadership levels. Accountability involves non-punitive consequences that are separate from the DCPD Positive Discipline process and also involves a discussion between the individual responsible for making the error and his/her leadership.
- Establishing a Human Performance Champion position to bring energy and awareness to the station regarding human performance. Implementation of this is to help drive a culture of accountability to the worker level by reinforcing desired behaviors involving the use of human performance tools.

Four major insights also arose from the analysis of the three station level events that resulted in Human Performance Event Clock resets, as follows:

- Apparent Cause Evaluations were narrowly focused and they tended to neither examine the situation beyond the individual who made a mistake, nor address organizational and/or programmatic issues. Therefore, follow-up often consisted simply of assignment of accountability and coaching.
- Weaknesses in procedures and work documents had an impact on some of the events. This was particularly true for procedures that transitioned from providing specific directions early in the procedure to providing more general guidance as the procedure progressed. The more general guidance tended to create situations that were more likely to lead to errors.
- In some cases workers lacked the capability to recognize the need to reduce risks, or to understand how to reduce risks.

- Personnel did not consistently or properly use human performance tools, and management and supervisors did not consistently educate workers to the expected standards.

The results have been favorable. Data from DCP's Monthly Plant Performance Improvement Reports indicate that Station Level Human Performance Clock Resets have been reduced. (This is an indicator that takes the number of human performance events for the prior 18 months and divides that number by the quotient of total person hours during that period and 10,000). The value of that performance indicator at the time of DCISC's January 2014 Fact-finding Visit was 0.0062. Its value in January 2015 of 0.0070. On the surface this would seem to indicate that DCP's Human Performance has actually deteriorated slightly during the past year (i.e. The rate of Human Performance Events has actually increased slightly.) However, DCP's indicator, which measures performance over an 18 month period is currently reflecting Human Performance events that occurred during October, November, and December of 2013, and those earlier events comprise 75 percent of the issues reflected in the current indicator. Therefore, if the station continues to operate as it has during the past 12 months, that 18 month indicator will decrease (i.e. improve) dramatically from April through June of this year.

The Operations Department has been performing commendably. In particular, with respect to Plant Status Control, the Station as a whole was rated as Green (top rating) for the period September 2013 through February 2015 as shown in DCP's Plant Performance Improvement Report. In particular, during that period the Operations Department experienced 4 Department Level Events, and Zero Station Level Events. Likewise, the Operations Department's performance with respect to Component Mispositionings has been commendable for the period February 2014 through January 2015. During that period the Operations Department incurred four Level 3 (i.e., Minor) Mispositionings and four Level 4 (i.e. Immediately Identified and Minor) Mispositionings. It is also worthy of note that DCP's performance as a whole with respect to Component Mispositionings was rated Green (top category) for the three month period November 2014 through January 2015 as reported in DCP's January 2015 Plant Performance Improvement Report dated February 13, 2015.

4.4.3 Conclusions and Recommendations

Conclusion:

Recent improvements in Human Performance at DCP reflect noticeable resources that the station has devoted to this important topic. The Operations group in particular has achieved commendable improvements in Component Mispositionings. The DCISC will reexamine these performance areas no later than the third quarter of 2016 to determine the degree to which these improvements are being sustained.

Recommendations:

None

[25th Annual Report](#), [Volume 1](#), Section 4.5, Health, 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 DCPD 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 (2013–2014) the DCISC reviewed the following:

- Safety Culture (DCPD Knowledge Transfer Program)

The DCISC concluded the following during the previous reporting period:

The DCPD knowledge transfer program, “Passport to Knowledge” appears well-designed but full implementation has taken a back seat to higher priority items such as outage planning and outages. The DCISC encourages DCPD to move forward with this program to not lose valuable job knowledge as employees retire.

4.5.2 Current Period Activities

During the current period (2014–2015) the DCISC reviewed the following topic that focused specifically on the two following topics of Health, Nuclear Safety Culture, or Safety Conscious Work Environment:

- Safety Conscious Work Environment
- Nuclear Safety Culture

Safety Conscious Work Environment Update (Volume II, [Exhibit D.7, Section 3.7](#))

DCPD has been enlarging its efforts with respect to both nuclear and personnel/industrial safety, with the objective of fostering a Safety Conscious Work Environment. The Nuclear Safety Culture Monitoring Panel continues to maintain active oversight of station results in these areas. Examination of station events from the standpoints of human performance and possible underlying issues has been a long-term, active aspect of an ongoing effort to operate the facility in a safe manner and to protect members of the DCPD workforce from injury. More recently, however, a greater focus has been placed on observing work activities for behaviors that may not have resulted in problems at the time of the observation, but could be precursors to possible future problems.

Supervisors and managers are being encouraged, and are expected, to take the time to engage in this observation activity, to provide feedback to their personnel on the job, and to listen to and strengthen their relationships with their subordinates.

In order to strengthen the observation process itself, some observations have, at times, been expanded to have more than one observer, and occasionally to have one observer observe another observer. Sometimes a supervisor and a manager will observe together, and they can also observe each other in the same process. The exchange of information has been found to be of benefit to the worker, the supervisor, and the manager. The results of these observations are then compiled and reviewed to identify strengths as well as issues that are in need of attention. The process, however, has not been implemented long enough to generate conclusive, meaningful data. In short, the station is still actively examining physical performance data, but is also supplementing these data with observations in the plant.

DCPP has increased its emphasis on the facilitative aspects of being a leader, and a recent survey indicated that working level personnel have been feeling more comfortable in providing information upward within the organization. Emphasis is continuing to be placed on this aspect of the organization (i.e. encouraging workers to provide feedback to supervisors and managers) as well as on communicating and reinforcing standards, self-reporting of issues, and promoting personal accountability.

The station is in the process of developing a chart of major characteristics of and contributors to nuclear safety, with each major characteristic being supported by a number of related aspects of an organization and its people. However, the listing was not yet formalized to the point of being released within DCPP.

The commercial nuclear industry's governing document is "Fostering a Healthy Nuclear Safety Culture", dated March 2014, and issued by the Nuclear Energy Institute, an organization that is supported by all U.S. nuclear plants and whose purpose, as the title of the above document implies, is to help its member companies achieve high levels of nuclear plant safety and reliability. The document identifies two key success factors for the monitoring process that can help create and foster an effective nuclear safety culture: 1) Inputs need to be obtained from a variety of data sources in order to discern emerging trends and 2) Organizations need to be genuinely self-critical, and interactions within the organization need to reflect and foster this aspect in the monitoring process.

DCPP's Interdepartmental Administrative Procedure (IDAP) OM16.ID2, "Nuclear Safety Culture Health Monitoring", dated December 8, 2014 prescribes responsibilities for creating and maintaining a healthy nuclear safety culture from the level of the Chief Nuclear Officer to station officers and managers and specifically to a station group, chaired by the Site VP and consisting of station directors, designated as the "Safety Culture Leadership Team." Input to this group comes from a report prepared by the station's "Nuclear Safety Culture Monitoring Panel (NSCMP)". Members of the NSCMP are "seasoned nuclear professionals with broad, diverse backgrounds in nuclear plant operations and maintenance." These members would typically have management or

supervisory responsibilities in areas such as nuclear regulations, industry operating experience, quality assurance, benchmarking, corrective action, security, human resources, employee concerns, and management observations.

Nuclear Safety Culture (Volume II, [Exhibit B.9](#))

At DCPD nuclear safety culture is made up of core values and behaviors, which result from a collective commitment from leaders and individuals to emphasize safety over competing goals to ensure the protection of people and the environment. DCPD emphasized that it is not just plant leadership, the entire plant needs to participate and practice nuclear safety culture principles. Traits of a healthy nuclear safety culture are as follows:

- Individual Commitment to Safety
 - Personal Accountability
 - Questioning Attitude
 - Effective Safety Communication
- Management Commitment to Safety
 - Leadership Safety Values and Actions
 - Decision-Making
 - Respectful Work Environment
- Management Systems
 - Continuous Learning
 - Problem Identification and Resolution
 - Environment for Raising Concerns
 - Work Processes

The station's Safety Conscious Work Environment (SCWE) which is stressed by industry guidance to ensure that individuals feel free and are openly willing to identify and raise issues, questions or concerns, express differing viewpoints or perspectives dealing with nuclear or radiological safety, quality, security, environmental or regulatory compliance and do so without fear of retaliation. DCPD's preferred route for persons to raise issues is through their supervisor, however, individuals can also go to managers, directors, the NRC, or raise their concerns through the plant's Employee Concerns Program (ECP). Issues identified are addressed promptly, with timely feedback to the initiator. Employees can raise concerns anonymously and one measure of the existence of a chilled environment is assessing the number of anonymous concerns and he remarked that the number of anonymous notifications or concerns raised by DCPD employees is low. Some of the concerns raised anonymously may not necessarily be germane to nuclear safety culture or issues and some may be raised anonymously for reasons of expediency.

The plant also periodically conducts surveys of its employees concerning their perception of nuclear safety culture and also arranges for independent assessments by outside organizations which include interviews, surveys and observations to assess nuclear safety culture. DCPD leaders also spend time in the plant observing activities and seeking feedback from the craft. DCPD also monitors its contractors in these efforts and he observed that the Corrective Action Program provides visibility for management's actions in response to notifications or concerns. DCPD leadership works to employ facilitative leadership behaviors. Data obtained from surveys does not demonstrate a decline in a healthy nuclear safety culture. Sometimes employees may disagree with the outcome or resolution of their concerns but that this is not necessarily indicative of a chilled environment relative to nuclear safety culture. Having a fair method for adjudicating disagreements, akin to a peer review process in academia, is a critical element to avoid a chilled environment. Providing feedback to the individuals raising concerns is a key element and attribute of a healthy nuclear safety culture. Similar to the peer review process cited by Dr. Peterson, DCPD also has a Differing Professional Opinion (DPO) program, which allows an appropriate level of review for technical issues.

The DCPD Nuclear Safety Culture Monitoring Panel (NSCMP) assesses nuclear safety culture using the recommendations of NEI 09-07, "Fostering a Healthy Nuclear Safety Culture", which places primary responsibility on management to provide an ongoing holistic, objective, transparent and safety-focused process. The process evaluates inputs from:

- Corrective Action Program
- Performance trends
- NRC inspections
- Industry evaluations, audits, and Operating Experience
- Independent and self-assessments
- Employee Concerns Program

The NSCMP monitors these inputs to identify early indications of potential concerns in the work environment that merit additional attention by the organization. It has been rare for DCPD to receive a concern under the DPO Program.

DCPD has undergone a number of NRC inspections that examined nuclear safety culture attributes of its regulatory, correction action, performance improvement, human resources, ECP, security and quality assurance functions. The latest assessment of the data used for evaluation and trend identification concluded in September 2014, by both the NRC through its PI&R inspection as well as recent NSCMP assessments, indicates that DCPD continues to exhibit the traits of a healthy nuclear safety culture. The responsibility is placed on management to lay the groundwork for nuclear safety culture and to ensure there is a framework in place in which employees can raise concerns in a respectful work environment and the onus is on individuals to demonstrate personal accountability and a commitment to safety.

4.5.3 Conclusions and Recommendations

Conclusions:

DCPP is organizationally focused on fostering a safety conscious work environment from the standpoints of both nuclear and industrial safety. The station appears to be in the early stages of implementing an enhanced process for observing station work activities. This includes obtaining feedback from employees being observed, occasionally conducting an observation with more than one observer, and expanding the amount of data that are retrieved and analyzed. The DCISC will continue to follow this area actively.

Recommendations:

None

25th Annual Report, Volume 1, Section 4.6, Performance Improvement Programs

4.6.1 Overview and Previous Activities

Termed “Corrective Action Program” in previous reports, this section is now expanded to “Performance Improvement Programs” to include programs included in DCP’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’ experience.

As have all nuclear plants, DCP 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 analysis, which is utilized to ascertain the real cause of a problem or event such that corrective action can be taken to prevent its recurrence. During the previous reporting periods, the DCISC has reviewed the DCP CAP and numerous events, which were identified and resolved using the CAP. NRC refers to this type program as Problem Identification and Resolution (PI&R).

The events, analyses, and corrective actions reviewed during the previous several reporting periods included the following:

- Operating Experience Program
- Performance Improvement Review Board
- Trending Program
- Corrective Action Program and Self-Assessment Program Audit by Quality Verification

The DCISC concluded in the last period that DCP’s Performance Improvement Program continues to be strengthened with the improving Operating Experience Program, Trending Program, and Performance Improvement Action Plan, a multi-faceted plan to integrate the results of several assessments and reviews of the program and by dedicated management performance improvement oversight boards such as the Performance Improvement Review Board. DCP’s Performance Improvement Program is extensive and multi-faceted. It includes identification, analysis, follow-up action, and monitoring of progress with respect to aspects of internal performance as well as to issues and strengths that are reported within the industry and that are determined to be applicable to DCP. The station’s senior managers and Quality Verification Department exercise major roles with respect to the implementation of this program.

4.6.2 Current Period Activities

The DCISC reviewed the following in DCP’s Performance Improvement Program during the current reporting period:

- Self-Assessment Program
- PIP Performance
- Untimely Corrective Action on Containment Spray System
- Benchmarking Program

- Operating Experience Program

Self-Assessment Program (Volume II, [Exhibit D.3, Section 3.3](#))

The objective of the Self-Assessment Program (S-AP) is to promote continuous improvement. Current performance is compared to management expectations, industry standards of excellence, and regulatory requirements to identify areas needing improvement. Self-assessments also identify strengths applicable to other station groups. DCPD has six types of self-assessments:

1. Formal Self-Assessment—an evaluation of a particular program, process, system or potential problem area using a structured methodology involving scheduling, planning, one or more industry peers, a team of DCPD personnel, training, documentation in written reports and Notifications, and report-outs to management and follow-through.
2. Independent Assessment—an evaluation of organizations, programs, processes, activities, potential problem areas, etc. that are routinely scheduled and performed by independent oversight groups such as QV, NSOC, etc.
3. Ongoing Self-Assessment—an ongoing evaluation of performance and processes performed on a regular basis to check that standards are being achieved. These activities are performed as specified by the respective program or process requirements. Examples of ongoing self-assessment activities include: management observations, trend analyses, critiques, corrective action effectiveness reviews, etc.
4. Quick Hit Assessment—a narrow, snapshot look at a specific program, process, or issue, usually of one-to-two day duration, typically performed by one or two persons.
5. Recurring Assessment—an assessment having a specified recurrent frequency.
6. Outside Assessment—Assessments at DCPD conducted by outside groups. However, a DCPD team lead and/or sponsor is/are typically assigned to ensure “DCPD ownership” of the process and the final product. This “ownership” is not intended to influence the objectivity or the determinations of the outside group, but rather to ensure that DCPD expectations are met.

The DCPD S-AP is described and controlled by Procedure OM15. ID4, “Self-Assessment and Benchmarking.” This procedure describes the various station responsibilities for performing, reviewing, reporting and approving the various types of S-As. It outlines the process and requirements for all types of S-As, especially formal S-As. Formal S-As are subject to effectiveness reviews approximately six months after the final S-A recommendation is complete. The Self-Assessment Review Board (SARB) reviews each effectiveness review to determine if results have been achieved as expected.

The DCPD SARB, consisting of the Site Senior Management personnel, sets the number of formal S-As for the upcoming calendar year. DCPD typically performs 10-to-15 formal self-assessments per year as well as typically 10 benchmarking trips to other nuclear facilities. The self-assessments are planned in advance for the year ahead and are carried out in accordance with the S-A procedure milestone schedule. The SA Coordinator keeps track of the progress of each S-A with the milestone schedule. Effectiveness reviews are performed on each S-A upon completion.

DCPD Self-Assessments are monitored and reported in the monthly Plant Performance Improvement Report (PPIR). The report lists all ongoing and planned formal S-As along with the lead organization/manager, milestones progress compared to pre-defined time-tables, and effectiveness review status. As of the date of this Fact-finding meeting, the overall S-AP health was reported as “Green”, i.e. Top Rating. There were a number of White ratings, each of which served to indicate that the particular milestone for the S-A had not yet become due, rather than having become delinquent. Therefore, at the time of this review the station had met every predefined milestone

for the 2014 Formal Self-assessments.

Brief summaries of the station strengths and improvement opportunities are identified in the two following S-A reports:

DCPP S-A Report on Pre-NRC Inspection of Problem Identification and Resolution Function

Pre-NRC Inspection Conducted 4/21/14—4/24/14

Summary of Results

Strengths

- None

Improvement Opportunities

- Weekly audits of equipment deficiencies related to operator workarounds were not regularly logged as required.
- Several Prompt Operability Assessments (POAs) were not updated with required refueling outage exit justifications.
- Active POAs were not always reviewed at daily management meetings.
- Some long term POAs did not meet expectations for resolution timeliness or for documentation of justification for remaining open.
- Operability Determinations were not performed on some components leaking Boric Acid.
- A need to evaluate the administration of Prompt Operability Assessments was cited in the report.
- One reportability determination was not completed within the station's required period of 30 days.
- The requirement to accompany Extent of Condition evaluations with Operability Determinations was not documented in the governing plant procedure.

DCPP S-A on Foreign Material Exclusion (FME) Program

Summary of Results

Strengths

- FME covers for station vent piping surpassed industry standards.
- FME practices at the reactor cavity were recognized as a strength as were the knowledge of the involved personnel and the coaching they provided.

Improvement Opportunities

- Workers in the Spent Fuel Pool area wore loose items under their protective clothing, which is contrary to industry best practices.

DCPP's Self-Assessment Program appears to be in continuing good health. The program administrators are knowledgeable, highly organized, and efficient. The DCISC should continue to review this on a regular basis,

which means about two years hence.

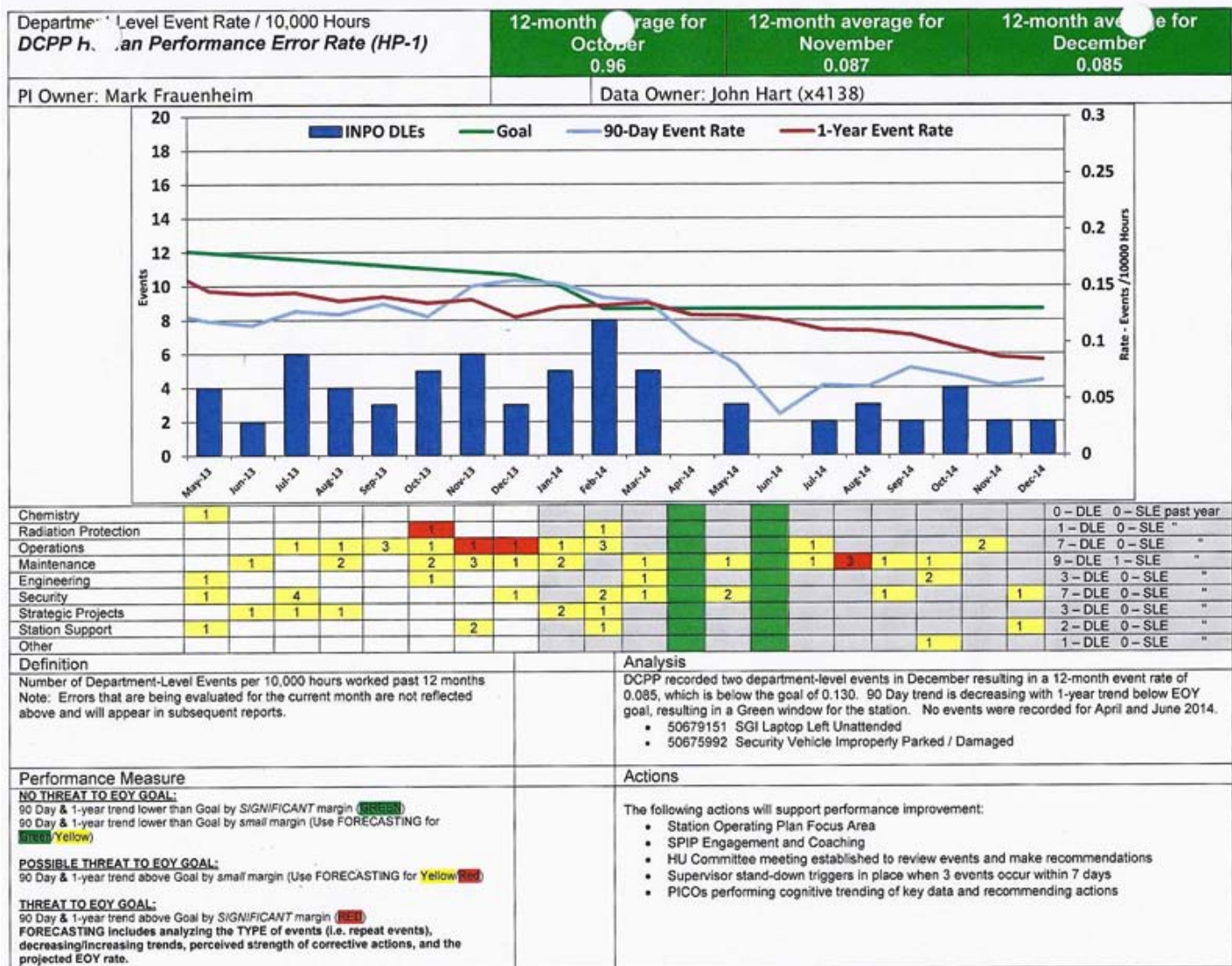
Performance Improvement Program (PIP) Performance (Volume II, [Exhibit D.6, Section 3.3](#))

As its name states the PIP is a program of performance improvement instituted to achieve excellence in nuclear plant operation and safety. DCP and all other domestic nuclear power plants have had their individual PIPs for a long time. The nuclear industry, via INPO, issued in October 2014 a new guideline, “Conduct of Performance Improvement.” The new guideline, a significant change in the behaviors and practices for PIPs was prepared and issued to focus on prevention and to reduce unnecessary administrative requirements and take a more practical approach to PI. The new NRC-approved guideline establishes a Performance Improvement Model with the following attributes:

- Engage, Identify, Prevent—establishing a culture wherein engaged employees seek to correct adverse behaviors and conditions before problems occur as well as having a low threshold for problem identification.
- Screening—screening by a cross-functional team to identify and address the more significant issues in the existing formal Corrective Action Program (CAP) and lower-level issues would be addressed more informally by line managers.
- Management Action, Approved Process, and Corrective Action—three processes or methods to address issues (1) formally (CAP) and less formally, (2) an “approved process”, and (3) management action as the issue significance directs.
- Performance Monitoring—methods to monitor performance including self-assessments, benchmarking, observation/coaching and performance indicators to facilitate identification of problems before consequential events occur. Included here would be corrective action effectiveness reviews

DCP has revised its overall PIP Procedure OM15.ID5, “DCP Performance Improvement Program, Revision 9, Effective October 30, 2014”, to comply with the new guidelines. The DCISC reviewed the updated procedure and found that it appropriately complied with the new industry guide. Lower-level implementing procedures are also being revised. This, along with other actions is included in a comprehensive DCP Performance Improvement 2015 Next-Level Actions document. The DCISC believes the new streamlined approach focused on prevention will be an improvement in reducing problems at DCP.

Related to PIP, the DCP human error rate and the number of Station Level Human Performance Clock Resets have been improving steadily since February 2014. The 90-day and one-year event rates are well below DCP goals, and are rated Green. This has been due primarily to an augmented management observation program, employee engagement sessions, establishment of a Human Performance Committee to review events and make recommendations, and work stand-downs when events occur. See the human performance trend chart below.



Also, the Station Level Clock Resets, though not currently meeting goal, are showing improvement.

The DCISC believes the new streamlined and prevention-based Performance Improvement Program (PIP) approach will be an improvement in reducing problems at DCP. Human performance has improved steadily since February 2014 primarily due to augmented management observations, coaching and counseling, employee engagement, a new Human Performance Committee, and work stand-downs following events. The DCISC should continue to follow DCP's PIP, especially the PI 2015 Next-Level Actions document.

Untimely Corrective Action on Gas Intrusion into the Containment Spray System (Volume II, [Exhibit D.6, Section 3.9](#))

The DCP Containment Spray System (CSS) provides water to a spray header high inside Containment to help limit and reduce temperature and pressure of steam following a Loss of Coolant Accident (LOCA) or Main Steam Line Accident. The CSS pump takes its initial suction from the Spray Additive Tank, which adds sodium hydroxide to the liquid to be sprayed to help reduce the pH in Containment to help retain radioactive materials.

In May 2011 a Corrective Action Program (CAP) Notification was written, based on industry operating experience, to identify the potential for gas intrusion into the suction of the CSS pumps following a LOCA. The gas would have been educated from the Spray Additive Tank following draining of the solution from the tank. A Prompt Operability Assessment (POA) was written to support continued operation. The basis for the POA was a

Westinghouse evaluation that a void fraction of less than 2% would occur, which would have no deleterious impact on CSS Pump operation without compensatory actions; however, because the DCPD licensing basis is zero void fraction, it was understood that corrective action would be required to preclude any air ingestion.

The original proposed corrective action was to revise a procedure to have Operations watch the tank level and isolate it when low. This was rejected by Operations, and DCPD reviewed other options until August 2014, when the original procedure change was decided upon and would finally be made. During its Problem Identification and Resolution inspection, the NRC determined it to be a Non-Cited Violation due to the three-year delay in corrective action. The procedure change is due by March 15, 2015.

DCPD initiated an Apparent Cause Evaluation to determine the cause for the delay and corrective actions to prevent recurrence. The causes were determined to be that

1. Existing DCPD processes do not address timely resolution of degraded/non-conforming conditions when an item is considered operable.
2. Current DCPD Processes do not adequately consider the regulatory consequences of the long-term failure to meet licensing bases for a degraded condition.

In addition to the above-mentioned procedure change, DCPD changed its process to require Plant Health Committee quarterly reviews of all POAs to concur with the corrective action, to monitor the timeliness for implementation, and to monitor the effectiveness of the interim actions.

DCPD's action to account for the potential for gas intrusion from the Spray Addition Tank into the Containment Spray System Pump was not timely, taking three years, hence the Non-Cited Violation (NCV) by the NRC. In actuality, the gas intrusion would not have physically caused a problem; however, it violated the licensing basis, which stated zero intrusion. DCPD had itself come close to implementing its corrective action at the time of the NCV; however, it should have been timelier in its approach to satisfy the licensing basis.

Benchmarking Program (Volume II, [Exhibit D.9, Section 3.7](#))

Station Procedure OM15.ID4, "Self-Assessment and Benchmarking Procedure, OM15.ID4", defines benchmarking as "a study which first identifies best practices in one or more organizations and subsequently compares DCPD programs, processes, products, and services to identify gaps, develop recommendations, and set targets to improve performance." "Formal" benchmarking is a highly structured process that involves scheduling, planning, training, conducting a site visit by a DCPD team, documenting results in written reports, planning and tracking corrective actions, and evaluating the resultant changes. "Informal" benchmarking may consist of telephone interviews, surveys, resource sharing, attendance at industry meetings, querying site visitors, or internal benchmarking. Informal benchmarking may also include a site visit or a trip to a vendor or another plant, but without the structure of a formal program.

The station's Self-assessment Review Board (SARB) is the governing and reviewing body for all formal benchmarking. It is a group composed of appropriate members of the leadership team to provide oversight of benchmarking schedules, plans, and results, as well as oversight of operating experience and other station programs.

Station departments have the latitude to conduct informal benchmarking without having to schedule them through SARB. These can be conducted by phone or e-mail. Also, effectiveness reviews are expected to be conducted at the department level for Benchmarking activities

As a part of DCP's routine correspondence, DCISC is provided with copies or summaries of various station reports and other documents, some of which report the Benchmarking activities that are conducted by DCP. Examples of the topics of some of these Benchmarking reports that have been reviewed by DCISC during the past year are as follows:

1. Feedwater Iron Strategies
2. "Fix It Now" Benchmark Report
3. Design Drafting and Drawing Incorporation
4. Work Week "T+1" Meeting
5. Functioning of the Equipment Reliability Working Group
6. Evaluation of Operating Crew Performance in the Simulator
7. Operations Training Program
8. Pressurized Water Reactor Owners Group Procedure Subcommittee Meeting, with special focus on Emergency Operating Procedures, Severe Accident Management Guidelines, Extreme Damage Mitigation Guidelines, and Fukushima Response Support Guidelines

Information in the reports reviewed by the DCISC Fact-finding Team appeared to be clear and focused, and would be expected to be of potential help to the station.

The Benchmarking Program appears to continue being an active and productive method for obtaining information supporting the achievement and maintenance of safe and reliable nuclear plant operation. It continues to provide for formal and informal examinations of a broad range of nuclear plant performance areas. The program again appears to warrant DCISC's review no more frequently than biennially.

Operating Experience Program (Volume II, [Exhibit D.9, Section 3.8](#))

Industry operating experience information comes from two primary sources:

- An Industry Consolidated Event System (ICES)
- Other, including NRC, industry vendors, etc.

The former has the most extensive collection of operating event information.

The Plant receives 15–20 Operating Experience (OE) documents weekly from a variety of sources as noted above. These OEs are screened and information considered to be relevant to DCP is transmitted to department Subject Matter Experts (SMEs) who review the material for specific applicability to their areas and determine appropriate action. The process and requirements for reviewing, screening, disseminating, and evaluating this industry OE are described and controlled by plant procedure: "Assessment of Industry Operating Experience." In addition to receiving industry OE, DCP also provides its own operating experience reports to both NRC and for others in the industry.

The DCISC reviewed DCP OE Program Health for the month of February 2015 as shown in DCP's Plant Performance Improvement Report (PPIR), dated March 16, 2015. The health report measures the following attributes:

- NRC Industry Event Report (IER) Response Timeliness

IER Evaluation Quality

- OE Evaluation Timeliness
- Industry Consolidated Event System (ICES) Report Timeliness
- ICES Report Completion

OE Program Health had been Red (Unacceptable) for the period ending two months prior to the report, then improved to Yellow (Needs Improvement) for the period ending one month prior to the report, and again improved to Green for the most recent month. These overall improvements were due almost exclusively to improvements in Evaluation Quality and Timeliness. The DCISC Fact-finding Team also reviewed prior monthly PPIRs dating back through May 2014 to discern DCP's monthly performance over a longer time span. In none of those prior months was DCP's OE overall performance rated as Red. One overall rating was Yellow (November 2014) and the ratings in the other months were Green and White. The predominant reasons for these lower ratings involved timeliness of both evaluations and processing of the industry documents.

DCP also continues to engage with others in the industry in order to adopt and maintain best industry practices and has also continued to review industry performance metrics to identify top performers.

DCP continues to maintain an active and effective Operating Experience Program. DCISC should continue to examine this topic on a frequency no greater than biennially.

4.6.3 Conclusions and Recommendations

Conclusion:

DCP's Performance Improvement Program appears to be effective in improving performance at the station. The program meets all requirements of the Nuclear Regulatory Commission and industry guidance.

Recommendations:

None

[25th Annual Report, Volume 1, Section 4.7, Emergency Preparedness](#)

4.7.1 Overview and Previous Activities

An Emergency Preparedness 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 facilities used in an actual emergency situation (and used for practice in an emergency drill) 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 DCP and San Luis Obispo County interface with the media.

The DCISC reviews Emergency Preparedness at DCP 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:

- Social Media in the DCP Emergency Response Organization
- Cooperative Efforts Between DCP and the California Department of Forestry and Fire Protection (CalFire)
- San Luis Obispo County Emergency Precautionary Actions and Use of Social Media
- Observe Evaluated Hostile Action Based Emergency Exercise

The DCISC concluded the following during the previous reporting period:

DCP appeared to have made considerable progress in enhancing the capabilities of its Fire Department, both in preparation and in equipment, to respond to a station fire and/or nuclear emergency. Communications and cooperation between DCP's Fire Department and CalFire (and other nuclear plants) also appeared to have strengthened. The San Luis Obispo County Office of Emergency Services uses of Precautionary Actions and social media appeared appropriate. During an evaluated hostile action based emergency exercise the Emergency Response Organization (ERO) successfully assessed plant damage conditions that were well outside the plant's design

basis, effectively prioritized repair activities, and executed time-critical actions to successfully stabilize the plant.

4.7.2 Current Period Activities

The DCISC reviewed the following in DCP's Emergency Preparedness (EP) Program during the current period (2014–2015):

- MIDAS (Meteorological Information and Doses Assessment System)
- Emergency Preparedness NRC Violation

MIDAS (Meteorological Information and Dose Assessment System) (Volume II, [Exhibit D.2, Section 3.1](#) and [Exhibit D.8, Section 3.3](#))

For practice emergency exercises or actual accidents involving radioactive material releases, radioactive dose assessment begins in the Control Room (CR) (or Control Room Simulator for practice exercises). Operators in the CR use a program named “EPR2net” to make initial calculations of offsite radiological consequences as described in DCP Procedure EP R-2, “Release of Airborne Radioactive Materials Initial Assessment.” The backup for this process is a manual calculation of radiological consequences using templates and pre-determined formulas. When the Unified Dose Assessment Center (UDAC), a joint DCP and San Luis Obispo (SLO) County team, is activated in a practice exercise or an actual emergency, they assume the duty of calculating offsite radiological consequences using EARS (Emergency Assessment Response System) and MIDAS.

MIDAS is used by PG&E to predict the path and magnitude of radiation releases to the surrounding environment caused by an accident at the plant, such that protective action (sheltering, evacuation, etc.) recommendations can be made to protect the public. Inputs to MIDAS include the concentration and height of radioactive releases at the plant from EARS and wind and temperature data from up to seven meteorological towers and several SODAR (Sonic Detection and Ranging) units. The predictions are corroborated by data from roving Field Monitoring Teams and by nine Pressurized Ionization Chambers (PIC radiation detectors) at fixed locations.

DCP originally used only the initial version of MIDAS in the early 1990s with one meteorological tower for wind speed and direction and elevation temperature data. Now DCP uses the second revision of MIDAS along with EARS with seven meteorological towers and several SODAR (Sonic Detection and Ranging) units for more accurate weather data. Beginning December 2014, DCP plans to implement the latest version of MIDAS as a standalone without EARS. The new release of MIDAS is capable of predicting off-site transport for multi-point releases (e.g., simultaneous accidents in both units).

The purpose of the MIDAS second revision upgrade was to enhance the capability of PG&E and the County for making appropriate Protective Action Recommendations (PARs) and decisions. Such decisions relate to the need to evacuate or shelter the population in various geographic sectors in the vicinity of DCP in the event of an unplanned radiological release from the site. Typically, the

most significant radioisotope initially from a radiological accident is Iodine-131, which may be released in the form of small aerosol particles from fuel damaged in a severe accident, and can be ingested through breathing or eating contaminated food and then concentrated in the thyroid gland. The closest population area to the plant at about six miles is Port San Luis with approximately 180 people. In emergency exercises, the County frequently decides to evacuate this area early in the exercise because of the area's location and frequent winds in its direction (actual evacuation does not occur, it is only simulated). Historically, during exercises the County has issued orders to evacuate selected population zones and schools well before the joint PG&E/County Unified Dose Assessment Center (UDAC) has recommended them.

The DCISC observed an example of the EPR2net application and an example of the latest MIDAS application on the computer. The models successfully generated and predicted radiological consequences for selected postulated radiological releases from the plant.

When the Unified Dose Assessment Center (UDAC), a joint DCPD and San Luis Obispo (SLO) County team, is activated in a practice exercise or an actual emergency, the UDAC personnel assume the responsibility of calculating offsite radiological consequences originally using EARS (Emergency Assessment Response System) and MIDAS. Now, the new MIDAS replaces EARS. Similarly, MIDAS replaces RASCAL (Radiological Assessment System for Consequence Analysis) previously used by San Luis Obispo County.

DCPD appears to have implemented the third version of MIDAS (Meteorological Information and Dose Assessment System) for predicting the magnitude and path of radioactive plumes from the plant in the event of an emergency. This version will provide more accuracy and versatility than the previous version.

Emergency Preparedness NRC Violation (Volume I, [Section 3.2.2](#) and Volume II, [Exhibit B.15](#))

DCPD received a Safety Significance Level III (White) violation from NRC for failure to obtain prior approval for a change, which decreased the effectiveness of the Emergency Plan (See Section 3.2.2). This is a White, or low-to-moderate level of safety significance. Specifically, on November 4, 2005, without approval from the NRC, Diablo Canyon Power Plant staff removed instructions in emergency plan implementing procedures for making protective action recommendations for members of the public on the ocean within the 10-mile Emergency Planning Zone, reducing the plan's effectiveness. DCPD's corrective actions included adding an emergency preparedness supervisor position for additional oversight; adding metrics to monitor program health; strengthening procedure instructions, training, and qualifications for performing change evaluations; and adding a protective action recommendation bases document to the site emergency plan. In addition, DCPD initiated an Emergency Preparedness Licensing Basis Verification Project to reassess all changes to the emergency plan since its original approval by the NRC.

DCPD originally developed PARs directly from the protective action zones, but because adjacent ocean areas were not explicitly identified as a protective action zone, there was no range of protective actions for members of the public in the plume exposure pathway emergency planning

zone. As a result of the 2005 change, the NRC determined that the DCP's emergency plan implementing procedures no longer contained guidance or requirements for developing and communicating PARs for areas of the Pacific Ocean that lie within the nominal 10-mile emergency planning zone. The November 4, 2005, revision to Diablo Canyon Power Plant EP G-3 removed the sector-to-zone conversion table. The zones were not revised to include the ocean and until corrected in February 13, 2014, DCP did not have a procedure that ensured that PARs would be made for the ocean. The 2005 revision to the plan removed all procedural direction to provide PARs for affected areas over the ocean within 10 miles of the plant. DCP did not request NRC approval for this change; therefore, the NRC was not given the opportunity to review these changes to its emergency plan. This caused DCP's procedures to be in noncompliance with its emergency plan and NRC's planning standard.

DCP believed that the county had adequate guidance in its procedures to implement necessary protective actions. The NRC determined that development of PARs is a regulatory requirement of the licensee, and could not be met by assuming that responsible offsite response organizations would make the correct decision absent any recommendation from the licensee. NRC concluded that this finding represents a degradation of the licensee's risk-significant planning standard function. The required planning standard function was degraded because the licensee's procedures did not direct the licensee to issue appropriate PARs to cover affected areas over the ocean within 5 to 10 miles of the site. The planning standard function was degraded, rather than lost, because default procedural actions of local governments would have resulted in effective protective actions for affected areas within 5 miles of the site.

4.7.3 Conclusions and Recommendations

Conclusions:

DCP appeared to have successfully implemented the second and third versions of the Meteorological Information and Dose Assessment System (MIDAS), utilizing seven meteorological towers and several sonic detection and ranging (SODAR) units, which provides more accurate offsite radiation release consequence predictions. The NRC Level III violation on Emergency Preparedness is White, or low-to-moderate level of safety significance. DCP addressed the violation with appropriate corrective actions

Recommendations:

None

[25th Annual Report](#), [Volume 1](#), Section 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 items in DCP's Probabilistic Risk Assessment Program during the prior reporting period:

- Probabilistic Risk Assessment (PRA) Update
- Unplanned De-energizing of 4 kV Electrical Bus

In its previous reporting period the DCISC concluded that the DCP PRA group's work today is focusing both on completing work to develop new PRA models in the fire and seismic areas and on applying PRA methods in several safety-significant applications at the plant. The work is proceeding well. The loss of power to Unit 2 4 kV Bus G during Refueling Outage 2R17 was avoidable and was due to a number of breakdowns in the planning and conduct of a maintenance activity during a refueling outage.

4.8.2 Current Period Activities

The DCISC reviewed the following topic during the current reporting period:

- Probabilistic Risk Assessment Program Status

Probabilistic Risk Assessment (PRA) Update (Volume II, [Exhibit D.7, Section 3.3](#))

The DCISC performed a broader review of the PRA area, including several different PRA topics, as discussed in what follows:

Internal-flooding PRA: The DCP team reported that they are well along toward completing development of the PRA model for the internal-flooding PRA, after having worked on it for the last three years. An external peer review was conducted, which resulted in a few findings and

observations that the DCPD team has responded to by revising and upgrading their model. This model was finally completed within the last few weeks before this Fact-finding Meeting, and is now being exercised by doing various analyses. A few technical findings from the model have resulted in the identification of some potential changes to the plant that are currently being evaluated. One involves potential sources of water that would flood the battery rooms, an issue that is being reviewed.

GI-191: The PRA team has been active with an industry consortium of 14 other nuclear power plants that is fostering the use of risk insights in the resolution of NRC Generic Safety Issue-191, "Assessment of Debris Accumulation on PWR Sump Pump Performance." DCPD reported that the analysis has proceeded well.

Low Power and Shutdown PRA: Dr. Budnitz reported to the DCPD team that the American Society of Mechanical Engineers (ASME) and the American Nuclear Society (ANS) have recently published a new PRA methodology standard covering PRA analysis during low power and shutdown (LPSD) conditions. (Dr. Budnitz is one of the two co-chairs of the ASME-ANS joint standards committee that published this standard in early 2015.) The DCPD team already knew about this new standard, and reported that they are planning to initiate a new PRA to evaluate LPSD conditions. However, they plan to await the completion of two pilot applications of the new LPSD standard at other US plants, in order to benefit from the insights gained during those pilot studies.

Revision to Technical Specifications Based on Risk Insights: DCPD reported that in mid-November the plant submitted a License Amendment Request (LAR) to the NRC to revise the plant's Technical Specifications based on insights from the plant PRA. DCPD is not the first U.S. plant to take an initiative along these same lines, and the NRC has already granted license changes to several other plants on this subject, so there are good precedents for DCPD's LAR submittal. The DCPD team is now awaiting receipt from the NRC of either a Safety Evaluation Report approving the request, or perhaps some questions seeking clarification. Related to this topic is a new software package, "Phoenix", which is now in place to replace "Safety Monitor" for the PRA-based analysis of maintenance activities as required by Section (a)(4) of NRC's "maintenance rule", 10 CFR 50.65.

Seismic PRA: The PRA team has been working for the last few years on a major updating of the existing seismic PRA (SPRA), which was performed in the late 1980s and which at the time was considered one of the very best SPRAs ever performed—indeed, even today that prior SPRA is often considered a "gold standard" SPRA in terms of the scope and depth of its analysis and the methods it used.

Major work has been done on the new SPRA systems model, based in large part on the plant's new internal-events PRA. One topic that remains "open" now, but will be addressed soon, is the issue of which human-error probabilities (HEPs) to use in the SPRA model after a large earthquake. This issue of HEPs in SPRA has been a source of uncertainty in SPRAs for decades, but a recent project sponsored by the Electric Power Research Institute has made some important advances that the DCPD team expects to utilize after the EPRI report receives an upcoming broad review in the community of SPRA experts.

Based on new data, the PRA team is currently re-evaluating the part of the old SPRA dealing with the seismic-induced chattering of certain less rugged relays, which can cause inadvertent electronic signals that can be adverse to safety. The team expects that this part of the PRA will be ready for outside review by the summer of 2015.

The SPRA seismic-fragility work has been under way for more than a year, but completing it needs to wait until the NRC provides an endorsement of PG&E's new seismic-hazard report, which was submitted to the NRC in mid-March and which will require several months of NRC staff review before PG&E will receive either an endorsement or further questions.

Fire PRA: The DCPD team has been working on a new fire PRA for three years, and analyses using it have served as a major part of the information in the plant's submittal to the NRC supporting the plant's plan to switch over its fire-protection regulations under NRC from the existing Appendix R-based approach to the new approach based on industry standard NFPA (National Fire Protection Association) Standard 805. The NRC recently sent the plant a second round of requests for additional information, which the plant has responded to just prior to this meeting. If NRC has no further issues, then DCPD plans to undertake its NFPA 805 "Integrated assessment" in May, with the expectation that the NRC's review and assessment will be completed in December 2015. If successful, this schedule will mean that the plant's ultimate switch-over to the NFPA-805 regulatory approach will occur one year thereafter, or at the end of 2016.

4.8.3 Conclusions and Recommendations

Conclusion:

The DCPD Probabilistic Risk Assessment (PRA) group's development work today is emphasizing the completion of new PRA models in the seismic and internal-flooding areas. Its applications work continues with applying PRA methods in several safety-significant areas at the plant. The DCISC concludes that the PRA group is doing fine work, as its competence and its recent accomplishments attest. The DCISC will continue to follow developments in the seismic-PRA area closely. On the other PRA topics the DCISC will undertake a further review about a year hence, when the plant anticipates it will have achieved additional major milestones in its PRA development effort.

Recommendations:

None

[25th Annual Report](#), [Volume 1](#), Section 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 about DCP'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 DCP is discussed in Chapter 3.0 NRC Assessments and Issues. NRC regulations require, and DCP Technical Specifications (TS) provide for, a high level of oversight in the form of the Nuclear Safety Oversight Committee (NSOC).

Additionally, the nuclear industry seeks operational safety and excellence with the Institute of Nuclear Power Operations (INPO) and the World Association of Nuclear Power Operators (WANO) which perform 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 DCP operating and technical and NRC documents; performs fact-findings at DCP 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 (2013–2014):

- INPO Update and Strategic Performance Improvement Plan

In the previous reporting period the DCISC concluded that DCP has developed a satisfactory plan

for addressing areas needing improvements identified in the Institute for Nuclear Power Operations August 2013.

4.9.2 Current Period Activities

The DCISC reviewed the following oversight item during the period:

- NSOC Summary Meeting Attendance

Nuclear Safety Oversight Committee (NSOC) Summary Meeting Attendance (Volume II, [Exhibit D.4, Section 3.11](#))

The DCISC has an agreement with DCCP to maintain NSOC information confidential, thus only limited information is presented here.

The DCISC attended the November 20, 2014 DCCP NSOC summary session with plant management. The summary session followed three-and-a-half days of NSOC subcommittee meetings with plant personnel and observations of plant activities.

The NSOC subcommittees consisted of the following functional areas:

NSOC Functional Areas
Organizational Effectiveness Safety Culture Security Performance Improvement Regulatory Services
Operations Chemistry Quality Verification
Engineering Risk Assessment Major Projects Equipment Reliability
Maintenance Work Management Outage Industrial Safety
Learning Services Radiation Protection Emergency Planning

The DCISC fact-finding team found that attending the NSOC review meeting was useful to the DCISC, because several of the issues that the NSOC reviewed are similar to issues that the DCISC

reviews.

Attending NSOC meetings is an excellent way for the DCISC to learn about various plant issues, and therefore the DCISC should plan to attend them regularly.

4.9.3 Conclusions and Recommendations

Conclusions:

Attending NSOC meetings is an excellent way for the DCISC to learn about various plant issues, and therefore the DCISC should plan to attend them regularly. The DCISC believes that the DCPN Nuclear Safety Oversight Committee is effective in advising plant management on items of nuclear safety and operational improvement.

Recommendations:

None

[25th Annual Report](#), [Volume 1](#), Section 4.10, Radiation Protection

4.10.1 Overview and Previous Activities

DCPP Technical Specifications contain requirements on Radiation Protection (RP), and DCPP has corresponding programs, and procedures to specify the details of their radiation protection programs. Although numerical limits are specified, plant operators are also required to use the philosophy of As Low As Reasonably Achievable (ALARA) to minimize excess radiation exposures and releases. DCPP has a formal ALARA program; the program applies to personnel exposure in the plant as well as normal 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 performance indicators. DCPP also reviews any radiation protection events or incidents in the industry that are reported in LERs or NRC violations. DCPP performance in radiation protection has been satisfactory; however, PG&E collective doses have not been in the lowest quartile of the industry. Further improvement is achievable.

The majority of personnel exposure occurs during refueling outages when most of the work in the Radiation Control Area (RCA) is performed. DCPP sets outage and annual goals for exposure, and reports these at each DCISC public meeting. 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 since the DCISC began in 1990.

The DCISC did not review any Radiation Protection items during the previous reporting period.

In the previous reporting period the DCISC concluded that although the DCISC did not review Radiation Protection items in this reporting period, in previous periods it has found that DCPP radioactivity releases have been very small fractions of Technical Specification and regulatory limits and that, overall, the DCPP Radiation Protection Program appeared effective. The DCISC will continue to monitor DCPP's progress in Radiation Protection.

4.10.2 Current Period Activities

The DCISC reviewed the following Radiation Protection items during the current reporting period:

- **2013 Annual Radioactive Releases and Radiological Environmental Monitoring Program**
-

(REMP) (Volume II, [Exhibit D.1, Section 3.9](#))

DCPP submitted its 2013 Annual Radioactive Effluent Release Report and its 2013 Annual Radiological Environmental Operating Report to the Nuclear Regulatory Commission (NRC) on April 30, 2014. The former report describes the quantities of radioactive gaseous and liquid effluents released from the plant. In all cases the releases were well below Technical Specifications limits for the year. The latter report provides the results of the radiological monitoring and sampling performed on and around the plant site in 2013.

Based on radioactive releases, the following whole body radiation doses to a theoretical “maximum exposed individual” at the site boundary approximately 800 yards from the plant and their corresponding percent of Technical Specifications limits for the year 2013 were calculated to be as follows:

Effluent Type	Calculated Radiation Dose	Percent of Tech. Spec. Limit
Liquid	0.00023 milliRem	0.008%
Gaseous	0.0065 milliRad	0.017%

The Radiological Environmental Operating Report (REOR) describes the results of the Radiological Environmental Monitoring Program (REMP), which reports and assesses the levels of radiation or radioactivity in the environment related to operation of DCP. The 2013 REMP includes about 2,200 samples (including Thermo-luminescent Dosimeters [TLD]) 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 2013 REMP showed no unusual environmental isotopic findings from DCP 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 in the environment.

Direct ambient radiation was measured at 32 locations surrounding DCP using thermo-luminescent dosimeters (TLD). These 32 locations are made up of 30 indicator stations and 2 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 search for adverse trends. The ambient direct radiation levels in the DCP offsite environs did not change and were within the preoperational range throughout 2013.

The Old Steam Generator Storage Facility (OSGSF) contains four old steam generators and two old reactor vessel heads. The OSGSF did not cause any detectable changes to the ambient direct radiation levels in the DCP environment during 2013. Also the sumps to the OSGSF were inspected quarterly and remained empty and dry during 2013.

Tritium levels in three monitoring wells beneath the power block were all 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 exiting the plant through an approved discharge path. All ground water at the site flows into the Pacific Ocean and is not a source of drinking water.

Beginning in June 2009, DCPD began loading of the onsite dry cask Independent Spent Fuel Storage Installation (ISFSI). At the end of 2013, a total of 29 casks had been shipped to the ISFSI. In addition to the 32 TLD locations mentioned above, direct radiation is also measured at eight TLD locations surrounding the ISFSI. Specifically, two TLDs are located on each of the four sides of the ISFSI pad. From the time these casks began to be stored until the present, the radiation levels at these locations have increased approximately 0.2 mrem per day (i.e. from about 0.3 mrem per day to about 0.5 mrem per day). An evaluation of direct radiation measurements and member-of-public occupancy times surrounding the ISFSI have indicated that all federal criteria for member-of-public dose limits are being met with significant margin. Also, since all of these TLDs are located well within the site boundary and are not within the unrestricted area, the ISFSI loading has not affected the TLD trending results with respect to the 32 locations surrounding DCPD, and the public is not significantly affected 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 evaluated to be 0.254 mrem.

As part of its Environmental Radiological Monitoring Program, DCPD initiated and has continued environmental samplings following and directed at the March 11, 2011 accident at the Fukushima Nuclear Power Plant in Japan. Other facilities in the U.S. have performed similar samplings and analyses to identify the extent to which radioactive releases from Fukushima were transported by the jet stream to the U.S. During this most recent reporting period DCPD identified minute, but detectable, concentrations of cesium 137 in one of the station's four monitoring wells that correlated with its sampling of rain events during the March 2011 accident at Fukushima. Concentrations of other radioactive isotopes, including iodine 131 and 132, cesium 134, and tellurium 132 that were initially detected after the Fukushima accident have since diminished to below detectable levels. Studies of the DCPD site have indicated that any groundwater (subsurface) flow beneath the DCPD power block is not used as a source of drinking water, and it discharges into the Pacific Ocean, which is 100 yards away from the power block.

The results of DCPD's 2013 REMP showed no unusual environmental isotopic findings from DCPD site operations. These results were also compared to DCPD preoperational data and showed no unusual trends. The report concludes that DCPD had no significant environmental radiological impact on airborne, surface water, drinking water, marine life, aquatic vegetation, terrestrial vegetation, sediment, milk, or meat radioactivity.

4.10.3 Conclusions and Recommendations

Conclusions:

DCPP's 2013 total liquid and gaseous radiological releases were very small fractions of amounts permitted by regulations and Technical Specifications. The Radiological Environmental Monitoring Program confirmed that the operation of DCPP had no significant radiological impact on the environment in 2013. The results of the program were also compared to preoperational data and showed no unusual trends. Minute and diminishing traces of radioactivity from the radioactive releases that occurred in the March 2011 accident at Japan's Fukushima Nuclear Plant were detected in one of DCPP's four monitoring wells.

Recommendations:

None

25th Annual Report, Volume 1, Section 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 (2013–2014):

- QA Audit Schedule
- Software Quality Assurance and Cyber Security

DCPP's Software Quality Assurance Program appeared satisfactory and effective. Though NRC had not issued its final rules/guidance on nuclear power plant cyber security, DCPP and other nuclear power plant operators had established cyber security procedures based on existing guidance and were moving ahead with their plans and procedures based on proposed NRC/industry requirements. This also appeared satisfactory. The DCISC should follow up on cyber security after NRC issues its final rules.

4.11.2 Current Period Activities

During the current period (2014–2015) the DCISC reviewed the following two topics related to Quality Programs:

- Results of Recent Quality Verification (QV) Audits

Results of Recent QV Audits (Volume II, [Exhibit D.3, Section 3.2](#))

The Fact-finding Team reviewed the results of the following QV Audits (as Audits these activities assess station performance with respect to Federal Regulations):

- May 16, 2014 Report on DCPP's Biennial Audit of DCPP's Radiation Protection (RP) Program and the RP Program for DCPP's Independent Spent Fuel Storage Installation (ISFSI). The audit concluded that "DCPP and the ISFSI RP Programs satisfy applicable regulatory criteria and have been effectively implemented for the period from April 17, 2012 through April 21, 2014". The report also identified what it referred to as "Key takeaways", as follows:
 - Program reviews were untimely.
 - Controls for outdoor storage needed to be strengthened to be consistent with industry best practices.
 - Guidance was recommended for performing radiological risk assessments for work that is

not associated with work orders.

A “Positive Performance” was noted in that the radiological risk process is integrated with station risk, and effective measures to reduce radiological risk have been implemented during 1R18 and online operation.

- June 12, 2014 Report on “2014 Operations and Technical Specifications Audit”. The audit team concluded that “the implementation of the Diablo Canyon Power Plant (DCPP) Operations Program has been effective to ensure the plant was operated in a safe and reliable manner and ensured safety-related and risk significant systems were maintained in an operable condition for the audit period, July 19, 2012 through May 29, 2014”. The audit Team also concluded that DCPP and its ISFSI Technical Specifications Program has effectively implemented the programs and processes established to ensure maintenance of and conformance to DCPP and ISFSI Technical Specifications, Technical Requirements Manual per 10 CFR 50.36, ‘Technical specifications’, and the Operating License for the audit period, July 15, 2013 through May 29, 2014”. The audit had one finding as follows: “DCPP performance for LCO (*i.e. Limiting Conditions of Operation*) entries has been unsatisfactory (red) for all but two months since June 2013.” The team further commented: “The team views this as a missed opportunity for Operations to demonstrate leadership and drive resolution of this long-standing adverse trend.”

4.11.3 Conclusions and Recommendations

Conclusions:

The QV audits reviewed by the DCISC Fact-finding Team were clear, detailed, and focused.

Recommendations:

None

25th Annual Report, Volume 1, Section 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 DCPD 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 DCPD and PG&E Headquarters.

DCPD 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 5.0×10^{-4} microCuries (Ci) of Iodine-131 per gram of coolant. The following depicts the RCS radioactivity trend for a five-year period:

Reactor Coolant System Radioactivity (microCuries/gram of coolant Iodine-131)			
Period	Goal (Ci/gm)	Unit 1 Actual (Ci/gm)	Unit 2 Actual (Ci/gm)
10–11	5.0×10^{-4}	1.0×10^{-6}	4.2×10^{-4}
11–12	5.0×10^{-4}	1.0×10^{-6}	4.2×10^{-4}
12–13	5.0×10^{-4}	1.0×10^{-6}	4.2×10^{-4}
13–14	5.0×10^{-4}	1.0×10^{-6}	4.2×10^{-4}
14–15	5.0×10^{-4}	1.0×10^{-6}	1.0×10^{-6}
Through June 2015			

The DCISC investigated the following fuel-related topic during the previous reporting period:

- Nuclear Fuel Receipt/Inspection

DCPD’s nuclear fuel has continued to function without any fuel failures since DCISC’s prior review of this topic in November 2011. Implementation of the Electric Power Research Institute’s (EPRI) guidelines for nuclear fuel management appears to have contributed positively to nuclear fuel performance and is aiding the continued preparation for transfer of used fuel to the Independent

Spent Fuel Storage Installation.

4.12.2 Current Period Activities

The DCISC reviewed the following item during the current reporting period:

- Nuclear Fuel Performance Update

Nuclear Fuel Performance Update (Volume II, [Exhibit D.1, Section 3.2](#))

At the time of the DCISC review, DCP Unit 1 was in Cycle 19. Unit 2 was in Cycle 18 and began begin Cycle 19 after the completion of Refueling Outage 2R18 (September 28 to October 28, 2014.) Unit 1 has continued to run with no fuel defects since Cycle 4, i.e. for 25 years. Unit 2 has had no defects identified since Cycle 17.

The Electric Power Research Institute (EPRI) had started a program four to five years ago aimed at achieving zero leakage in nuclear fuel. The EPRI guidelines for achieving this goal include targets for chemistry of the reactor coolant, including targets for oxygen, grid to rod fretting, and fuel surveillance. Also, noted was that some instrument tubes for flux measurements have been replaced on occasion due to tube wear.

Vacuum can sipping has been performed on all first core fuel assemblies in preparation for placing them in the Independent Spent Fuel Storage Installation (ISFSI). Also, forty different assemblies were examined (twenty from each Unit), and there was no evidence of grid to rod fretting. The outer periphery of the cores was also examined for the same purpose, and no evidence of this condition was found there as well; however, that fuel assembly distortion (FAD) measurements cannot be performed until the vendor develops the required tooling.

These early assemblies experienced fuel failures, which originally made them undesirable for movement from the Spent Fuel Pools to the ISFSI. However, these assemblies have also provided an accompanying benefit by having decayed to levels where they can be used to generate the “checkerboard” pattern of low-decay-heat assemblies needed to surround freshly off-loaded fuel bundles that are removed from the reactors during refueling outages.

4.12.3 Conclusions and Recommendations

Conclusion:

DCPP’s nuclear fuel has continued to function without any fuel failures since DCISC’s prior review of this topic in November 2011. Implementation of the Electric Power Research Institute’s (EPRI) guidelines for nuclear fuel management appears to have contributed positively to nuclear fuel performance and is aiding the continued preparation for transfer of used fuel to the Independent Spent Fuel Storage Installation.

Recommendations:

None

[25th Annual Report](#), [Volume 1](#), Section 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 (ER) 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. As a part of Equipment Reliability (ER), the plant had developed System Long Term Plans (SLTP) which specify needs and actions for systems for the next five years. DCPD had established an Equipment Reliability Program with a dedicated Program Manager.

The DCISC reviewed the following ER related topics during the previous reporting period (2013–2014):

- Refueling Equipment Reliability
- Unit 2 Reactor Coolant Pump Seal Failure Root Cause Evaluation
- RC Pump 1–3 Seal Leakage
- 230 kV System Update
- Deficient Critical Components Backlog and Critical Equipment Clock Resets
- Safety System Functional Failures
- Flashover Events

The DCISC concluded the following during the previous reporting period:

The DCPD Fuel Handling System has been problematic since Refueling Outage 2R14, with most issues related to equipment aging. Major modifications are planned to commence with Refueling Outage 1R19, and interim actions appeared to be appropriate.

DCPD responded properly to the failure of seals in its Units 1 and 2 Reactor Coolant Pumps, which occurred at different times. The evaluations appeared to be comprehensive and accurate.

The options being examined and pursued by both DCPD and PG&E's transmission group appeared to provide satisfactory remedies to the issue of voltage fluctuations on the 230 kV system.

Equipment problems and failures increased the frequency of Critical Event Clock Resets in the second half of 2013. Also, equipment problems due to aging have led to an increasingly negative trend in the station's Deficient Critical Component Backlog Orders.

DCPP's performance with respect to reducing or eliminating Safety System Functional Failures (SSFFs) has not improved despite implementation of a corrective action plan.

DCPP's Root Cause Evaluation of Unit 2's trip from 100 percent power following a failure on the 500 kV Main Bank Transformer B phase lightning arrester was extensive and appeared to be reasonable.

4.13.2 Current Period Activities

Although the Equipment Reliability Program was not specifically reviewed during the current period (2014–2015), DCISC reviewed the following topics related to equipment reliability:

- Critical Equipment Clock Resets
- Single Points of Vulnerability Update

Critical Equipment Clock Resets (Volume II, [Exhibit D.1, Section 3.7](#))

A Critical Equipment Event is defined by the occurrence of any the following as the result of equipment failure:

- Automatic or manual unit trip
- Submittal of a Licensee Event Report to the Nuclear Regulatory Commission (NRC), i.e. the equipment failure results in an NRC reportable condition under 10CFR50.72 or 10CFR50.73
- Unplanned Entry into a Limiting Condition of Operation (LCO), i.e. the equipment failure directly results in an unplanned entry into a short (less than or equal to 24 hours) shutdown or derate Technical Specification Action Statement
- Unplanned Down-power, i.e. the equipment failure directly results in either an unplanned reduction in power greater than 2 percent or a forced unit outage.

Since these types of events typically occur infrequently, performance is assessed based on the number of events occurring on a rolling 12-month basis, i.e. the number of events occurring during the most recent 12 months is reported each month. This assessment is graded as follows (where Green is considered Good):

- Green: Less than or equal to 6 events in most recent 12 months
- White: Less than or equal to 8 events
- Yellow: Less than or equal to 10
- Red: Greater than or equal to 11

Although the running monthly values of the total number of events causing clock resets in the prior twelve months has remained between nine and eleven resets, considerable progress has been made during the past nine months. During the past nine months DCPD experienced four Resets and during the most recent six months, the station has had only two resets. The two recent resets were as follows:

- First event: On February 2, 2014, after an hour and a half of light rain, the Unit 2 Main Bank Transformer (MBT) “B” Phase Lightning Arrester failed, causing a single-line-to ground fault that resulted in a Unit 2 reactor trip from 100% power. DCPD has experienced similar problems during the past few years, and this recent apparent vulnerability of DCPD’s exterior high voltage components to contaminants resulted in an extensive examination of the problem. However, because of the damage incurred by the lightning arrester the specific root cause could not be conclusively determined. Nevertheless, DCPD has engaged the vendor and others in order to obtain and install components that are more impervious to contaminants.
- Second event: While Unit 1 was in the process of preparing to return to power operation at the end of Refueling Outage 1-18, the Number 1 seal of Reactor Coolant Pump (RCP) 1-3 was experiencing slight leakage when the pump was started on March 7 while the Unit was still in Cold Shutdown condition. As the Unit returned to power operation and during the subsequent several days, the seal return flow to the Volume Control Tank (VCT) fluctuated, and eventually reached a level (> 6 gpm) that dictated a plant shutdown for trouble shooting and repair of the seal assembly. DCPD also implemented a number of corrective actions to prevent recurrence including the following:
 - Implementation of vendor manual guidance for a second check of physical measurement on pump shaft centering
 - Utilization of the latest technology for dial indicators
 - Two-person verification of final stages of alignment during centering actions and independent verification of final alignment readings

The station also recognized that equipment aging can be a factor in Critical Event Clock Resets. Accordingly, DCPD increased its efforts to monitor and document aging and degradation mechanisms. Where areas needing improvement are identified, this process also leads to the development of strategies for interim implementation until appropriate corrective actions can be taken.

DCPD appears to be sustaining its reduction of Critical Event Clock Resets since October 2012. Only two such resets have occurred since that time. The station’s approach to minimizing the effects of any noted emerging equipment degradation appears to be appropriate.

Single Points of Vulnerability Update (Volume II, [Exhibit D.1, Section 3.6](#) and [Exhibit D.6, Section 3.12](#))

A single component is an SPV component if its failure alone can result in a reactor trip or turbine

trip, or a plant decrease in power of greater than 2% power. Obviously, SPVs are undesirable, and DCP, like other nuclear plants, takes efforts to eliminate them. Generally, SPVs are eliminated by modifications and/or changes in their Preventive Maintenance (PM) to minimize or eliminate their failure rate. Generally, only active components are considered for SPV; however, selected passive components, generally treated as inherently reliable, can be considered.

DCP's first SPV study in 2002 to identify/eliminate single points of failure was performed at a system and component level. Then in 2006, using external contractor engineers working with DCP System Engineers and Operations, DCP performed a more extensive SPV study and completed it in 2008. DCP has completed the SPV study on all systems (about 20) that have an impact on either generation or reliability. This was a collaborative effort with support from industry organizations such as the Electric Power Research Institute (EPRI) and the Nuclear Energy Institute (NEI).

Safety-related components are covered by the NRC Maintenance Rule, which also includes rules for SPV. DCP also worked with an Industry Working Group to review nuclear plant scrams (automatic or manual fast reactor shutdowns) in order to identify scram causes and actions taken to prevent future scrams. (Most scrams were caused by failed circuit cards).

In the 20 reviewed plant systems, over 1,500 SPVs were identified and evaluated for the two units (over 750 for each individual unit). Changes were then implemented as needed to a component's design and/or preventive maintenance.

The concept of SPV continues to be applied as various issues arise. One recent self-revealing example was a fire in an Auxiliary Saltwater System Pump Room in which a fire was detected (and subsequently extinguished). The fire was caused by a single electrical component failure, and the circuit was then modified.

DCP has been moving from analog control systems to digital versions. This has had a significant positive effect on single point failures caused by individual electronic components, such as capacitors.

DCP has completed its studies for elimination of Single Point Vulnerabilities (SPVs), i.e., those individual components whose failure alone could cause plant trips or greater than two percent power reduction. Items identified as SPVs have either been modified or had their preventive maintenance changed. These studies have resulted in greater reliability and improved operation.

4.13.3 Conclusions and Recommendations

Conclusions

DCP appears to be sustaining its reduction of Critical Event Clock Resets since October 2012. Only two such resets have occurred since that time.

DCP has completed its studies for elimination of Single Point Vulnerabilities (SPVs), i.e., those individual components whose failure alone could cause plant

trips or greater than two percent power reduction. Items identified as SPVs have either been modified or had their preventive maintenance changed. These studies and DCCP's follow-up actions have resulted in greater reliability and improved operation.

Recommendations:

None

[25th Annual Report](#), [Volume 1](#), Section 4.14, Organizational Effectiveness and Development

4.14.1 Overview and Previous Activities

The focus of Organizational Effectiveness and Development is centered upon the prior process transformation and process structure and organizational effectiveness initiatives. DCP'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 DCP 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 periods the DCISC reviewed the following Organizational Effectiveness topic:

- 2012 and 2013 DCP Operating Plans
- STARS Update
- Human Performance/Equipment Reliability Issue Communication Process
- Safety Culture (DCP Knowledge Transfer Program)

In the past period the DCISC concluded that DCP has several activities, which enhance its Organizational Effectiveness, such as its emerging issue process to organize, communicate, and correct issues involving equipment reliability and human performance; its Operating Plans; and its membership in STARS, a consortium of seven nuclear plants for sharing of resources.

4.14.2 Current Period Activities

During the current period, the DCISC reviewed the following Organizational Effectiveness and Development item:

Management Observation Program (Volume II, [Exhibit D.5, Section 3.9](#))

The DCPD Observation and Coaching Program is controlled by DCPD procedure OM15.ID3, “Observation and Coaching”, which describes it as a robust, effective program consisting of three fundamental sub-processes...”

1. Monitor Performance
2. Analyze Trends and Determine Action
3. Implement Improvement

The program is intended to provide an opportunity to observe, learn from, and coach someone in how they go about doing their job. The program is considered a low-level reporting tool, providing real time documentation and indications used to identify and correct latent weaknesses that exist in the organization. The observations are intended to

- Identify organizational and human performance issues and provide insight and behaviors, tools, and resources needed to help workers accomplish their jobs
- Foster two-way communication between management and their employees and provide management interaction with personnel as they do their work
- Solve problems and remove barriers for more efficient work
- Communicate management performance standard expectations
- Provide a forum to monitor and improve human performance

The procedure provides guidance and expectations on quality and quantity of observations, feedback and coaching, analysis and trending of observations, and attributes of a good observation with “dos” and “don’ts”. It is not intended to be used for “positive discipline”. The DCISC Fact-finding Team believes that the procedure is comprehensive. Observations are routinely reviewed by the next-higher level of management and at periodic Management Observation Meetings.

The station has changed its approach to the conduct of observations. Although the program had previously been aimed at identifying problems for the purpose of achieving improvements, as opposed to simply critiquing and criticizing, the revised approach has been even more oriented toward positive engagement, assistance, coaching, and identifying barriers as means of achieving error free work. This approach also focuses not only on the worker’s behavior but also the conditions in the working environments that can have an effect on the worker’s performance. In essence, the purpose is to help the worker rather than to criticize. The program is entitled the “Field Engagement and Assistant Program”. The changes resulted from “grass roots” meetings and Employee Advisory Council Meetings with DCPD’s Senior Leadership Team (SLT). The program essentially reflects a change in philosophy from “checking up on employees” to “checking in with employees”.

Each affected manager is expected to spend one day each month observing work and providing feedback/assistance. This also includes engineering personnel who may be involved in testing, modifications, etc. Conditions noted in the field that can affect worker performance have been photographed, as appropriate, for use in developing the appropriate corrective action. Leadership training also includes aspects of implementing this enhanced program. Paired observations are even conducted where one observer views the worker, and a second observer views the first observer. This has been found to identify areas in which the observation process itself can be improved.

The program has resulted in identifying barriers to error free work. These barriers include aspects of worker performance, procedural and documentation aspects, and conditions at the work site. DCISC's Fact-finding Team was provided with a listing of over three dozen such barriers. The following are a few examples:

- Housekeeping at the job site
- Changing conditions
- Inadequate signage
- Distractions/interruptions
- Working surfaces wet or contain hazards
- Noise levels
- Staging of material
- Use of checklist
- Teamwork
- Documentation of status

The intent is not only to eliminate barriers to the extent possible, but also to gain worker recognition of barriers that could affect the work being performed and of the accompanying need to address or compensate for those barriers.

The Fact-finding Team was also provided with an example of DCP's Daily Brief Sheet, which contained a Section on Safety Focus. This particular brief sheet discussed techniques that can be employed to avoid slips, trips, and falls. It also discussed the effect of potential distractions to personnel during the upcoming Holiday period, and also how to deal with situations likely to lead to errors, such as inadequate lighting around a particular component.

4.14.3 Conclusions and Recommendations

Conclusions:

Considerable attention and effort have been devoted during 2014 to enhancing DCP's Management Observation Program. This includes changing the basic approach from being somewhat critical of observed workers to being more

supportive. The cooperative aspect of this program thus far has resulted in the identification of barriers to error free work, which can either be eliminated or addressed during the performance of work. This enhanced program is still in too early a stage to accurately evaluate its effectiveness with respect to worker performance. The results from DCPD Refueling Outage 2R18, which should be available in early 2015, may provide preliminary indications.

Recommendations:

None

25th Annual Report, Volume 1, Section 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 DCPD equipment and systems as well as the actions taken by PG&E to resolve them.

During the previous period (July 1, 2013—June 30, 2014), the DCISC reviewed the following items:

- Large Motor Program
- Containment Hatch Closure Seismic Capability (3 visits)
- Plant Health Committee
- Pressurizer Weld Overlay
- Plant Health Committee
- Plant Protection System Replacement
- Load Follow Update
- Containment Sump Capability LOCA

The DCISC performed the following system/component reviews and/or walk downs with DCPD System/Component Engineers in the previous period:

- Process Control System
- Containment Spray System
- 4 kV System
- 230 kV System
- Digital Systems
- Auxiliary Saltwater System
- Control Room Ventilation System
- Emergency Diesel Generators
- Component Cooling Water System
- Auxiliary Building Ventilation System

In the previous period (2013–2014) the DCISC concluded that DCPD has dealt effectively with most equipment and system problems and is focused on improving system health. Systems that are the sources of emergency electrical power to the station’s vital electrical equipment, the station’s Emergency Diesel Generators and the 230 kV system that is supplied from the offsite electrical grid, were found to be operational but have been a focus of station and NRC attention. DCPD’s Plant Health Committee has been improved to focus more on system/component health and meets more frequently, and overall system health has improved. The System Engineer/Component Program continues to be effective.

4.15.2 Current Period Activities

The DCISC reviewed the following system and equipment issues during the current reporting period:

- 230 kV System Issues
- Pressurizer Weld Overlay Issue
- Containment Fan Cooler Issues
- Safety System Functional Failures
- Large Transformer Issues
- Reactor Vessel Surveillance Program

The DCISC performed the following system/component reviews and walk downs with DCPD System Engineers:

- Auxiliary Feedwater System
- DC Power System
- Reactor Coolant System
- Compressed Air System
- Digital Control Systems
- Radioactive Waste Systems
- Radiation Monitoring System
- Large Station Transformers
- Residual Heat Removal System
- Reactor Coolant Pumps
- Spent Fuel Pool Cooling System
- Safety Injection Pumps
- Emergency Diesel Generators
- Plant Health Committee Meetings

I. DCISC Reviews Of System And Equipment Performance And Problems

230 kV Power System Issues (Volume II, [Exhibit D.1, Section 3.10](#))

The 230 kV system is DCPD's primary source of offsite Vital AC electrical power, in the event of a loss of normal power from a station main turbine generator. DCPD's 230 kV system is served by PG&E's offsite 230 kV system through two incoming lines to the switchyard. In turn, DCPD is then served by one 230 kV line from the switchyard to the plant. The 230 kV system serves DCPD's vital buses through the station's Startup Transformers. The station's Emergency Diesel Generators serve as backup if the 230 kV system is unable to perform its function. The station is also served by a 500 kV offsite power line, which is available for emergencies.

The DCISC reviewed information describing PG&E's assessment of the possible future demands on the 230 kV system in the several-county region near the plant. As the system is now configured these demands could possibly result in occasional drops in voltage on the 230 kV power to DCPD, which in turn could affect the capability of the system to meet DCPD's needs if called upon.

To help address this issue, DCPD has been taking action to prevent any nonessential 4 kV equipment loads from being supplied by the 4 kV Vital Buses in order to ensure that sufficient electrical power is available for vital equipment in situations when DCPD's main generators are unable to supply power to the station. DCPD is also pursuing the feasibility of installing Main Generator Output Circuit Breakers onsite to provide another option for sources of emergency power to the station. The current scoping study for this installation projects 5 years from commencement to completion, i.e. completion would be expected in 2017.

To partially address the issue further, DCPD is pursuing a License Amendment, which seeks NRC approval to replace the current undervoltage relays with more reliable/robust relays. To further address the problem of voltage fluctuations, DCPD is planning to install VAR (i.e. Voltage/Amperage/Resistance) Compensators in the 230 kV switchyard. These devices are commonly used in high voltage transmission networks for stabilizing voltage. Nevertheless, the VAR Compensators do not appear to fully compensate for the issue that PG&E is experiencing with continually increasing offsite demand on its 230 kV system. This particular issue appears to reside with the PG&E corporate office rather than with the nuclear power plant.

In response to this need, PG&E's transmission group has developed project plans and schedules for strengthening the 230 kV system so that the more-robust system can serve the local area and also meet DCPD's safety requirements, if called upon in the future.

PG&E's Transmission Group has developed what appear to be reasonable plans and schedules for addressing the predicted effect of future load growth on the 230 kV system in the area of DCPD and so that the system can continue to fulfill DCPD's safety requirements. The DCISC will continue to monitor progress on this effort.

Pressurizer Weld Overlay Issue (Volume II, [Exhibit D.4, Section 3.1](#))

An "Indication" is a flaw or crack inside the weld that can be detected by reflections during ultrasonic test (UT). The key safety question for such flaws is whether they are sufficiently small that they would not be expected to grow in size during service. Very small flaws do not grow and do not present a safety hazard. If a flaw is sufficiently large that it could grow, then normally the weld material with the flaw would be removed by grinding and the welding repaired.

DCPD had applied pre-emptive structural weld overlays (SWOLs) to the Unit 2 Pressurizer nozzles' dissimilar-metal butt welds during Refueling Outage 2R14 in March 2008. The overlays were applied using a provision from the American Society of Mechanical Engineers (ASME) Section XI In-service Inspection Code known as a relief request. The purpose of the weld overlays, which have been used in other plants, too, was to provide structural reinforcement of the original Alloy 600 SE weld areas, which had experienced Primary Water Stress Corrosion Cracking (PWSCC) elsewhere in the industry. The Unit 1 Pressurizer nozzles do not use Alloy 600 and do not have this issue.

The Pressurizer weld overlays were originally inspected following the welding in March 2008 using conventional UT exams (using several discrete ultrasonic angle beams), and they were inspected again in Outage 2R15 in October 2009 with similar UT exams with the exception that low angle detection was not required. During subsequent inspections in Outage 2R17 in February 2013 using more advanced UT techniques (phased array techniques), several new indications (flaws) were discovered that were outside the ASME Code allowable screening size. These flaws were determined to involve single weld passes, which meant that a Code-required flaw analysis be done, which was performed by AREVA under contract to PG&E. Using conservative assumptions, this analysis found that the flaw sizes were sufficiently small that the structures would be expected to provide satisfactory performance for at least an additional operating cycle. Review of the AREVA report by the DCISC Fact-finding team revealed that the analysis was satisfactory to demonstrate that no additional growth of the

detected flaws would occur and to support continued operation for another operating cycle. An independent Electric Power Research Institute (EPRI) analysis supported this conclusion.

DCPP initiated a Root Cause Evaluation (RCE) to determine the reasons for not detecting the indications originally in Outages 2R14 and 2R15. The root cause was identified as:

A mismatch exists between the conventional UT weld overlay inspection procedure and the Performance Demonstration Initiative qualification process. Although the qualification process successfully demonstrated the ability to detect flaws, the procedure instructions do not adequately constrain the zero-degree scan speed to assure that small cross-section, low angle flaws are consistently detected in the field.

Contributing causes were that inattentive errors were made by vendor examiners for the following reasons:

1. *Data indicate that 45-degree angle beam was able to detect indications in the weld overlays, yet the indications were not recorded.*
2. *Examiners failed to adequately investigate indication responses to determine the actual length of the flaw.*
3. *Examiners failed to recognize zero-degree angle ergonomic factors necessitating reduced scan speed to maintain optimum search unit coupling*

The Corrective Action to Prevent Recurrence (CAPR) for the root cause was to revise the In-service Inspection Program procedure to not permit the conventional UT technique to be used for weld overlays until the recommendations for the first contributing cause have been addressed.

DCPP had submitted to the NRC a single cycle ASME Code Request for Relief (RFR) based on the initial analysis. This was approved, but NRC needed an additional analysis to support a request for long-term operation, looking at lateral crack growth in addition to the original circumferential cracks. This analysis produced acceptable results and was approved by NRC in an October 14, 2014 letter for continued operation to the year 2045.

DCPP performed re-examinations of the weld overlay in Outage 2R18 in the fall of 2014. The techniques and results were essentially the same as in 2R17, i.e., no crack growth. Additionally, DCPD committed to performing phased array examinations during the next three ISI inspection periods.

DCPP has satisfactorily completed its analysis of the Pressurizer weld overlay cracking issue to support continued operation until 2045 as approved by the NRC. The DCISC believes that this issue can be closed.

Containment Fan Cooler Unit Modifications/Issues (Volume II, [Exhibit D.4, Section 3.2](#))

DCPP's Containment Building contains Containment Fan Cooler Units (CFCUs), which are actuated for cooling of Containment following accidents and are used for normal building cooling during refueling outages when workers are present.

DCPP had added anti-rotation devices to each CFCU to prevent reverse rotation. Reverse rotation is a potential problem because, if it were to occur above a prescribed amount, a start-up of the CFCUs could result in loss of the motors due to over-current. Unit 1 CFCU anti-rotation devices were installed during 2010 with satisfactory performance. A Unit 2 device was installed by May 2011, and by June noisy operation was evident, resulting in replacement with a spare. Shortly afterward two more devices were found to be noisy (ratchet pawls dragging), causing DCPD to write a Prompt Operability Assessment (POA) for justification of operation only at low speed. Performing an Apparent Cause Evaluation (ACE), DCPD and the vendor determined the devices are rubbing due to

machining tolerance issues. Through the end of 2011 all devices were refurbished.

During Refueling Outage 2R17, a routine PM (Preventive Maintenance) inspection of the CFCU 2-5 coupling/anti-reverse rotation device (ARRD), the fan side coupling struts were discovered to have failed and the tension struts had buckled. Even with damage, CFCU 2-5 was determined to still be capable of performing its safety function. No problems were apparent on the remaining Unit 2 CFCUs, and no problems were noticed from inspections of Unit 1 CFCUs in outage 1R17. Thus there was no common failure. Following vendor inspection and analysis, it was determined that this damage could only have occurred due to application of reverse torque. The CFCU 2-5 damaged coupling was replaced with a spare.

DCPP hired a consultant to perform a failure analysis. The consultant concluded that the coupling failed due to a tensile overload resulting from a torque applied in the reverse direction, which was most likely caused by a shift of the CFCU motor from High to Low speed while the fan was rotating at more than the low speed of 600 revolutions per minute (rpm). DCPD performed a temporary modification to restrict the 2-5 CFCU to low speed while the investigation continues into the cause of the damaging speed change. The CFCU safety function, cooling of Containment following a loss of coolant accident, uses low speed. High speed is used for normal Containment cooling, and compensatory measures have been taken to assure that function is maintained.

There is more work to be done on the CFCUs including adjusting the timing sequence to address the anti-rotation device problem. In the meantime the CFCUs are run only in low speed. Design changes are also required to the CFCU cooling coils to upgrade and replace the current coils. Along with replacing the cooling coils, the plant will implement design changes to the inlet dampers to the CFCUs to meet the requirements of the cooling coils.

The anti-rotation devices are currently working well. The fan/motor couplings are not designed for instant slowdown from 1200 to 600 rpm in going from high to low speed. A design change is being issued to improve the delay time for speed changes and to implement a sequencing scheme when on emergency power. These design changes are scheduled for completion by mid-2015.

Some CFCUs had experienced high vibration at higher speeds due to damper changes to reduce airflow to reduce the potential for Component Cooling Water (CCW) overheating. DCPD will replace the cooling coils and modify the dampers to accommodate the reduced airflows. Finally, DCPD has a CFCU coil replacement program due to aging and corrosion. The Unit 1 and 2 coils are scheduled for replacement in Outages 1R19 and 2R19, respectively.

DCPD appears to have satisfactory solutions to problems with its Containment Fan Cooler Unit Fans. The DCISC will continue to follow this issue after each refueling outage.

Safety System Functional Failures (Volume II, [Exhibit D.4, Section 3.5](#))

A Safety System Functional Failure (SSFF) is defined as “the failure of or the loss of the ability of a system safety function to shut down the reactor and maintain it in a safe shutdown condition, remove residual heat, control the release of radioactive materials, or mitigate the consequences of an accident.” Therefore, a safety system may meet a Technical Specification (TS) limiting condition for operation (LCO), but exhibit an SSFF at the same time.

The recent history of this issue began in 2001 when the Nuclear Regulatory Commission (NRC) changed the significance of a SSFF event when it established a new Reactor Oversight Program (ROP) that, among other things, uses performance indicators for key parameters, including SSFFs. Depending on the number of SSFFs that a plant experiences, the plant will receive a varying level of regulatory oversight. For, example, if a plant experiences five SSFFs within a rolling four quarter period, the plant will move into the White regulatory response column and receive greater NRC oversight.

Between July 1, 2010 and August 31, 2011, DCPD Units 1 and 2 experienced a combined total of 12 SSFFs. Of these 12 SSFFs, four were common to both units. There was considerable variety in the nature of the SSFFs. Some examples include the following:

- Non-conservative Technical Specification (TS) First Level Undervoltage Relay (FLUR)/Second Level Undervoltage Relay (SLUR) results in loss of power to Emergency Diesel Generator (EDG) start instrumentation, Units 1 and 2
- 230 kV allowed outage time exceeded when cross-tied between Units 1 and 2
- Mode 3 Entry with AFW Pump 1-1 inoperable
- Auxiliary Building Ventilation System single failure, Units 1 and 2
- Three Losses of Offsite Power during Refueling Outage 2R16, Unit 1

DCPD's Root Cause Evaluation (RCE) Report of these SSFFs further notes that, beginning with the discovery of incorrect open limit switch settings on motor-operated Emergency Core Cooling System (ECCS) sump suction valves in 2009, "DCPD experienced multiple events that resulted in the loss of a system safety function to shut down the reactor and maintain it in a safe shutdown condition, remove residual heat, control the release of radioactive materials or mitigate the consequences of an accident".

DCPD's examination of this issue in its Root Cause Evaluation (RCE) was extensive and detailed, and included reviews of operating experience within the industry. The examination concluded that DCPD lacked clear standards for risk assessment, risk evaluations, and risk mitigation activities that could, and did, result in SSFFs. It further concluded that, when reviewing evaluations, the station had a tendency to justify and accept the evaluations rather than to provide a healthy challenge to them. It also noted that opportunities had been missed to reinforce high standards, that resolutions of identified risks were sometimes incomplete, and that there was sometimes no means or expectation for identifying risk significant activities. A contributing cause identified by the station was that "station personnel had insufficient understanding of the definition of an SSFF, resulting in failure to recognize that adherence to station procedures and plant Technical Specification action requirements does not prevent SSFFs".

To address the root and contributory causes of this adverse trend in SSFFs, DCPD developed 30 planned actions, which collectively comprise one of the eight areas for improvement in a broader "Regulatory Excellence Action Plan." The first major component of the Action Plan to address Safety System Functional Failures involved completing the RCE which resulted in its March 7, 2012 Action Plan, which contained 30 major and supporting actions.

The purpose of the March 2014 fact-finding visit was to assess DCPD's progress on reducing the number of SSFFs. The RCE effectiveness evaluation concluded that the corrective actions in the Action Plan were not effective because of an increased number of SSFFs. Prior to the RCE, all SSFF events were designated as preventable. Following the RCE, five of nine events were designated as preventable, and the remaining four would have been preventable had the corrective actions been effectively implemented. DCPD found no commonality of causes. DCPD has taken new, augmented corrective actions to the Corrective Action Review Board, which contained processes to preclude SSFFs from happening from initiating events. These new corrective actions include the following:

1. Update the applicable procedure to include all modes of operation and expand the list of Single Failure Vulnerable Systems to include shared portions of systems that create a single point vulnerability.
2. Establish risk mitigation actions for any condition, which reduces vulnerability to SSFF to loss of a single component, power supply, or train.

3. Establish the Station Focus Area that includes the top five human performance error prevention tools (the “High Five”).
4. Post Systems, Structures, and Components (SSCs) where the loss of the component would result in loss of SSF, and revise the Operations Policy to reflect this standard.
5. Require Outage Scope Review Team (OSRT) identification of SSFF vulnerabilities and establishment of risk-commensurate mitigations when repair will be delayed or deferred.
6. Develop and proceduralize a clear standard for evaluations of conformance to licensing basis and SSFF vulnerability to be implemented in Operating Experience Assessments, plant modifications, design and licensing basis reviews, NRC communications, and Licensing Basis Verification Program processes.
7. Educate station Senior Reactor Operators, managers, senior leadership team, and engineers such that they can recognize a SSFF or potential SSFF challenge.
8. Communicate to station to achieve plant-wide recognition of DCPD SSFF Performance Indicator vulnerability, including:
 - a. Current station SSFF performance
 - b. Bottom industry decile standing
 - c. How to recognize an SSFF vulnerability
 - d. Expectations to reduce risk of SSFF events
 - e. Broad range of situations whereby plant staff can create a possible SSFF event.

With the relatively high number of SSFFs recently, DCPD needs strong, effective correction action to reverse the degrading trend of SSFFs. The DCISC should follow this issue closely with quarterly reviews to assess the effectiveness of corrective action.

The trend of SSFFs for the last two years at DCPD is as follows:

Quarter	Unit 1 SSFFs		Unit 2 SSFFs	
	New	Value	New	Value
3Q13	2	3	1	4
4Q13	0	3	0	3
1Q14	2	4	0	2
2Q14	1	5	1	2
3Q14	0	3	0	1
4Q14	0	3	1	2
1Q15	0	1	0	2
2Q15	0	0	0	1

New = new SSFFs reported to NRC in the quarter

Value = total SSFFs for the year ending with the quarter (SSFFs are kept on the books for 12 months for measurement purposes.)

NRC’s second-quarter 2015 Performance Indicator for DCPD’s SSFI is currently Green based on the following data:

Unit	No. of SSFIs	NRC White Threshold	DCPD Goal

1	0	> 5	0
2	1	> 5	0

It appears to the DCISC that there has been improvement in DCPD System Functional Failures (SSFFs) since July 2010, when originally reviewed. This has been and is still a concern to the DCISC. The DCISC will continue to review the SSFF status.

Large Transformer Issues (Volume II, [Exhibit D.5, Section 3.1](#))

Since mid-2013, the station has experienced several upsets (i.e. flashovers to ground) in its high voltage systems that are external to, but near to the plant. Careful examination of these events has determined that the contributor to the flashovers is buildup of contamination, including sea-salt aerosols, on the affected components from the atmosphere around the plant. Recent prolonged dry spells, during which build-up occurs, interspersed with periods of light rain, which is insufficient to wash contamination away but increases the electrical conductivity of the deposits, have further aggravated the situation. The problem has been determined to be more severe for Unit 2 equipment that is located near the southeast corner of the turbine building due to the effect of onshore wind entraining the mist from the station's outfall, which is carried between the Turbine and Administration Buildings and deposits preferentially in this area where the Unit 2 transformers are located. This Fact-finding Visit focused on the status of and plans for DCPD's Large Transformers as continuing follow-up to Fact-finding Visits that were conducted in April 2013 and earlier.

Summaries of the health reports for the 230 and 500 kV systems are as follows:

230 kV System

- The System Health Reports noted that loss of this system provides a 5% contribution to Core Damage Frequency.
- Replacement of Unit 1 230 kV Startup Transformer 1-1 (230/12 kV) bushings with bushings of silicone rubber is scheduled for Refueling Outage 1R19 (October/November 2015).
- It was noted that Unit 2 Startup Transformer 2-1 bushings and lightning arrestors have been replaced with arrestors that have silicone rubber components.
- It was noted that Unit unavailability criteria have been routinely exceeded due to maintenance activities that require periodic cleaning of the 230 kV Startup Transformers.

500 kV System

- An adverse trend was noted regarding Unit 1 Main Bank Transformers. Oil sampling has indicated long-term degradation of the insulation of the transformer windings. The Plant Review Committee authorized replacing the oil pumps to provide increased recirculation flow of the oil. Pump replacements are scheduled for Refueling Outage 1R19 (October/November 2015). It was further noted that the cooling setpoint was lowered, and this has helped reduce the gas generation.
- From the Unit 2 500 kV Report:
 - Margin Management Program: Undersized motor starters, Main Bank Transformer C phase
 - U2 Main Bank Transformer A & B phases, Cooler Breaker AIC (Amps Interrupting Capacity) Rating undersized. (AIC Rating is the maximum number of surge amps that can be served to the equipment and still safely trip off when the amperage gets too high.)

- Although the following information extracted from DCP Unit 2's 500 kV System Health Report is not directly related to transformer health, it became of interest to the DCISC. The information pertains to a design change that may be needed to improve 500 kV backfeed time. The information in the above mentioned Health Report notes that DCP's Final Safety Analysis Report (FSAR) states that 500 kV backfeed can be achieved in 30 minutes after a Unit Trip, compared to the original time of 30 seconds that was established in the original Safety Analysis Report (SAR). As mentioned in the System Health Report, this may raise a question regarding the design basis documentation of Diablo Canyon's compliance with 10 CFR 50 Appendix A General Design Criteria (GDC) 17 (Electric Power Systems) with respect to the 30 minute vs 30 second time criterion for 500 kV backfeed.

As extracted from the DCISC's April 2013 Fact-finding Report, the station has recognized that if a fire were to occur on any of the Main Bank Transformers and spread to adjacent transformers, the affected Operating Unit could be shut down for over a year in order to replace the transformers. At the time of the April 2013 Fact-finding Visit, DCP planned to construct walls between these transformers in the R21 outages (which had been rescheduled from the R18 outages) to meet Long Term Plan targets. Though not a safety issue per se, the April 2013 DCISC FFT expressed concern that the schedule had been delayed for over four years.

DCP is continuing to pursue transformer improvements and preventive measures that are designed to strengthen the capabilities of this equipment to better withstand the effects of high salinity in the local atmosphere and as aggravated by prolonged dry spells that have been interspersed with periods of light rain. Station actions in this area appear to be appropriate and aggressive.

Reactor Vessel Surveillance Program (Volume II, [Exhibit D.6, Section 3.6](#))

The DCP Reactor Vessel Surveillance Program (RVSP) manages loss of fracture toughness of reactor vessels due to neutron embrittlement in reactor materials exposed to neutron fluence exceeding 1.0×10^{17} neutrons/cm² for neutron energies above 1.0 MeV (Million Electron Volts). Capsules of RV material are periodically removed from the vessels during the course of plant operating life. Neutron embrittlement is evaluated through capsule testing and evaluation, ex-vessel neutron fluence calculations, and actual measurement of reactor vessel neutron fluence. Data resulting from the program are used to determine RCS pressure-temperature limits, minimum temperature requirements, and end-of-life fracture toughness requirements. Fracture toughness relates to the ability to withstand Pressurized Thermal Shock.

Pressurized Thermal Shock (PTS) is a concern for pressurized water reactors due to its potential to rupture the Reactor Vessel as a nuclear plant ages and neutron impingement hardens or embrittles the Reactor Vessel. If the vessel, which normally operates at approximately 600 degrees F and 2200 pounds per square inch of pressure (psi), were to experience a cold-water shock from inadvertently injecting cold water into the vessel while at operating pressure, it is possible that existing cracks in the vessel could rapidly enlarge, resulting in a vessel rupture. Such a rupture could make it difficult to safely shut down the reactor and/or to maintain core cooling. This phenomenon is a concern only for vessels embrittled by years of high-energy neutron flux. Nuclear plants are designed and analyzed to be able to withstand such a shock without damage during their operating lives. For this reason DCP's reactors have a system, LTOP (Low Temperature Overpressure Protection) System, which prevents pressure increases above a selected point when at lower temperature upon increasing or decreasing power.

DCP plant possesses enough metallic coupons, either in the reactor itself or already removed and in the Spent Fuel Pool, to support the plant's need to determine the capability of the reactor vessel to withstand the effects of pressurized thermal shock out to the full 40-year lifetime of the plant, as well as the proposed 20-year extension, if NRC grants a license extension. DCP is able to rely on additional backup information on tests conducted on

specimens from another nuclear plant because the reactor vessel at that plant, and the accompanying metallic specimens, were fabricated from the same batch of metal as was the reactor vessel at DCP. DCP's two reactor vessels are slightly different in composition. Hence, they have slightly different metallic properties, slightly different susceptibilities to PTS, and different specimens for testing.

In January 2010 the NRC approved a final rule to provide alternate requirements for protection against pressurized thermal shock events in nuclear power plant reactor vessels. The NRC indicated that the rule, "Part 61a of Title 10, Code of Federal Regulations", increases the realism of calculations used to examine a Pressurized Water Reactor's (PWR's) susceptibility to PTS. Plants like DCP can choose whether to abide by the new rule or the earlier rule, known as "Part 61." Updated analysis methods allow PWR licensees to better account for some effects of aging on their reactor vessels. The NRC's announcement regarding this rule noted that the revised approach was derived using data from research on currently operating PWRs. This research was in three different areas: (1) the types of scenarios, and the likelihood of such scenarios that might lead to PTS, (2) the thermal and thermal hydraulic conditions that would occur during the various scenarios, and (3) the metallurgical properties of the vessels and welds and of their responses to PTS types of events.

Also noted was that the data indicate the overall risk of PTS-induced reactor vessel failure after 60 years of operation is much lower than previously estimated. If plants choose to adopt the new approach, the rule requires PWR operators to perform detailed analyses of both reactor vessel surveillance data and the results of regular reactor vessel inspections. If the analyses' findings exceed certain limits, the operator must take steps either to limit the reactor vessel's exposure to neutron radiation or to determine how the reactor's systems can be modified to prevent PTS-induced vessel failure.

DCP chose to address PTS by abiding by the old rule as well as the new rule, the latter of which would be used to increase design margin to permit more relaxed temperature-pressure curve operating restrictions.

Several coupons have been removed which have already received the equivalent of 55 Effective Full Power Years, which replicates 60 calendar years of plant operation because the units do not run continuously at full power throughout their lifetimes but rather shut down periodically for refueling and maintenance. These specimens are subjected to a testing process that verifies their ability to withstand the forces of PTS. The test used to determine fracture toughness is the well-known and standardized "Charpy V-Notch" test.

For Unit 1 the last capsule is expected to be withdrawn during the 1R23 refueling outage in 2022 after it has accumulated a fluence equivalent to 94.2 years of operation. The remaining four standby capsules have low lead factors and will remain in the vessel throughout the vessel lifetime to be available for future testing. There are no capsules remaining in the Unit 2 vessel. All capsules were removed because high lead factors produced exposures comparable to the fluences at the end of the period of extended operation.

DCP's reactor vessel material surveillance program appears satisfactory to support operation through the normal end-of-life as well as an additional 20 years, should life extension be sought by DCP and granted by the NRC.

II. DCISC Reviews of DCP SystemS/COMPONENTS

Auxiliary Feedwater System (AFWS) (Volume II, [Exhibit D.1, Section 3.8](#))

The AFWS is a safety-related system that provides feedwater under shutdown, startup, and low power conditions. During normal power operation the Main Feedwater System (MFWS) supplies feedwater to the secondary side of the Steam Generators (SGs), where water is pumped to the SGs in which the water is boiled into high-pressure steam. This steam is then supplied to and spins a turbine generator to produce electricity, after

which it is condensed back into water that is pumped back to the secondary side of the SGs.

The AFWS is relied upon to prevent damage to the nuclear reactor fuel and to prevent overpressurization of the Reactor Coolant System in the event of transients such as a loss of normal Main Feedwater or a pipe rupture on the secondary side. The MFWS is not designed to operate stably at the low-flow conditions needed under shutdown, start-up, and low power operation, which is why it is not used to provide feed water under these operating modes. During normal plant shutdown the AFWS replaces the MFWS and serves as a cooldown system to maintain hot standby and to proceed further through cooldown to a point where the Residual Heat Removal (RHR) System can be placed in operation, which can be accomplished when Reactor Coolant System temperature goes below 350 degrees. The AFWS is also used during normal plant startup prior to placing the MFWS in service.

The AFWS consists of three feedwater supply trains with diverse means of powering the pumps. One train consists of a full-capacity steam turbine-driven pump, which can be aligned to use steam from any of the four SGs. The other two supply trains consist of half-capacity electric-motor-driven pumps, each supplying flow to two of the four SGs, with the capability to be aligned to any of the four SGs.

DCPP employs a broad color coding system for grading the overall health of plant systems:

- Green—Healthy
- White—Achievable Action Plans in place to return system to complete Healthy status
- Yellow—Needs Improvement
- Red—Unsatisfactory

Currently, the System Health Reports show that Unit 1's AFWS is rated White and Unit 2's AFWS is rated Green.

The health of Unit 1's Auxiliary Feedwater (AFW) System has improved to White from Yellow in September 2011. Unit 2's AFW System Health is Green, as it was in 2011. The few existing system health issues do not appear to be significant enough to negatively affect system reliability or plant safety. Considering the significance of this safety system, DCISC should conduct its next review of AFW System no later than the fourth quarter of 2015.

DC Power System (Volume II, [Exhibit D.1, Section 3.5](#))

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:

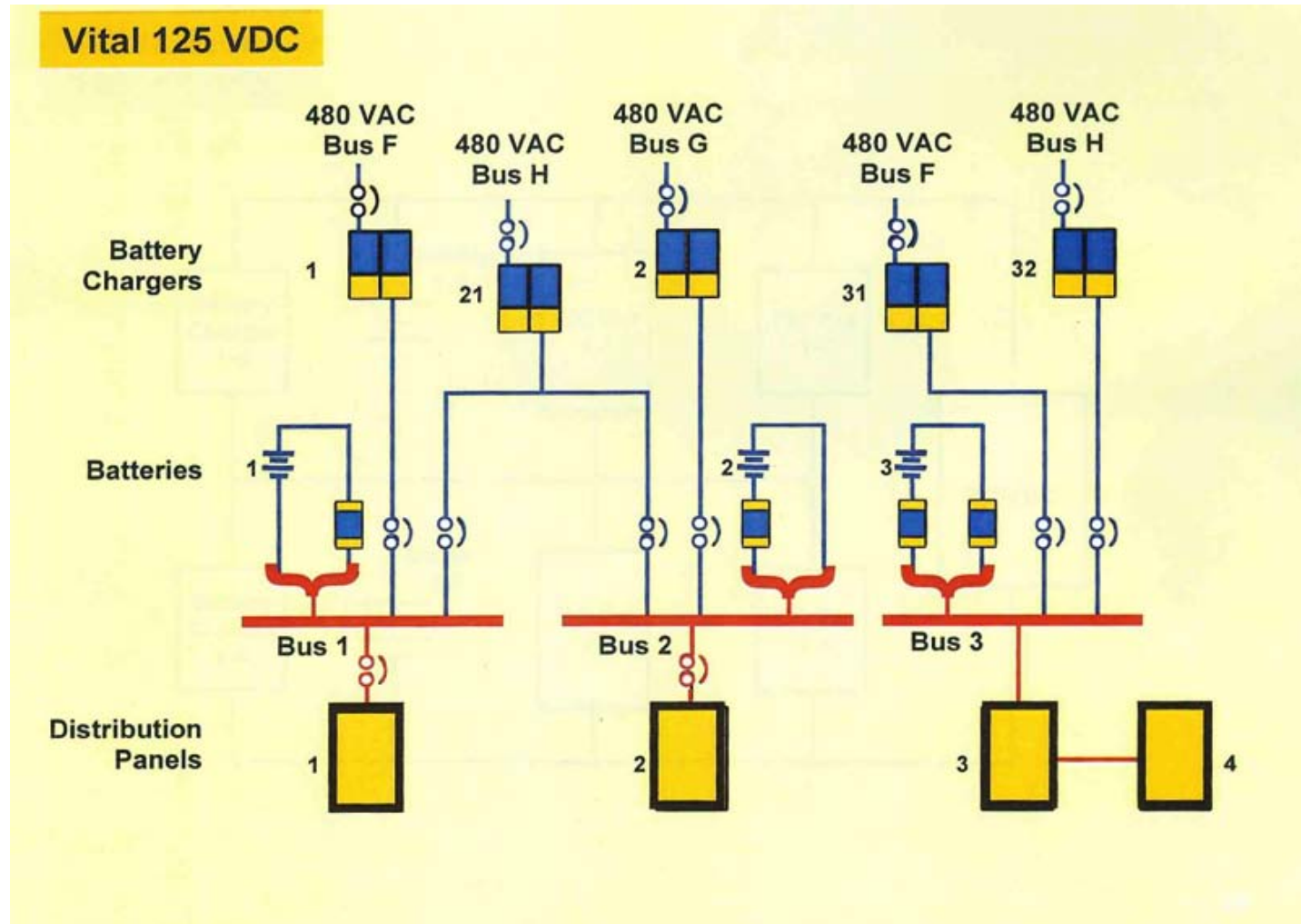
1. Vital 125 VDC
2. Non-vital 125/150 VDC

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, DCP 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 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 that has been determined to be experienced in 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, and the three remaining breakers will be 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 battery manufacturer is recommending analysis of cells to determine if cell or battery replacement is necessary. Replacement cells will be furnished under warranty, and replacement is targeted for refueling outage 2R18.

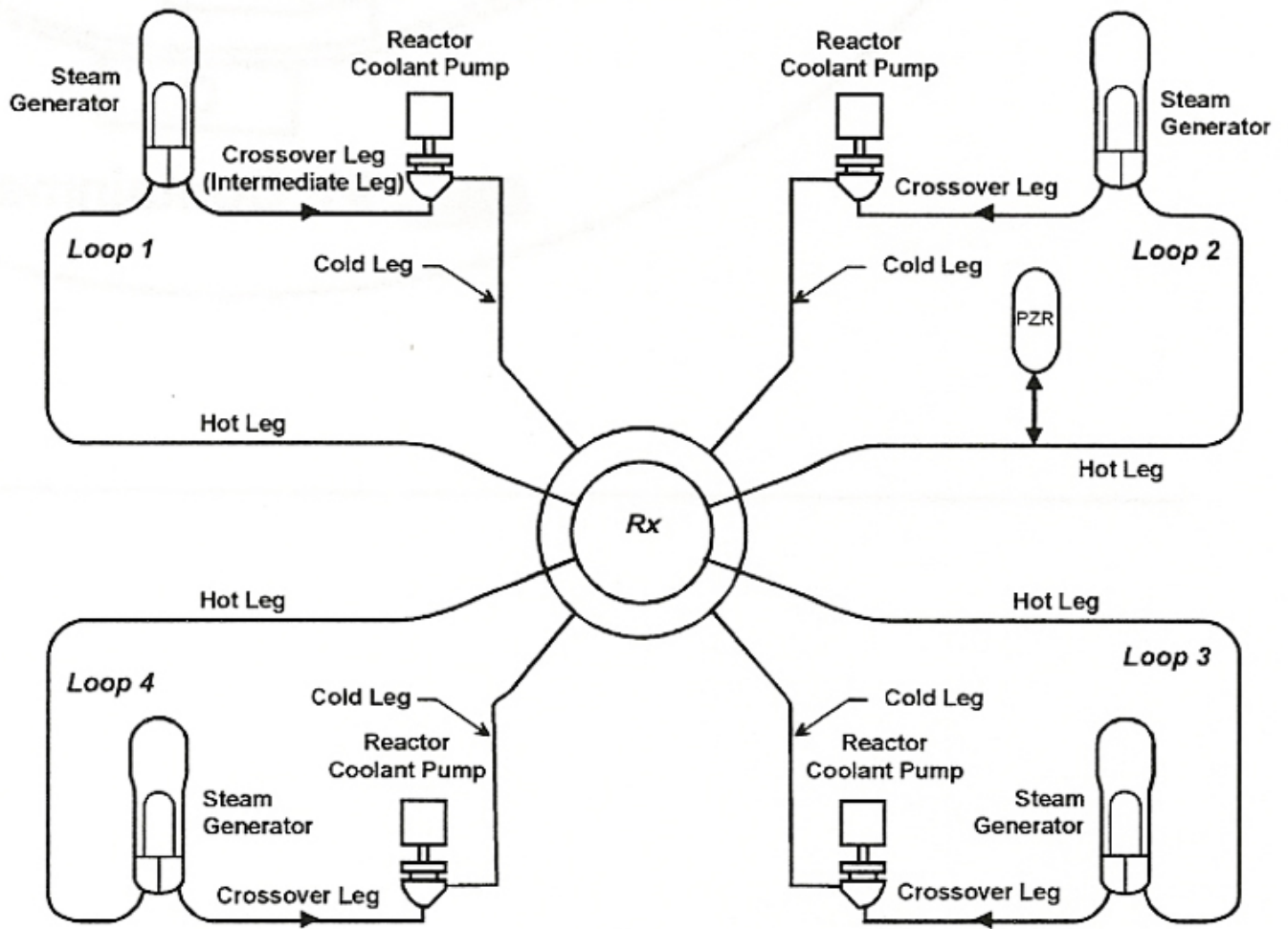
The 125-Volt DCPD Direct Current Power Systems (DCPS) in both Units are in good health (Green). An aging issue in both Units pertaining to molded case circuit breakers is being effectively addressed as is a margin issue in Unit 2’s Battery 27 due to sediment.

Reactor Coolant System (Volume II, [Exhibit D.3, Section 3.6](#))

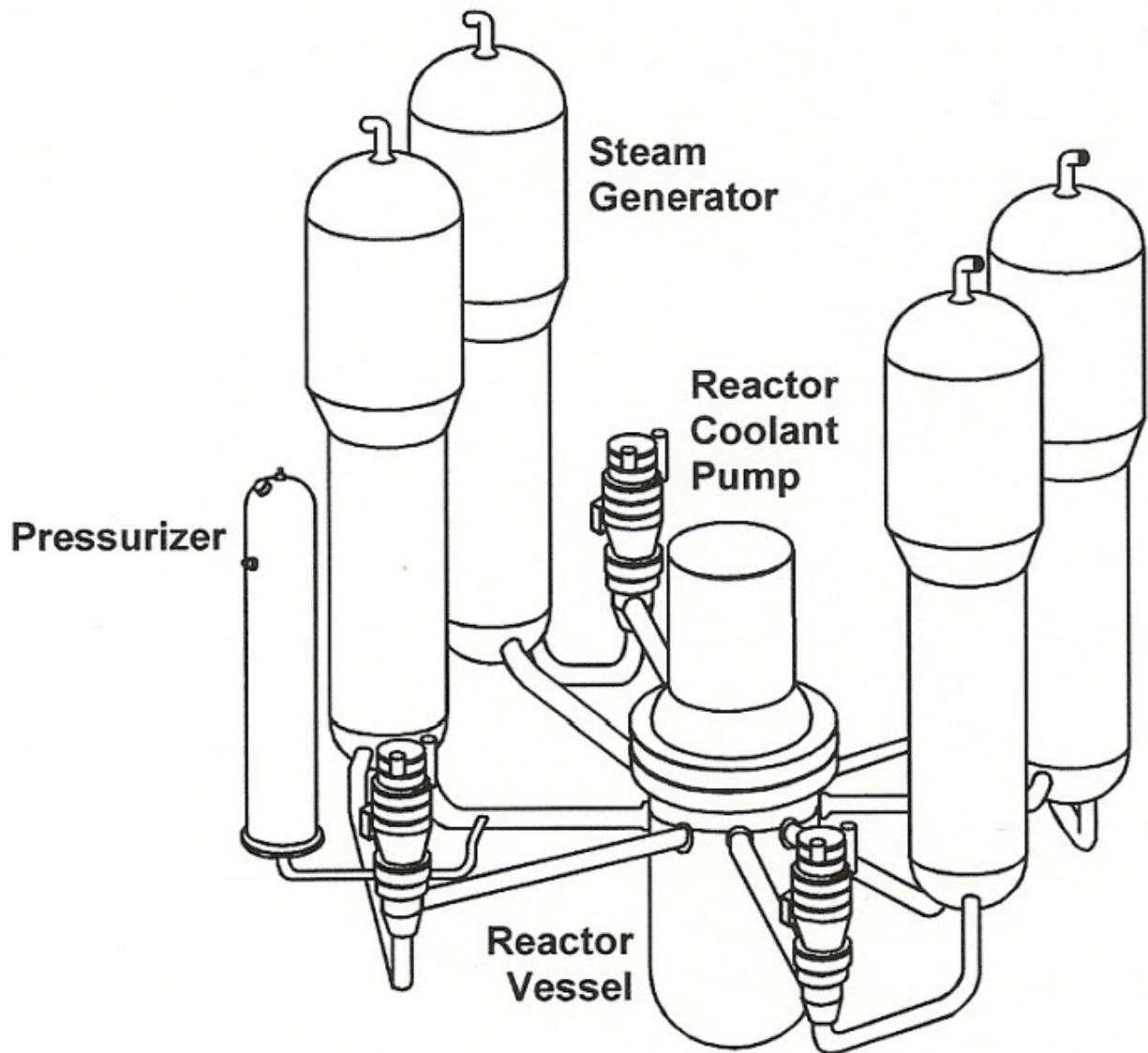
The purpose of the RCS is to transfer heat generated by the fission process in the reactor core to the secondary plant steam system as well as provide coolant pressure boundary, serve as the second barrier against release of fission products, and to promote natural circulation. The system consists of:

- Reactor vessel containing the nuclear core
- Pressurizer connected to the system to maintain pressure
- Four parallel heat transfer loops connected to the reactor vessel with each loop consisting of the following:
 - One steam generator which serves as a heat sink and heat exchanger to transfer heat to the secondary steam plant
 - One reactor coolant pump which circulates the loop water
 - Interconnecting loop piping
 - Taps for parameter (temperature, pressure, flow) measuring instruments

A basic RCS piping flow diagram is shown below:



The physical arrangement of the RCS is as follows:



The RCS is capable of (1) $\pm 10\%$ step power changes, (2) 5%/minute ramp from 100% to 15% power, and (3) 95% load rejection. The RCS is able to maintain its integrity during a Design Earthquake, a Double Design Earthquake (0.4g horizontal and 2/3 that for vertical motion), or (3) a Hosgri Earthquake. The RCS can be shutdown from either the Control Room or Hot Shutdown Panel.

At the time prior to DCISC's previous review of this System the health ratings of the RCSs in both Units 1 & 2 were primarily affected by a design problem associated with the Pressurizer Safety Valves. The relief valves were water-seated, and each had a loop seal associated with the valve. The combination of these two designs could have created a water hammer in a segment of downstream piping that is not rated for water hammer. This problem was corrected since DCISC's previous Fact-finding review of this system through replacement of the water seated relief valves with steam seated internals during Refueling Outages 2R15 and 1R16. However, following this conversion, both Unit 1 and Unit2 valves have experienced weepage (i.e. slight leakage) during unit pressurization in all outages except 2R16. This new condition requires that a minimum of 18 hours of critical path time be allocated each outage to allow a slow ramp rate to normal operating pressure along with multiple hold times at various increasing pressures to thermally soak the Pressurizer Safety Valves. The station is currently working with a consulting firm to analyze whether corrective actions can be taken to assist in reducing these delays in return to power.

Two notable events occurred during the past two years pertaining to the Reactor Coolant System. Both involved failures or excessive leakage from Reactor Coolant Pump seals. Both were evaluated in depth by the station through formal Root Cause Evaluations. Both were also examined by DCISC during Fact-finding Visits in September 2013 and April 2014 respectively.

DCPP's analytical and remedial actions, including the use of vendor expertise and input as well as the experiences of other plants in the industry, appear to have been appropriate and effective. DCP's Quality Verification Group performed an insightful assessment of the key aspects of this event. The resulting twelve-day forced outage appears to have been an avoidable event. The identified root cause of the seal leakage appears reasonable, as do the station's intended follow-up steps to prevent recurrence.

The accident at Fukushima has prompted the U.S. nuclear industry to examine implications for its own plants. One implication pertaining to the Reactor Coolant System has involved actions that could be taken to reduce possible paths for loss of reactor coolant. One impact of this examination is that PG&E has made a regulatory commitment to the NRC to install what are referred to as SHIELD passive thermal shutdown seals in all of DCP's Reactor Coolant Pumps no later than in the two R19 Refueling Outages. These seals would be operated when the pumps are stopped and if both forms of seal cooling are lost, and are they designed to reduce each pump's seal leakage to less than 1 gallon per minute (gpm) compared to the current design leakage of 25 gpm for each pump.

There are several aspects of DCP's Reactor Coolant Systems that need to be addressed in both Units in order to return the systems to Green Health status, including:

- **The conversion from water seated to steam seated Pressurizer Safety Valves for both Units 1 and Unit 2 has resulted in leakage during startups and the accompanying need for multiple hold points at various increasing pressures during plant startups in order to thermally soak the Pressurizer Safety Valves.**
- **A design deficiency in the number 2 seal leakoff lines of the Reactor Coolant Pumps in both Units can inhibit the lateral movement of the number 2 seal of the 3-stage pump shaft seals, which can lead to higher than desired leakage of Reactor Coolant.**
- **A regulatory commitment to the NRC, in follow-up to the accident at Fukushima, needs to be fulfilled to install what are referred to as SHIELD passive thermal shutdown seals. These seals need to be installed in all of DCP's Reactor Coolant Pumps no later than in the two R19 Refueling Outages in order to significantly reduce reactor coolant leakage in post-accident situations**

The DCISC will conduct follow-up Fact-finding reviews of the Reactor Coolant System in the next twelve months, and the review should be allocated more than the usual time because of the complexities.

Compressed Air System (Volume II, [Exhibit D.3, Section 3.8](#) and [Exhibit D.7, Section 3.7](#))

The Compressed Air System is common to and serves both units and is divided into two Subsystems: Instrument Air System (IAS) and Service Air System (SAS). The IAS is Safety Class 2, having redundancy and high-quality components typical of Class 1, but it is not designed for seismic loads or supplied by emergency electrical power. IAS consists of three primary full-capacity air compressors, Plant Air Compressors (PACs) 5, 6, and 7, which supply clean, dry air pressure primarily to air-operated valves (AOVs) and instruments needed to run the plant and for safe shutdown. Normally one compressor is required for plant operation. These three compressors are rotated in succession to serve the plant with each compressor operating for a week at a time.

Because the IAS is not fully safety-related, the valves required for safe shutdown are supplied with an additional source of assured air from the Backup Air/Nitrogen System (BANS), a Class 1 design. The BANS is a passive

pressure system with air or nitrogen accumulators located with and dedicated to each safe-shutdown valve. They are seismically designed to resist earthquakes and require no electrical power. Each is designed with capacity adequate for valve operation to assure safe shutdown.

+Four additional full-capacity compressors (PAC 0-1 through 0-4) are maintained on site and are intended to serve the IAS at any time when called upon and are also to serve in a secondary role during refueling outages. During outages, two additional diesel driven air compressors are brought onsite and are the primary source of compressed air during the outages.

One of the air compressors had been installed, and resides, outside the Turbine Building, i.e. it is continuously exposed to outside atmospheric conditions. This compressor is one of the three on which DCPD continually relies for compressed air. The Compressed Air System Health Report notes that PAC 0-7 “often trips on elevated Low Pressure Element outlet air temperature during periods of elevated ambient site temperature.” DCPD is working with the vendor to develop a detailed troubleshooting plan and evaluate (the) compressor for warranty repair.” The DCISC visually inspected the compressor and the station it occupies. The compressor and all other components at that compressor’s station appeared to be clean and free of rust.

Overall System Health is rated “White”, i.e. “Needs Improvement.” This compares to the overall System Health rating of “Yellow” in September 2014 that was primarily due 1) to oil leakage from the breather of PAC 0-5 when the compressor was loaded and 2) to the overall material condition of the outdoor air compressor PAC 0-7, both conditions of which have been remedied.

DCPD has been taking action to improve the material condition of the Compressed Air System and the reliability of its individual components. Overall System Health has improved to White, i.e. Needs Improvement. The DCISC should conduct its next Fact-finding Visit on this topic prior to the third Quarter of 2016.

DCPD Digital Control Systems (Volume II, [Exhibit B.6](#))

The term ‘digital’ means that control functions have moved from electro-mechanical control to computer control, much like has been done with modern motor vehicles. This change from electro-mechanical to computers matters because the end result is that control systems have become more reliable, ultimately providing a safer operating plant. There are three primary digital control systems at DCPD:

- Turbine Control System (in-service 2004)
- Feedwater Control System (in-service 2005)
- Process Control System (in-service 2012)

The purpose of the digital Turbine Control System is to regulate the governor valve position which in turn controls steam flow during all modes of turbine operation. Essentially, the system controls the turbine generator during plant startup, normal operations, and plant shutdown. The Turbine Control System has been digital for some time and was replaced in 2004 with a new digital system.

The purpose of the Feedwater Control System is to automatically maintain SG water levels during steady-state operations. The system restores and maintains the water levels within safe levels during normal unit transients. Newer controls have reduced or eliminated operator interaction during system transients, preventing unnecessary plant trips, and simplifying operation.

The function of the Process Control System is to convert physical plant parameters such as temperature, pressure, level, and flow into electrical signals during normal operation. These signals are used for plant control

(pumps, valves, heat exchangers, and tanks), operator indication, and computer monitoring and recording. The recorded signals are used by Operations to trend parameters and also to provide a historical record which assists in identifying any system degradation.

The common benefits and features of the Process Control Systems are as follows:

- Common Benefits
 - Common/shared platforms, inherent redundancy
 - Cost savings (parts & labor)
 - Reduced impact on maintenance
 - Reliability
 - Ease of redundancy
 - Less maintenance required
 - Flexibility - used for different systems
 - Zero moving parts
- Common Features
 - Triple redundancy
 - System functionality not affected by module failure
 - Faulted modules can be replaced online, thus maintaining uninterrupted control
 - Built-in online diagnostics without additional external hardware or software
 - Utilized in critical petroleum and chemical production plants

Redundancy is not required by regulation but is a design feature, and redundancy is valued and used in the petroleum and the chemical industry as well as in the nuclear industry. All three process control systems share a common hardware platform and a flexible software commonality in that they are flexible as they function as logic controllers and are not similar to home-based computers. The systems are comprised of three separate modules, each processing the same signals and if one detects a fault the other two will continue to work. The process control systems are safety-related systems.

None of the digital control systems he discussed have ever caused a unit trip at DCPD or at another nuclear power plant, lost their ability to perform a safety function, or caused an unplanned change in reactor power. As a result, the operators have an overall system that they can depend upon to safely and reliably control the plant under all conditions. Recent upgrades include the process control system (in-service 2012) and the auxiliary control system (in-service 2006). Future upgrades are planned for the Condensate Polisher Control System and the Reactor Protection System, which are not control systems.

DCPD has been designated as a lead plant on replacement of its Reactor Protection System. DCPD has more digital systems than most other nuclear power plants and is considered to be a leader in the area of digital systems and frequently consults with other plants to identify and solve problems which he stated provides valuable operating experience to DCPD.

Radioactive Waste Systems (Volume II, [Exhibit D.4, section 3.7](#))

The DCISC Fact-finding Team (FFT) reviewed the design and operation of the three radioactive waste (radwaste) systems and toured the accessible portions of the liquid and gaseous systems. The systems appeared to be in good working order, and the plant conditions in these areas appeared to be acceptable.

Gaseous Radwaste System (GRWS) Status

The GRWS collects and processes radioactive gases from various plant systems and includes two large waste gas decay tanks which hold radioactive gases for time to decay to low levels of radioactivity. The GRWS then discharges small amounts of gaseous radioactivity to the environment via the Plant Vent System. These discharges are monitored by a pre-set radiation detector, and, if too high, the discharges are automatically terminated. Annual reports of radioactive gas discharges have all shown that discharges are very small fractions of DCPD Technical Specifications and NRC regulatory limits.

The GRWS is healthy (White) according to the System Health Report. The major issue is Waste Gas Sampling Subsystem inoperability, which is due to obsolescent system components preventing continuous monitoring of oxygen levels upstream of the gas compressor when the compressor is shutdown, because the oxygen analyzer is located downstream. Manual samples are taken as a compensatory measure. Funding has been on hold until January 2015 due to budget constraints. It is expected that design, procurement and installation will commence in 2015 and be complete by the end of 2016.

Liquid Radwaste System (LRWS) Status

Liquid radwaste is processed and reduced by way of filters, demineralizers and evaporators. The clean water is recycled back into plant systems, and the spent resins and filters are input to the Solid Radwaste System. Small remaining amounts of radioactive liquids are diluted, measured for radioactivity, and discharged into the Pacific Ocean via the Auxiliary Saltwater System discharge. Annual reports of liquid radioactive releases have all shown that releases are very small fractions of DCPD Technical Specifications and NRC regulatory limits.

The LRWS is healthy (White) according to the System Health Report. The major issues are the nitrogen supply to the Reactor Coolant Drain Tank and level detectors for the Spent Resin Storage Tanks (SRSTs). New level probes for the SRSTs are scheduled to be installed during 2015.

Solid Radwaste System

The Solid Radwaste System (SRWS) collects and processes (decontamination, drying, compaction and packaging) solid radioactive materials for eventual shipment to licensed burial facilities. The solids are mostly spent resins, used filter media, and miscellaneous paper, cloth and other solids. The radioactive solids are handled remotely in shielded facilities. There are no solid radioactive wastes discharged into the environment.

SRWS health is White—healthy. There are a variety of issues needed for Green status. These are typically crane parts, lights, cooling fans, shielding, etc., whose repair, upgrading, or replacement is not central to achieving safe operation

The DCPD radioactive gas, liquid, and solid waste management systems are all healthy (White) each with minor issues, which are being addressed.

Radiation Monitoring System (Volume II, [Exhibit D.4, Section 3.10](#))

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 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, there have been enough maintenance and reliability and availability problems for DCPD to develop a long-term radiation monitoring strategy. DCPD believes the performance of the system is acceptable, and the system is rated Healthy (White). With corrective actions both the reliability and availability improved noticeably in the fourth quarter of 2013 and have been very good during 2014.

The DCPD long-term RM strategy is under way in Engineering with an April 1, 2015 completion date. The purpose is to improve reliability and reduce the maintenance burdens. A presentation to the Plant Health Committee is set for July 1, 2015. The DCISC should review the strategy in mid-2015.

The DCPD Radiation Monitoring System, consisting of both analog and digital components dating back to the 1970s, 1980s, and 1990s, has had availability and reliability problems up until the fourth quarter of 2013, when corrective actions resulted in noticeable improvements. For sustained improvements DCPD Engineering is developing a Long-Term Radiation Monitoring Strategy scheduled for completion in mid-2015. The DCISC will review that strategy at that time.

Residual Heat Removal (RHR) System (Volume II, [Exhibit D.5, Section 3.5](#))

The RHR System is one of a number of systems whose purpose is to remove heat from the Reactor Coolant System (RCS). During normal operation the Main Steam and Feedwater Systems work in combination to perform this function. When normal feedwater is not available and the operating unit is shutdown, the Auxiliary Feedwater (AFW) System performs this function to maintain or reduce RCS temperature until the RHR System is placed in service.

The RHR System is a safety related system, and one of its purposes is to add water and remove heat from the RCS in the event of a Loss of Coolant Accident (LOCA). In such an event, initially two high head (i.e. high discharge pressure) Safety Injection Pumps, which are not part of the RHR System, are designed and installed to resupply water into the RCS from Boric Acid Makeup Tanks and then from a Refueling Water Storage Tank in order to maintain cooling of the nuclear fuel. As RCS pressure decreases the RHR pumps can then be called upon to operate in place of those high-head pumps. These RHR pumps are each rated at 3,000 gallons per minute (gpm) at a differential pressure of 155 pounds per square inch differential (psid). They take their suction from a 245,000 gallon Refueling Water Storage Tank until the tank nears depletion, at which time their suction supply is transferred to the Containment Building Sump which would have been collecting coolant resulting from the LOCA.

The RHR System Health for Unit 1 was rated White and for Unit 2 was rated Green. System Health is rated on a descending scale of Green, White, Yellow, and Red, where Yellow and Red are considered to be Unhealthy, Green is Healthy, and White reflects a condition where certain actions are in place to return the system to the most desired condition, and the timing of those actions is considered to be acceptable.

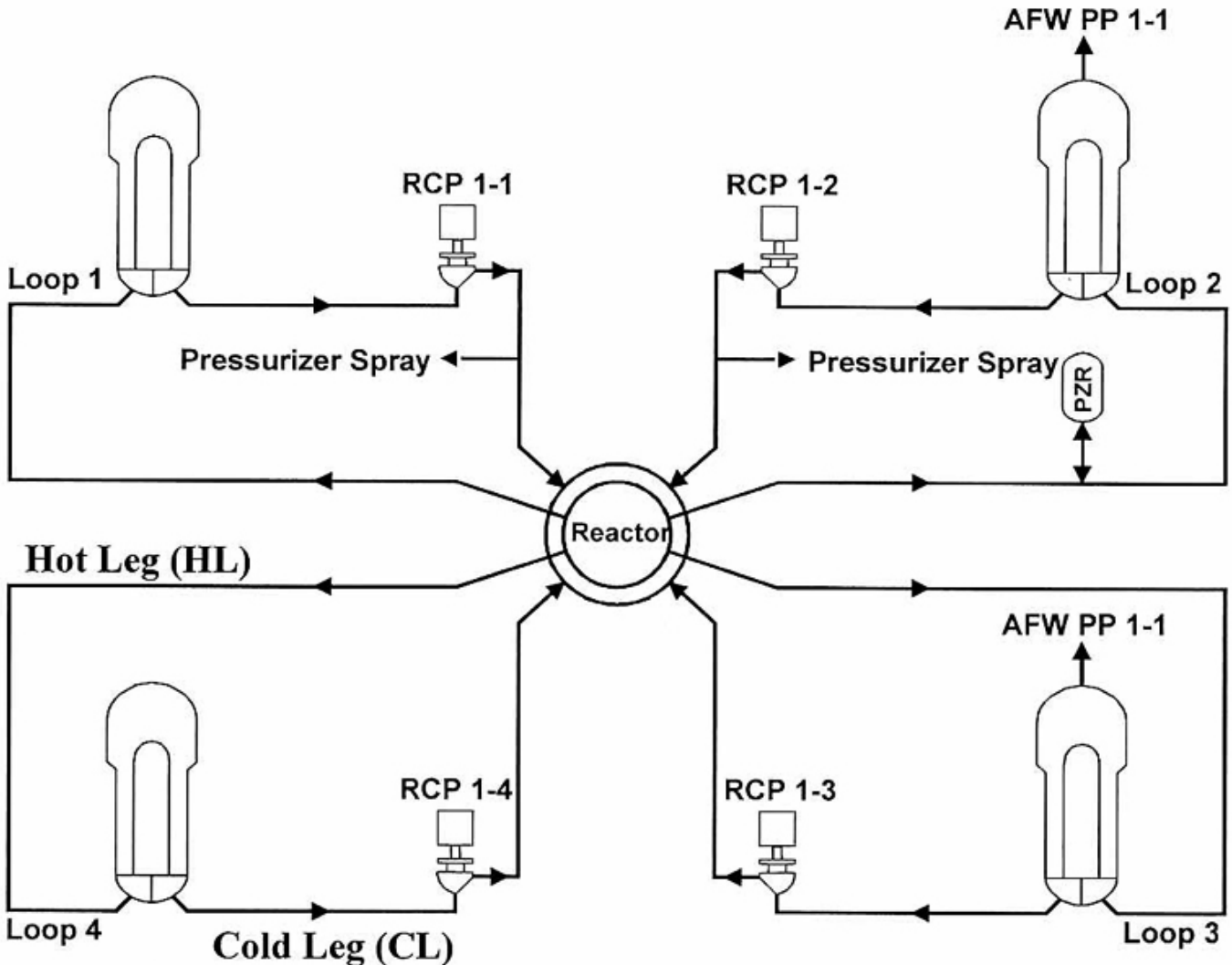
The issue that distinguishes Unit 1 as White compared to Unit 2's Green overall rating is that a weld on the stem pipe to a Unit 1 relief valve had cracked slightly resulting in a loss of barrier integrity of the pipe. This small leak was indicated by a small buildup of boric acid on the pipe. The indication of this leak was discovered in June 2013, and the Unit was then shut down for repairs. The weld was repaired soon after shutting down the Unit, and plans are to install a new rigid lateral support during Unit 1 refueling outage 1R19 to reduce the chances of piping vibration which was determined to be the likely cause of the crack and leak. Although the leak was repaired, Unit

1's Health will not be returned to Green until this lateral support is installed, to better assure that this previous cracking will not recur.

The Residual Heat Removal Systems of both Units 1 and 2 appear to be in good health. The DCP System Engineer appeared to be highly knowledgeable of various conditions that impact the health of his systems. The System Health Reports provide a good assessment of system health and of plans to address identified issues. The scheduling of the next Plant Health Committee Review of this system in May 2015 appears to be appropriate.

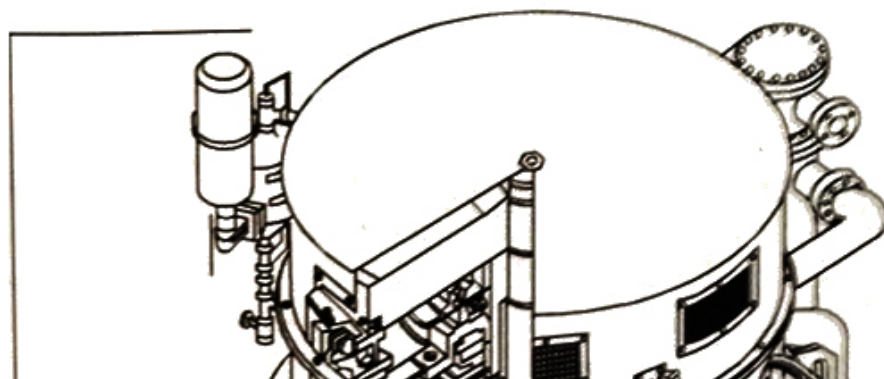
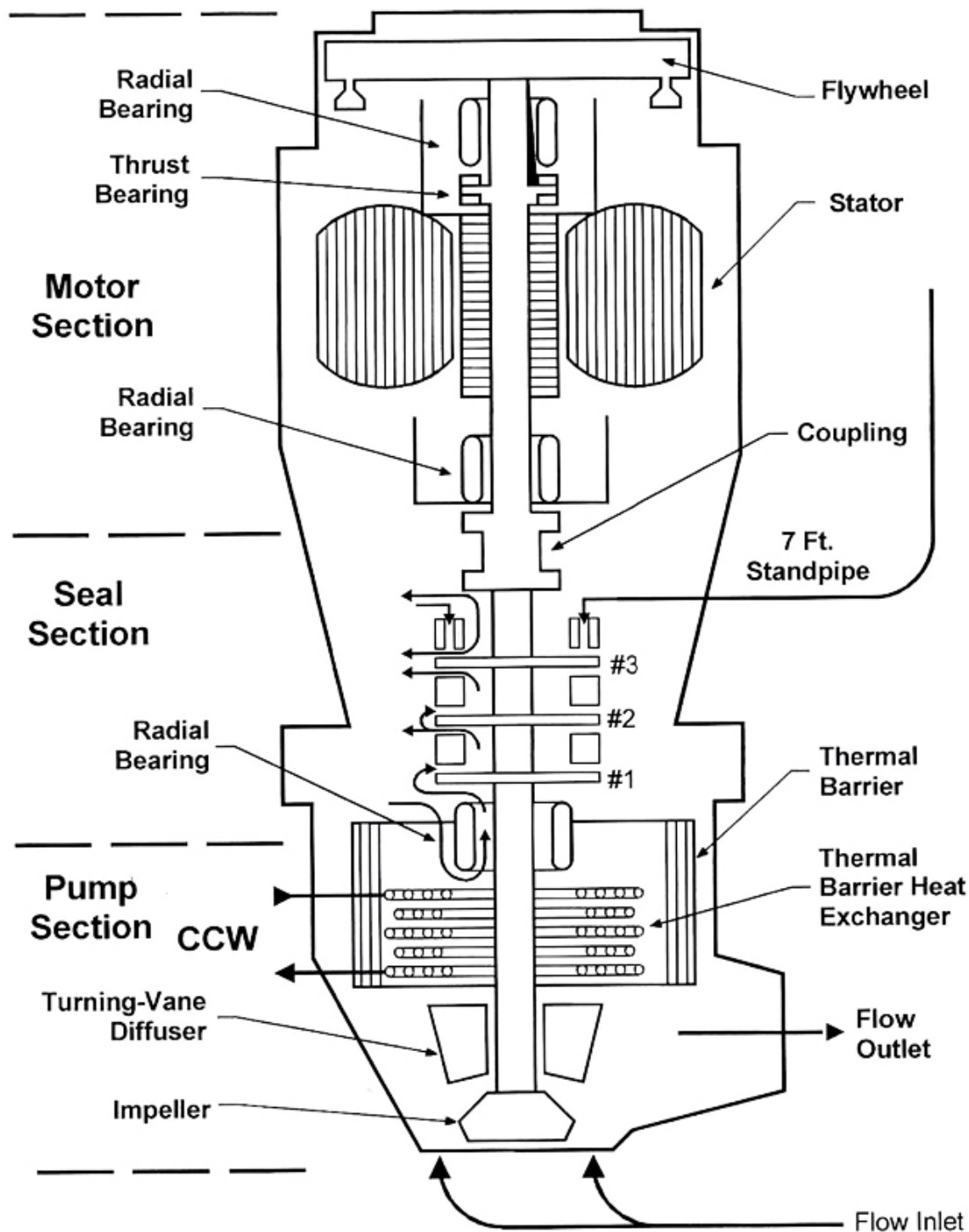
Reactor Coolant Pumps (RCPs) (Volume II, [Exhibit D.6, Section 3.5](#))

The purpose of the RCPs is to provide flow through the RCS to support the design heat transfer rate from the Reactor fuel core to the Steam Generators (SGs). A secondary purpose is to provide energy to initially heat the RCS from cold plant conditions. The RCPs are located at the 117-foot level in the Containment next to their respective SG. Each unit has four RCPs with identical characteristics. Each RCP takes suction from its respective SG cold leg and discharges to the Reactor with sufficient energy to flow through the Reactor and SG before returning to the suction of the RCP. This is depicted in the following RCS flow loop diagram.



The RCPs consist of the pump or hydraulic section, the seal assembly, the flywheel and the motor all located on a common shaft as shown in the following diagram.

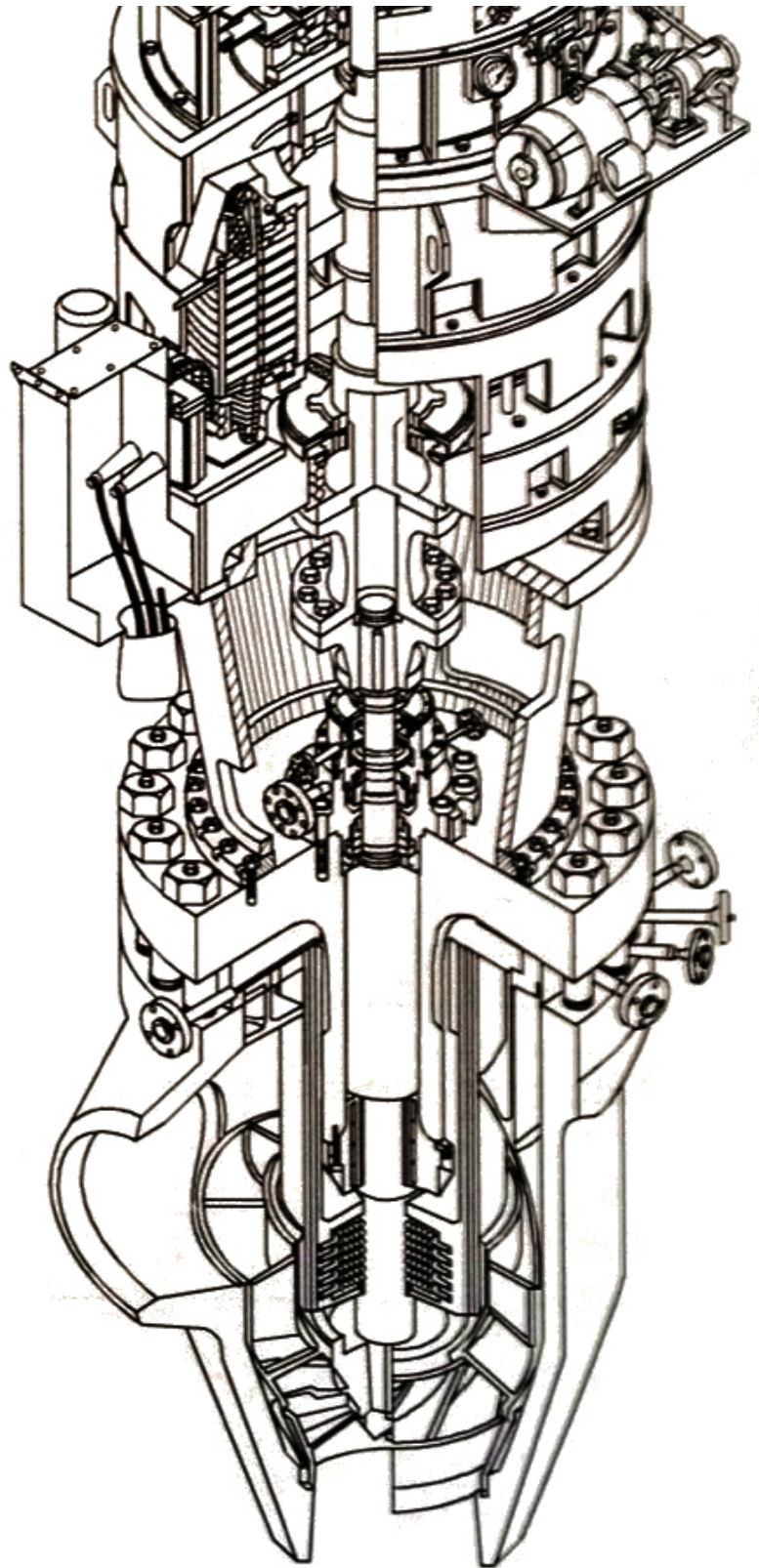
RCP Overview
Drawing
(Figure 1)



Motor Section

Seal Assembly

Hydraulic Section



The hydraulic section is a vertical, single stage centrifugal pump with an axial diffuser and turning vanes with a radial discharge outlet. The pump is rated to deliver 88,500 gallons per minute (gpm) at a head of 277 feet at 1190 rpm. A water-cooled radial bearing is located at the upper or driven end of the pump shaft. The seal assembly consists of three mechanical seals that provide a pressure drop from RCS pressure of 2200 psi nominally to ambient pressure, thus minimizing RCS leakage along the shaft.

The electric motor is a nominal 6000 hp 12,000 volt, vertical, 6-pole squirrel cage induction motor. It is equipped

with upper and lower segmented journal bearings and a Kingsbury thrust bearing. Motor bearings are lubricated by an internal oil pump and cooled by integral oil coolers. A flywheel at the top of the motor adds additional inertia that extends pump coast-down time. The flywheel also incorporates five pawls to prevent reverse rotation which could cause excessive starting current.

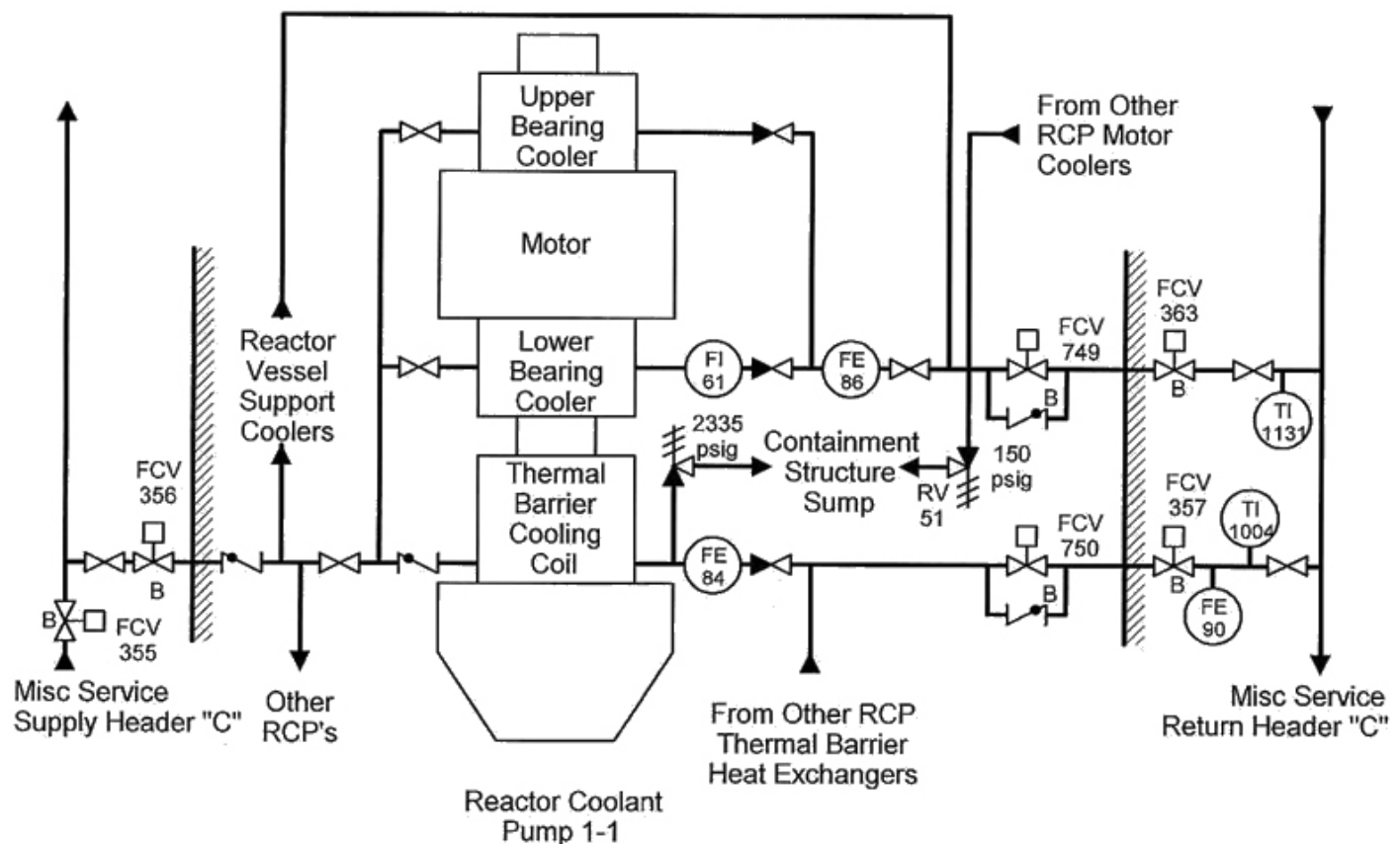
RCP motors have generally been trouble-free. They are inspected regularly and re-built on-site over a ten-year schedule. Beginning December 2009, there have been multiple instances of TCP motor bearing temperatures spiking high and immediately returning to normal. These instances are being tracked in the Corrective Action Program to determine the cause of the spikes and to ascertain the need for any corrective actions.

RCPs depend on the following systems:

- Component Cooling Water (CCW) System and heat exchangers to provide cooling water to the pump section thermal barrier heat exchanger
- Seal water injection flow provided by the Chemical and Volume Control System (CVCS) via the Charging Pumps
- Seal water return and leakage removal to the Pressurizer Relief Tank/Reactor Coolant Drain Tank (RCDT)
- Monitoring of temperature, vibration and flows

All RCPs are normally in service at power. RCP #2 is normally the first pump started and last pump shutdown because it is used to provide Pressurizer Spray flow. At least two pumps must be running to enter Mode 3, Hot Shutdown. All RCPS must be operating to enter Mode 2, Hot Standby and Mode 1, Power Operation.

The RCP shaft seal assembly is located near the upper or coupling (driven) end of the pump shaft as shown in the following diagram.



The seals are contained in three primary pressure seal housings that are bolted to the top side of the pump main flange. The assembly consists of three water-lubricated seals connected to an external monitoring and control system. The system monitors and controls the upward flow of the high pressure coolant during a loss of normal seal injection flow. If normal seal injection flow and CCW are lost, the RCP must be shut down immediately.

Seal water is injected at a nominal nine gpm into the No. 3 Seal with six gpm injected into the RCS and leak off of three gpm from the Number 1 and 2 seals. Seal water is important for cooling and leakage control to assure proper pump operation. Pump seals are given a general, non-intrusive inspection each year (8,760 operational hours) and a boroscope inspection of the pump rotor from inside every 10 years (87,600 operational hours). Pump seals are inspected with a boroscope typically every six years (52,560 operating hours), unless there are problems. Seals are being replaced on a three-cycle frequency.

DCPP has had a number of RCP seal leakage problems requiring replacements either at normal refueling outages or special shutdowns. Most of the leaks were caused by debris getting into the seals. This is a time, dose and personnel intensive procedure. DCPP will be replacing all RCP seals with improved third generation Westinghouse SHIELD Passive Thermal Shut Down Seals. These new seals are more rugged than the current ones and Seal #1 has a special thermal actuator which allows a piston ring and polymer seal to constrict around the RCP shaft seal leakage upon loss of seal cooling and temperatures of approximately 260-320°F. To be effective the RCP shaft must be stopped or slowly rotating. This is important for DCPP's move to NFPA-805 probabilistic fire protection and FLEX considerations for a loss of all plant electric power which would cause loss of seal injection and unacceptable RCP seal leakage. DCPP plans to install the new seals before returning from refueling outage 1R19 for Unit 1 and 2R19 for Unit 2. The DCISC FFT reviewed DCPP's 10CFR50.59 evaluation (determination of need for NRC approval) for the new seals and found it satisfactory that no NRC approval was necessary.

The RCS health is currently Yellow (Needs Improvement) for the following reasons:

1. RCP seal leakage and failures
2. Pressurizer safety valves to steam seated internal weepage, during unit pressurization following outages
3. A design deficiency in the #2 seal leak off lines that could affect seal performance and reliability.
4. CET replacements to address aging concerns in an effort to recapture operating margin
5. Failures of the Aux Control Board Digital System have resulted in numerous unplanned entries into Tech Spec 3.4.15 due to inability to estimate RCS leakage.

Action plans are in place to address these items.

DCPP Reactor Coolant Pumps (RCPs) have performed well without significant problems, except for occasional seal leakage problems. The RCP seals, which are sensitive to debris and thermal transients, are receiving proper attention in the form of periodic inspections, flushing of upstream seal water injection lines, and regular replacements. DCPP is replacing the current seals with improved models.

Spent Fuel Pool Cooling System (Volume II, [Exhibit D.7, Section 3.5](#) and [Exhibit D.8, Section 3.6](#))

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, hence the term "spent" fuel. However, even 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 is then transferred from the pool, along with 31 other spent fuel assemblies, in a dry storage cask. This cask, containing the 32 spent fuel assemblies, is then transported to a

secure dry storage area located on a hill above DCPD where the cask is bolted firmly to a strong, solid concrete and steel pad for dry storage. The Spent Fuel Pool is also the temporary storage facility for new fuel assemblies that have been delivered to the plant prior to loading them into the reactor during a refueling outage.

Because the fuel assemblies in the SFP continue to produce heat, it is important to keep the water in the pools cooled. The purpose of the SFP Cooling System is as follows:

- To maintain a water inventory in the SFP sufficient to keep the spent fuel immersed at all times.
- To provide cooling of the water in the SFP
- To provide a water inventory in the SFP to mitigate radiological consequences that could stem from design basis fuel handling accident
- To provide reactivity control (borated water) for storage of spent fuel assemblies

The SFP Cooling System transfers decay heat from the SFP to the Component Cooling Water (CCW) System via the SFP heater exchanger. In addition, it maintains a water inventory in the SFP to provide radiation shielding for long-term storage of fuel assemblies in the SFP. It also purifies and demineralizes SFP water to maintain SFP water quality.

Each pool has two 100 percent capacity pumps provided with Class 1E electric power and one 100 percent capacity heat exchanger that is cooled by the Component Cooling Water (CCW). The SFP is designed with proper depth to provide a minimum of 23 feet elevation 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, during normal operation there is no remote wide-range level indication that could be used to determine the pool water inventory from outside the fuel handling building. During outages a mounted camera is focused on the level-marking strip in the pool so that it can be read from the Control Room Annunciators in the Control Room. As a consequence of the Fukushima accident, new SFP water level instrumentation system is being installed, which will be connected to readouts in the Control Room (see Section 4.25.2).

Because each Spent Fuel Pool has only one heat exchanger, the need for a second exchanger for each pool has been examined. DCPD has purchased and maintains one portable system consisting of hoses and three pumps. In situations where the cooling system for one of the SFPs becomes disabled, the portable system is set up to transfer the cooler water from the SFP with the operational cooling system into the second SFP, whose cooling system is inoperable, and then to recirculate water from the second SFP back to the SFP with the operational cooling system. In effect, each SFP cooling system can now serve as a backup for the other. It has been demonstrated that this portable system can be made operational within the minimum time-to-boil time frame for a Spent Fuel Pool, which would occur when the pool contains a full and recently offloaded reactor core. The installed heat exchangers have recently undergone eddy current examinations, and were found to have no significant tube indications.

The SFP Cooling System health is Green (good) overall for each Unit with no major problems outstanding. The System Engineer appeared knowledgeable and proactive about the System.

DCPD's Spent Fuel Pool (SFP) Cooling System is currently rated to be in Green (good) health with no major outstanding issues.

Safety Injection Pumps (Volume II, [Exhibit D.7, Section 3.6](#))

The DCPD Safety Injection System is part of the Emergency Core Cooling System that is designed to provide water

initially from the Refueling Water Storage Tank (RWST) to cool the reactor core and provide negative reactivity in the event of a loss of coolant accident in either the Reactor Coolant System (RCS) or the Main Steam System, spurious lifting of a RCS relief valve, a Rod Cluster Control assembly ejection, or a Steam Generator tube rupture.

This section is about the Safety Injection Pumps that are part of the Safety Injection (SI) System. SI consists of two 100% capacity trains that are interconnected and redundant such that either train is capable of supplying 100% of the flow required. The SIS contains two safety injection pumps along with associated suction, discharge, and throttle valves and instrumentation for each Unit. Four accumulator tanks and one RWST are also part of the SIS.

The Safety Injection pumps receive power from the 4160 V Vital AC electrical systems and utilize control power from 125V Vital DC distribution panels. Various SI motor operated valves receive power from buses F, G, and H of the 480 V Vital AC electrical system. These power sources are backed up by the Emergency Diesel Generators.

The SI Pump discharge lines are cross-connected via two normally open motor-operated valves (MOVs). Downstream of these valves, the discharge crosstie supplies the RCS cold legs via a header containing a normally open MOV (containment isolation valve) and four branch lines each containing a pressure reducing orifice assembly, flow orifice (used for flow measurement), and a throttle valve. This arrangement allows proper flow balancing between loops and limiting the pump flow to prevent pump runout. The injection lines are sized and the throttle valves are set so that a single broken injection line will not starve the other injection lines.

The SI Pumps provide ECCS flow to the RCS cold and hot legs, and flow through test lines for check valve testing and to fill all the accumulators. The nominal shutoff backpressure for the SI Pumps is 1,520 psig. The maximum allowable pump flow for the SI Pump is 675 gpm. The required Net Positive Suction Head at 675 gpm is approximately 29 feet. The maximum pump flow is controlled by design features, e.g., throttle valves, flow orifices, and piping resistances. SI Pumps are full-flow tested each refueling outage and tested quarterly at partial/recirculation flow. All tests have been successful. The SI Pumps are seismically qualified in accordance with NRC requirements.

The current Health of the Safety Injection Pumps is Green (Healthy). There are no significant issues affecting system health. Nevertheless, non-conforming conditions exist pertaining to welds on the vent and drain piping for each of Safety Injection Pumps 1-1, 1-2, and 2-1. More specifically, for each of those three pumps the welds in four small-bore pipe nipples have compositions that do not conform to the governing welding code. A safety evaluation has been performed, and repairs are scheduled.

The Health of the Safety Injection Pumps is currently rated as “Green”, or “Healthy.” Deviations from welding specifications on the part of some small bore pipe nipples in the vent and drain piping for three of the four Safety Injection Pumps do not appear to create a safety concern.

Emergency Diesel Generator System (Volume II, [Exhibit D.8, Section 3.2](#))

The EDGs are safety-related pieces of equipment whose functions are as follows:

- To furnish sufficient power to mitigate a design basis accident in one unit and safely bring the other unit to cold shutdown when both the 230 kV and 500 kV 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 in either the hot or cold shutdown condition, or (b) the equipment for both units in either the hot or cold shutdown condition.

Each nuclear operating unit is supported by three EDGs. Each diesel-generator set is provided with two 100% capacity starting air trains, with each train having two starting air motors.

Each EDG is designed to start automatically on any of the following signals:

- A Safety Injection signal from either Train A or Train B of the plant protection system.
- Undervoltage on the preferred offsite sources to each of the 4160 V vital buses; this starts its respective diesel.
- Undervoltage on any of the vital 4160 V buses; this starts its respective diesel.

These automatic starts are to ensure that the EDGs are available with minimal delay to mitigate any operational or accident condition that may exist at the time of the signal. The Safety Injection signal, by itself, is an indication of an accident condition. The undervoltage signal from any vital bus is an indication of a loss of both onsite and offsite power sources.

Currently, the EDG Systems of both units are rated Yellow, as needing improvement, and have been Yellow for at least the previous four quarters. All of the EDGs are operable, but the following concerns appeared in the EDG System Health Report for each Unit:

License Amendment Request (LAR 14-001) to NRC for both units has been filed with the NRC for the following eight items. Corresponding calculations and implementation of LAR items are expected to be complete by July 1, 2015. The resolution of these loading issues will result in a healthy system color of White.

LAR 14-001 Issues

1. Margin management issue: EDG time dependent dynamic load study showed that some EDGs are loaded above their continuous rating.
2. Prompt Operability Assessment (POA): the Diesel Fuel Oil Day Tank low-level alarm is impacted by the higher EDG fuel consumption rates calculated.
3. POA: EDG maximum calculated loads in Item 1 above are greater than the specified EDG full load rejection value.
4. POA: EDG maximum calculated loads in Item 1 above are greater than the allowable Technical Specification (TS) upper frequency limit of 61.2 Hertz.
5. POA: Current TS allow EDG testing below continuous and two-hour load ratings, which does not meet Regulatory Guide 1.108 requirements.
6. POA: Sustained winds could impact the ability of the EDG radiators to cool the jacket water and engine compartment components.
7. Engine Derate due to air inlet temperature being higher than ambient. This degraded condition is bounded by the POA for EDG loading.

8. Engine Derate due to high jacket water intercooler inlet temperature, which is bounded by POA.

Other EDG Issues

1. Margin Management Issue: The EDG usable volume of fuel oil in each Day Tank has been recalculated, and new low-level alarm setpoints are required. Estimated completion for Unit 1 is August 31, 2015 and for Unit 2 is July 1, 2015.
2. Margin Management Issue: EDG instrument channel loop uncertainty of +/-90kW is too large to comply with LAR 14-001 requirements, due to deficient margin in the instrument control loops. EDG watt transducers will be replaced to reduce the uncertainty to +/-24.5kW. Completion is expected by August 31, 2015 for Unit 1 and July 1, 2015 for Unit 2.
3. Margin Management Issue: EDG dynamic loading analysis determined engines were overloaded and margins deficient. Long-term corrective action is to restore margin by uprating the engines. Completion is expected by the end of 2019.
4. The EDG control system components are over 40 years old and obsolete. Upgrades are planned for 2017—2020 (Outages 1R20, 1R21, and 1R22 for Unit 1 EDGs) and (2R20, 2R21, and 2R22 for Unit 2 EDGs).
5. Oil leakage occurs at the cylinder head pushrod grommets. Grommet replacements will be performed as part of the EDG uprate project to be completed by the end of 2019.
6. Lower the pre-circulation lube oil standby pressure alarm setpoint. Completion is planned for mid-2016.

The DCISC notes that many of the conditions in the above listing are “Conditions Requiring Prompt Operability Assessments (POA) with Compensating Measures.” Four POAs have been implemented to support continued operation while the problems are resolved. DCPD expects to achieve White (healthy) status by July 1, 2015 with approval of the NRC of EDG LARs. Green health is expected to be achieved for Unit 1 by September 1, 2015 with the implementation of the Day Tank setpoint changes, Watt transducer upgrades, and capscrew upgrades by the end of August 2015. Green health is expected to be achieved for Unit 2 by June 10, 2016 when the above upgrades are complete and when Unit 2 EDGs re-enters the Maintenance Rule monitoring phase.

The six (three per unit) DCPD Emergency Diesel Generators (EDGs) are operable and able to perform their functions; however, system health is rated as Yellow (needs improvement) primarily because of the need to increase their rated loads to meet new demand conditions. Prompt Operability Assessments have been performed to support operation with the higher loadings. Testing has shown that the EDGs are able to perform at the higher loads. DCPD is awaiting NRC review and approval prior to documenting the new loads in the Updated Final Safety Analysis Report. DCPD expects to return the all EDGs to White (healthy) status by July 1, 2015 and Green by September 1, 2015 for Unit 1 and June 10, 2016 for Unit 2.

Plant Health Committee Meeting (Volume II, [Exhibit D.8, Section 3.7](#) and [Exhibit D.9, Section 3.1](#))

The Plant Health Committee (PHC) is governed by DCPD 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

- Review and monitoring of plant health issue plans that are presented to the PHC

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 and Facilitator (currently the Station Director)
- Engineering Director
- Operations Director
- Nuclear Work Management Director
- Maintenance Director
- Strategic Projects Director
- Equipment Reliability Director

Plant health issues that require PHC periodic review include:

- Issues that result in a Red or Yellow (unacceptable health) System Health color (reviewed at least every six months)
- Programs that are rated Red or Yellow health color (reviewed at least every 6 months)
- Equipment performance issues that result in a red or yellow component health color
- Issues that result in a Maintenance Rule (a)(1) system
- Chronic system, program, or component health problems
- Issues that require special management attention or extensive resources to address

The agenda for this meeting included the following:

- Review and approve Minutes from previous meeting
- Review of Action Items
- Review of Auxiliary/Fuel Handling Building Ventilation System
- Review of Reactor Coolant System
- Evaluation of the Conduct of the Meeting

The meeting was conducted efficiently, and the agenda was covered as scheduled. It was evident that discussion by focus groups prior to the meeting helped the attendees prepare for the meeting. Great emphasis was placed on plant safety and reliability throughout the discussion.

A portion of the meeting was designated for discussion of the Units 1 and 2 Reactor Coolant Systems (RCS), both of which are rated as Yellow (Unhealthy) and have been Unhealthy for about a year. The discussion was classified as a “6-month Review” of this topic. The RCS System Health Reports had been distributed to the attendees for their review prior to the meeting. Also, the most recent Plant Performance Improvement Report indicates that those systems are expected to return to Healthy status during Refueling Outages 1R19 (i.e. 4th Quarter 2015) and 2R19 (i.e. 1st Quarter 2016) respectively. The DCISC’s most recent review of these systems was in September 2014.

Throughout the meeting attendees actively engaged in providing their input and in asking questions of others. The meeting Chairman encouraged this interaction. This included providing differing opinions, having questioning

attitudes, and yet reaching agreement on issues being discussed. Participants appeared to be well prepared for the meeting and knowledgeable of the topics being discussed.

The objective of maintaining safe and reliable nuclear plant operation was stated on a number of occasions. Actions were assigned to participants as the meeting progressed and captured for future reference. Participants readily accepted responsibility for these future actions as the needs arose.

The Plant Health Committee meeting was conducted efficiently and effectively. Members and presenters appeared to be well prepared. Discussion was active, thoughtful, and probing, with a focus on safety. The DCISC will consider conducting a Fact-finding review of the Reactor Coolant Systems of both Units prior to the 4th Quarter of 2015 since both systems have been rated as Unhealthy for about a year.

4.15.3 Conclusions and Recommendations

Conclusions:

DCPP has dealt effectively with most equipment and system problems and is focused on improving system health. Systems that are the sources of emergency electrical power to the station's vital electrical equipment, the station's Emergency Diesel Generators and the 230 kV system that is supplied from the offsite electrical grid, were found to be operational but have been a focus of station and NRC attention. DCPP has been continuing to pursue preventive measures that are designed to strengthen the capabilities of exterior electrical equipment to better withstand the effects of high salinity in the local atmosphere and as aggravated by prolonged dry spells that have been interspersed with periods of light rain. 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. The System Engineer/Component Program continues to be effective. DCPP has improved its performance with Safety System Functional Failures.

Recommendations:

None

[25th Annual Report, Volume 1](#), 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 DCPD engaged in a major capital project of replacing all 8 DCPD 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).

The DCISC Review the following topic related to Steam Generator Performance during the reporting period July 1, 2013 through June 30, 2014.

- Feedwater Chemistry and Steam Generator Health

Results of chemical analyses of feedwater and steam generator samples indicated no negative potential impacts on steam generator performance during DCISC's 2013 2014 Reporting Period.

4.16.2 Current Period Activities

During the current period (2014–2015) the DCISC reviewed the following topic related to the Steam Generator (SG) Performance:

- Steam Generator Performance and Inspections through Outage 2R18

Steam Generator (SG) Performance and Inspections through Outage 2R18 (Volume II, [Exhibit D.4, Section 3.9](#))

The four DCPD 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 outages 1R18 and 2R18 resulted in 15 tubes showing minor indications. After evaluation, all were left in place. The next inspections are required to be in 1R21 and 2R21.

Sludge lancing of mineral build-up on the tubes resulted in a very small (three pounds) amount of

material per unit.

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 2R18 inspections, none of the SG performance criteria were exceeded since the last ECT inspection in 2R15. That is, the three cycle operating period between the start of the Unit 2 Cycle 1 and the end of Unit 2 Cycle 18. The operational assessment (OA) concludes that there is reasonable assurance that operation of the DCPP Unit 2 SGs until the next scheduled ECT inspection in 2R21 (three operating cycles) will not cause any of the SG performance criteria to be exceeded.

There was a similar assessment written for Unit 1 following outage 1R18.

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

25th Annual Report, Volume 1, Section 4.17, Outage Management

4.17.1 Overview and Previous Activities

The DCISC monitors DCP's outage plans, actions, and results in the following ways:

- Review 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 DCP 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. PG&E expects its outages can routinely run in the high-twenty to low-thirty day range.

DCP continues to actively manage and track Collective Radiation Exposure and Recordable Injuries incurred during the conduct of Unit outages, as shown below:

	Outage Duration (days)		Collective Radiation Exposure (person-Rem)		Personnel Safety (recordable injuries)	
	Unit 1	Unit 2	Unit 1	Unit 2	Unit 1	Unit 2
R13	41	39	116	74	5	3
R14	30	69	103	226	6	3
R15	58	38	247	87	3	0
R16	42	36	123	30	1	0
R17	55	48	41	25	1	0
R18	32	32	30	30	0	0

Steam Generator Replacement Outage
Process Control System Replacement

During the reporting period of 2013–2014 the DCISC reviewed the following topics related to outage management:

- Outage 2R17 Readiness for Restart Experience
- Outage 2R17 Intake Concrete Work
- Refueling Outage 1R18 Plan and Outage Safety Plan
- Outage 1R18 Performance Results

The DCISC concluded the following during the previous reporting period:

The DCPD Readiness for Restart (from outage) Program appeared appropriate. The implementation of the program for Outage 2R17 was effectively carried out. DCPD's concrete repair procedure and repairs of concrete in the Intake Structure appeared satisfactory. The DCPD Outage 1R18 Outage Safety Plan was a comprehensive and detailed document. The emphasis was on prevention of incidents, mitigation of accidents and control of radioactive material. With one exception the Outage Safety Plan appeared to be well designed to achieve outage safety. The exception was that the new DCPD requirement that the Containment Equipment Hatch be closed and secured during fuel movement was not specifically addressed. The DCISC believed that it should be specifically addressed in the Outage Safety Plan. DCPD's Outage 1R18 Outage results were positive with the one exception of loss of a Spent Fuel Cooling Pump due to an electric grid disturbance. Operators restarted the pump, and there were no safety consequences of the event.

4.17.2 Current Period Activities

During the current period (July 2014 through June 2015) the DCISC reviewed the following topics:

- Outage Planning and Execution
- Outage 2R18 Outage Safety Plan
- Outage 2R18 Results
- Clearance Performance in Outages 1R18 and 2R18

Outage Planning and Execution (Volume II, [Exhibit D.1, Section 3.4](#))

The focus areas for Refueling Outage 1R18 were:

- Prioritization of Scope and Alignment of Costs
- Improvement of Line Ownership of Outage Scheduling
- Implementation of Improved Outage Risk Management
- Improvement in Electric Equipment Reliability

Desired goals were:

- No loss of decay removal
- Outage Safety Plan goals

- Outage durations
- Unit Capability Factor
- Equipment Reliability Index

Results were provided for the following aspects of DCP's performance in the most recent refueling outage 1R18 compared to refueling outage 2R17, as follows:

	1R18	2R17
Outage Human Performance		
Station Level Events	0	1
Department Level Events	4	13
Loss of Decay Removal		0
Industrial Safety		
Lost Time Injuries	0	0
Recordable Injuries	0	0
First Aid Cases	14	27
Personal Contamination Events (PCE)		
Actual	13	10
Goal	16	17
Collective Radiation Exposure (Person Rem)	31	25
Foreign Material Exclusion (FME) Conditions	16	23
FME Threats	1	1
Significant FME Events	0	0
Outage Duration		
Actual	32	48
Goal	33	52

Spent Fuel Cooling was interrupted for several minutes in 1R18 due to a disturbance on the electric grid. The pump was restarted manually by Operations.

It was noted that "Department Level" performance in the area of Human Performance was the best of any outage in the station's history, and there were no Site Clock Reset events in this performance area. This reflected the continuing attention devoted by the station for a number of years to this area of performance. However, vendor performance deficiencies were noted in the following activities: thimble tube replacement, the reactor vessel inspection, and the overhaul of Reactor Coolant Pump 1-3. Of particular significance was that the vendor performing the overhaul of Reactor Coolant Pump 1-3 misaligned the pump and motor shafts. This, in turn, caused pump seal leakage that was sufficiently large that the Unit needed to be taken off line for 10 days shortly after start-up after the outage in order to realign the shafts.

The majority of actions in the Outage Planning and Execution Action Plan were completed. Almost all of the remaining actions addressed aspects of scope and cost and the improvement of electric equipment reliability. A project model for developing and implementing a 5-year planning process was nearing completion and was scheduled to be reviewed by the Project Review Committee and Outage Management Team in July 2014.

DCPP's statistical performance, in general, in refueling outage 1R18 reflected continuing improvement over that of earlier outages. Also, DCP's intended future outage focus on the reliability of electrical equipment appeared to be reasonable.

Outage 2R18 Outage Safety Plan (Volume II, [Exhibit D.2, Section 3.10](#))

The DCISC Fact-finding Team noted that the support device for the Containment Equipment Hatch had been modified to make it seismically qualified.

The intent of the Outage Safety Plan is to provide a concise document for use in evaluating plant conditions during Modes 5 (Cold Shutdown) and 6 (Refueling) to ensure the key safety functions are satisfied, while maintaining consistency with the Technical Specifications and Equipment Control Guidelines. In order to assess outage safety impact, referral to the Outage Safety Plan and Outage Safety Schedule is to be made prior to making major schedule changes.

DCPP's outage safety program is designed around three major concepts:

1. Prevention of any accident-initiating event
2. Mitigation of an accident before it potentially progresses to core damage
3. Control of radioactive material if a core damage accident should occur

The outage safety plan provides background information for the logic contained in the outage safety checklists. The checklists provide the logic used to develop the outage safety schedule. The schedule and checklists ensure that the equipment and plant conditions assumed in the abnormal procedures shutdown are met. These procedures contain guidance for providing passive core cooling used during and key safety system restoration.

Outage safety planning is based upon the assumption of a worst-case event, which is a loss of all AC power.

The Outage Safety Plan contains the following topics:

- Infrequently Performed Tests or Evolutions
- Contingency Strategies
- Transition Periods and Testing
- Prevention of Accident Initiating Events

- Outage Safety Checklists
 - Mode 5 (Cold Shutdown) Loops Filled
 - Mode 5 Loops Not Filled
 - Mode 6 (Refueling) RCS Level at RV Nozzles
 - Mode 6 Level Below RV Nozzles
 - Core Offloaded
- Containment Closure
- Industry Outage Events

DCPP uses “Safety Monitor”, a probabilistic risk analysis tool to analyze the risk of reactor coolant boiling and core damage risk while fuel is in the reactor vessel based upon the outage equipment out-of-service schedule information. The resultant Outage Safety Schedule shows the Defense-in-Depth (DID) Status for various states of the following safety functions:

- Decay Heat Removal Capability
- Reactor Coolant System Inventory Control
- Reactivity Control
- Support Systems (Heat Sink)
- Containment Closure
- AC Power Available
- Spent Fuel Pool Cooling
- DC Power
- 120VAC Instrument Power
- Emergency Diesel Generator/Fuel Handling Building/Charging Power Supply

DCPP has a process (Procedure OP Q-38, “Protected Equipment Postings – Outages”) to designate and protect equipment required for DID of safety systems during outages. The process includes lists, tags, signage, and physical barriers. The procedure appeared adequate.

An “N+1” defense in depth philosophy, where N generally represents the minimum equipment needed to maintain a key safety function, is utilized to evaluate the status of the key safety functions. Defense-in-Depth (DID) Status is represented by the following four color definitions:

- Green—represents $> N+1$ DID, where N is the minimum equipment needed to maintain a key safety function with more than one backup means of support.
- Yellow—represents $N+1$ DID, which is considered the normal DID. Key safety functions are fully supported with at least one backup means of support.

- Orange—represents an N condition, where key safety functions are supported, but minimum DID is not met, and compensatory measures must be in place.
- Red—represents a < N condition in which key safety functions are not supported.

DCPP considers a status of Green or Yellow acceptable for planned outage activities because key safety functions are fully supported with DID. No planned activities should result in an Orange condition; however, in the rare case where an Orange condition is necessary, a contingency plan with compensatory actions must be developed and implemented. The contingency plan then provides DID, since it provides a backup safety function if the minimum safety function becomes unavailable. Planned Red conditions are prohibited. The 1R18 Outage Safety Plan contains no Orange or Red conditions and eleven Yellow ones. Significant points in the Outage Safety Plan are as follows:

- The RCS will not be completely drained and no Steam Generator eddy current testing is scheduled; therefore, no nozzle dams will be installed.
- Temporary Containment Penetration 60 will be installed to support the 10-year Reactor Vessel in-service inspection, which requires removing the Lower Internals.
- Integrated Safeguards testing and associated bus transfer testing will be performed in Mode 5 at the beginning of the outage.
- STPs M-13B1, B2, B3, and B4 will be performed at the start of the outage.
- Vital Battery 1-1 cells and DC Distribution Shut Down Panel SD1-1 will be replaced. Prior to clearing SD1-1, a Class 1E temporary modification for 4 kV Bus F relaying and DC control power and Non-Class 1E temporary modification for selected circuits will be installed.
- Vital Bus G will be de-energized for maintenance after the Upper Internals are removed.
- Mode 2 Low Power Physics Testing will be performed.
- The Refueling Cavity will remain filled during the Defueled Window.
- Upgrades to the Process Control System will be performed to address issues of rack power supply overheating, fiber optic cable protection, HSP annunciator, and software changes.

Outage Safety Checklists are used to verify normal and backup decay heat removal capabilities are maintained. The checklists are provided for each of the five following basic plant outage configurations:

1. Mode 5—Loops Filled
2. Mode 5—Loops Not Filled
3. Mode 6—Reactor Coolant System (RCS) Level > 111 foot level
4. Mode 6—RCS Level $\geq$ 111 foot level
5. Core Offloaded

Outage Safety planning is based upon the assumption of a worst case event, which is a loss of all AC power. Backup decay heat removal capability is maintained during most of the outage by assuring the natural physical laws (natural circulation by gravity or boiling) will work to maintain passive cooling if Residual Heat Removal (RHR) of Spent Fuel Pool (SFP) cooling is lost. Passive cooling is available to reduce the risk of core damage in the event the normal and backup decay heat removal methods are lost.

The Outage Safety Plan also includes operating experience, i.e., prior outage events at DCPD or other nuclear plants. These are in the form of “lessons-learned” to prevent the events from reoccurring at DCPD.

The DCPD 2R18 Outage Safety Plan, used to assure nuclear safety during the outage, appeared comprehensive and clearly written, assuring the Defense-in-Depth philosophy to prevent accidents and to mitigate the effects of accidents, if they were to occur.

Outage 2R18 Results (Volume II, [Exhibit D.4, Section 3.6](#))

Outage goals and results were as follows:

Performance Category	Goal	Actual
Recordable & Disabling Injuries	0	0
Nuclear Safety Events	0	0
Human Events Clock Resets	0	0
Outage Duration (days)	≤ 33	32.4
Dose Goal (Person-Rem)	32	30.37
Significant Foreign Material Events (FME)	0	0
Power Ascension (days)	≤ 5	4.7

Major Reliability Scope items included the following:

- Lightning Arrestors (200 kV and 500 kV)
- CFCU Inlet Dampers
- SG Eddy Current and Sludge Lance
- 13 CETs Replaced
- RCP 202 Motor and RCP 2-3 Seal
- CWP 2-2 Motor Overhaul
- Extraction Steam Expansion Bellows
- 480 V Bus G Breaker Replacement
- 500 kV Yard Relay and Breaker Project

DCPP's 2R18 Refueling Outage met essentially all goals and was considered a success by DCPP. The DCISC considered 2R18 to be a success from a nuclear safety perspective.

Clearance Performance in Outages 1R18 and 2R18 (Volume II, [Exhibit D.6, Section 3.4](#))

DCPP's Clearance System is used to isolate complete systems or portions of systems so that components within the isolated section(s) can be worked on without posing a risk to the safety station personnel or to plant operation. The system uses eSOMS clearance and tagging software, a computer based system which is easier to use than completely manual systems and it also displays applicable Technical Specifications. As such it is helpful from a human performance standpoint in that, based on the applicable Technical Specification, it can refer the user to applicable Limiting Conditions of Operation (LCOs).

Also, eSOMS is more efficient than completely manual tagging systems in that multiple tags do not have to be hung on the same component for multiple tagouts. Rather, the same physical tag can apply to more than one electronic tagout, each of which is referenced in the computer as affecting that one component. When one electronic tagout is being cleared, eSOMS will note the components that have other tagouts applying to them. Therefore, the physical tags are not removed from those particular components.

In Outages 1R18 and 2R18 there were several low level errors, except for one higher-level error in Outage 2R18 on a Maintenance Red Tag concerning confusion about removing the tag based on a clerical error. Although this did not affect personnel safety directly, it is receiving attention to prevent recurrence and more significant errors.

DCPP has a good clearance program, which continues to show effective protection of personnel and components.

4.17.3 Conclusions and Recommendations

Conclusions:

DCPP's statistical performance, in general, in refueling outage 1R18 reflected continuing improvement over that of earlier outages. Also, DCPP's intended future outage focus on the reliability of electrical equipment appeared to be reasonable. The DCPP 2R18 Outage Safety Plan, used to assure nuclear safety during the outage, appeared comprehensive and clearly written, assuring the Defense-in-Depth philosophy to prevent accidents and to mitigate the effects of accidents, if they were to occur. DCPP's 2R18 Refueling Outage met essentially all goals and was considered a success by DCPP. The DCISC considered 2R18 to be a success from a nuclear safety perspective. DCPP has a good clearance program, which continues to show effective protection of personnel and components.

Recommendations:

None

25th Annual Report, Volume 1, Section 4.18, Plant 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 did not review the DCPD safety-security interface during the current period.

Although the DCISC did not review the DCPD safety-security interface during the previous period, it has found that the DCPD safety-security interface to have be appropriately designed and implemented in prior periods.

4.18.2 Current Period Activities

The DCISC reviewed the following the DCPD safety-security interface during the current period:

Safety/Security Interface Update (Volume II, [Exhibit D.2, Section 3.2](#))

The purpose of the Safety-Security Interface Process is to assess and manage changes to safety and security activities so as to prevent or mitigate potential adverse effects that could negatively impact either plant safety or security. The DCISC received and reviewed the DCPD Procedure OM11.ID7, "Safety/Security Interface Program", dated September 4, 2012 and Procedure OM11.DC7, "Conduct of Security", dated July 17, 2014. The first procedure identifies management controls and processes used to establish and maintain an effective interface between nuclear safety and site security. This procedure instructs Design Engineering, Projects, and Security to involve all others in any modifications or changes to the plant physical configuration and procedures. The procedure includes a detailed and comprehensive checklist for each proposed modification or procedure that

has potential security or safety impacts.

The first procedure addresses the following:

- Plant Modifications
- Procedure Changes and Emergency Plan Changes
- Emergent Operational Conditions and Maintenance Activities
- Changes to Security Plans
- Safety/Security Programmatic Reviews

The DCISC Fact-finding Team determined that the two procedures were satisfactory in controlling the safety/security interface at DCP. Mr. Kirven believed that the safety-security interface was being operated satisfactorily at DCP.

4.18.3 Conclusions and Recommendations

Conclusions:

The Safety-Security Interface appears to be satisfactorily implemented at DCP.

Recommendations:

None

25th Annual Report, Volume 1, Section 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 DCPD Independent Spent Fuel Storage Installation (ISFSI). “Spent Fuel” is also referred to as “Used Fuel”.

The history of spent fuel storage at DCPD 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 DCPD’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 DCPD 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, DCPD 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) has been constructed on site for the dry storage of used fuel whose heat production has decreased to acceptable levels, and the ISFSI began receiving used fuel in 2009.

The DCISC has been following the DCPD ISFSI since it was in the planning stages at PG&E in 1997. The DCISC reviewed the following ISFSI-related topics during the previous period.

- Used Fuel Update
- Spent Fuel Inventory Management
- Plans for Spent Fuel Management
- Acceleration of Spent Fuel Movement to ISFSI

In the previous reporting period the DCISC concluded that it believed that DCPD is prudent in its planned campaigns to move its spent fuel from the Spent Fuel Pools to its Independent Spent Fuel Storage Installation (ISFSI), its dry storage facility.

4.19.2 Current Period Activities

The DCISC reviewed the following items related to the ISFSI during the current reporting period:

- ISFSI Update
- CSCC of ISFSI MPC

ISFSI Update (Volume II, [Exhibit D.5, Section 3.10](#) and [Exhibit B.9](#))

DCISC's spent nuclear fuel is stored in large metal Multi-purpose Canisters (MPCs), which are loaded into air-cooled Holtec Hi-Integrity Storage Modules that are transported to and loaded onto storage pads on a hill overlooking the power plant. The dry cask storage system that PG&E uses at the Diablo Canyon ISFSI is the Holtec International HI-STORM 100 System. The HI-STORM 100 System is a canister-based storage system that stores spent nuclear fuel in a vertical orientation (the outer cask, inner canister and the fuel rods inside are, in effect, standing up). It is a passive system that does not rely on any active cooling systems to remove decay heat from the spent nuclear fuel.

To withstand potential seismic forces, the HI-STORM 100 casks are anchored to the reinforced concrete storage pads, rather than simply resting on the pads. This anchoring is unique to DCP and was implemented voluntarily in response to public concerns rather than being required by regulation.

The entire process of transferring used nuclear fuel from DCP's Spent Fuel Pools (SFP) to the ISFS is intended to preserve the integrity of the fuel and to protect the environment. To accomplish this, a rigorous process is followed with respect to every step of the activity.

Due to the current lack of an approved permanent repository for the nation's used nuclear fuel and to the storage limitations of nuclear plant Spent Fuel Pools, domestic nuclear power plants are finding it necessary to expand the capacity of their outdoor storage sites. DCP is currently engaged in this activity. Currently DCP has two ISFSI storage pads available and is in the process of constructing five more. Each of the seven pads will be able to store 20 HI-STORMs. Thus, there will eventually be room for storing 140 HI-STORMs. However, in order to accommodate the possible future need to move a HI-STORM, two cask locations will need to remain vacant. Therefore the total capacity of the ISFSI will be:

$(7 \text{ pads} \times 20\text{-cask locations/pad} - 2 \text{ locations}) \times (32 \text{ fuel assemblies/cask location}) = 4,416 \text{ fuel assemblies}$

As shown in the photograph below construction of the storage pads is a significant activity. Each pad is composed of approximately 2,000 cubic yards of concrete reinforced with rebar. The pads are 8 feet thick. Each pad is created with a continuous pour of concrete that lasts 14 hours. Two concrete batching plants are on site, one wet and one dry. The five pads currently under construction were originally within the same Security zone as the two that are currently functional. Consequently, the Security fence needed to be moved to surround only the two functional pads in order for construction to be performed on the additional five pads in a non-Security area. That fence move began in January 2014, digging of the new beds commenced in mid-March 2014, and the laying of the bed-bars for the final pad was being performed at the time of this Fact-finding Visit, after which the concrete pour will commence.

DCISC's David Linnen and Per Peterson at ISFSI pad construction site, December 3, 2014.

Geologically, the ISFSI stands on the same “rock” as the plant; therefore, the ISFSI is exposed to the same seismic effects as the plant itself.

The MPCs are potentially subject to chloride stress corrosion cracking (CSCC). See Section 3.9 below. Construction of the additional ISFSI pads appears to be proceeding in a well-managed manner.

CSCC of ISFSI MPCs (Volume II, [Exhibit D.9, Section 3.9](#))

Potential for Chloride Stress Corrosion Cracking (CSCC) of Multi-purpose Canisters (MPCs) in the Independent Spent Fuel Storage Installation (ISFSI) (Volume II, [Exhibit D.9, Section 3.9](#))

DCPP stores its long-term spent nuclear fuel in its dry cask storage facility, the Independent Spent Fuel Storage Installation (ISFSI) described above in Section 3.8. The MPCs are potentially subject to chloride stress corrosion cracking (CSCC). The key points for the purpose of this issue are:

- The used fuel is in a sealed, stainless steel MPC, and the atmosphere inside the MPC is dry helium, not air. The helium atmosphere inside the MPC protects the fuel. Being a sealed canister, this also prevents loss of helium, and prevents the release of radioactive decay products to the atmosphere.

- Because the spent fuel canister is dried using forced helium dehydration, the peak temperature of the metal cladding of the fuel pins remains low, and none of the spent fuel in storage at DCPD has the potential to have experienced cladding hydriding and embrittlement as may be possible with vacuum drying processes used by other spent fuel cask vendors.
- The HI-STORM, which contains the sealed MPC, has 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.
- Stainless steel can undergo corrosion influenced by chlorides, which are in the salt aerosol particles formed from sea-spray and carried inland by winds at the ISFSI site. Some types of stainless steel are more susceptible to chloride stress induced corrosion cracking than others. DCPD has a program to monitor salt deposition rates in various locations around the plant.
- The issue is whether the MPCs could undergo chloride stress induced corrosion cracking to an extent that could expose the nuclear fuel to the outside atmosphere and permit the release of radionuclides to the outside atmosphere.

The industry is pursuing this issue, and DCPD participates in the Electric Power Research Institute's (EPRI's) Technical Advisory Committee on Stress Corrosion Cracking. DCPD is part of an EPRI pilot program in which sample swabs have been taken from the surfaces of some MPCs, from the circumferential weld at the midpoint as well as from an axial weld. The samples were analyzed, and found to contain chlorides. Different types of stainless steel have differing degrees of susceptibility to chloride stress induced corrosion cracking, and lower carbon content in stainless steel tends to reduce its susceptibility to this type of corrosion. Of the four predominant types (304 (austenitic), 304L (L means lower carbon), 316, and 316L), 304 stainless is the most susceptible to this corrosion. The first two sets of DCPD's casks (16 MPCs in total) transferred to the ISFSI in 2009 and 2010 contain MPCs made of 304 stainless.

NRC Information Notice (IN 2012-20) was issued to ISFSI owners "to inform addressees of recent issues and technical information concerning the potential for chloride-induced stress corrosion cracking (SCC) of austenitic stainless steel dry cask storage system canisters." The NRC has engaged the Nuclear Energy Institute (NEI) to describe information related to structures, systems, and components important and to understand industry plans for generically addressing this issue. At this point, no immediate safety concern has been identified with currently approved licenses that would warrant a backfit analysis under 10CFR 72.62, 'Backfitting'. However, maintenance and surveillance programs during initial license periods and aging management programs (AMPs) during license renewal periods are required to address aging effects, such as chloride-induced SCC, as appropriate for the relevant canister design(s), operating conditions, specific site environmental conditions, and proposed license renewal periods.

NEI is to finalize and send to the NRC by June 2015 "Industry Susceptibility Criteria that can be used by ISFSI licensees to evaluate the potential for Chloride Induced Stress Corrosion Cracking to occur on canisters at their site". The DCISC will follow up on this submittal.

Measurement of the surface temperature of the canisters in the DCPD ISFSI, along with the outside ambient temperature, provides a way to verify that the canister surface temperatures are sufficiently high to make deliquescence impossible, even if the air relative humidity is 100%. The rate of decay heat generation in the canisters currently in storage is sufficiently high that this condition exists and deliquescence is impossible. One concern is that in coming decades, decay heat generation will drop and ISFSI canisters may then become vulnerable to deliquescence and SCC. Given the age of the spent fuel in storage in the ISFSI, the dominant heat generation comes from decay of Cs-137 and Sr-90, which have 30-year half-lives, so heat generation can be expected to drop by about half every 30 years. However, if the canister temperatures are monitored, it will be

possible to block air vent holes in the over pack containers to reduce airflow, and thus to maintain appropriate canister temperatures over extended periods of time if required.

PG&E and the state of California are also examining the possibility of installing salt-water cooling towers as an option to once through cooling. To the extent possible it would be advisable to examine the potential impact of such cooling towers on salt deposition rates at the ISFSI, and the accompanying impact on the possible deliquescence and SCC phenomena for the ISFSI Multipurpose Canisters.

DCPP is participating in an industry initiative to determine the impact of atmospheric chlorides on the corrosion rate of ISFSI Multipurpose Canisters (MPCs). Deliquescence that can cause stress corrosion cracking can be made impossible if the canister surface temperatures are maintained sufficiently above outside ambient temperatures, so periodic monitoring of canister temperatures is valuable. Because PG&E and the state of California are examining the possibility of installing salt-water cooling towers as an option to once through cooling at DCPP, it would be advisable, to the extent possible, to examine the potential impact of such cooling towers on the rate of salt aerosol deposition at the ISFSI.

4.19.3 Conclusions and Recommendations

Conclusions:

The DCISC believes that DCPP is prudent in its planned campaigns to expand its Independent Spent Fuel Storage Installation (ISFSI) and move its spent fuel from the Spent Fuel Pools to the ISFSI in a timely manner. The potential chloride stress corrosion cracking issue in stainless steel spent fuel casks, which is not an urgent issue, is being addressed by the NRC and nuclear industry. The DCISC plans to monitor this issue.

Recommendations:

None

25th Annual Report, Volume 1, Section 4.20, 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 DCPD.

In previous reports the DCISC has reviewed with PG&E earthquakes occurring in California in the vicinity of DCPD as well as seismic designs, analyses, and activities related to DCPD. 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 DCPD design.

In the previous period the DCISC reviewed the following activities:

- Workplace Seismic Safety
- Tsunami Hazard Analysis
- Seismic Licensing Basis
- Seismic Characterization Workshop
- Seismic PRA Fragility Analysis

In the previous reporting period the DCISC concluded that DCPD's progress on resolving its Workplace Personnel Seismic Safety issues has been satisfactory and responsive to the DCISC's concerns. PG&E's technical work on tsunami hazards at the DCPD site is well-planned, proceeding very well so far, and working on the correct set of problems. The DCISC concluded that the full DCISC should be engaged in reviewing whether the controversy over the plant's seismic licensing basis raises a safety concern. The DCISC finds that the current project to develop probabilistic seismic hazard information about the Diablo Canyon site is going well. The DCISC should continue to follow the progress of this important work.

4.20.2 Current Period Activities

The DCISC reviewed the following items during the current reporting period:

- Workplace Seismic Safety Update
- Tsunami Hazard and Risk Update
- Seismic Fragility Probabilistic Risk Assessment (PRA)
- PG&E's Seismic Studies

Seismically Induced System Interaction Program

- Seismic Review of New Steam Generators and New Reactor Vessel Head

Workplace Seismic Safety Update (Volume II, [Exhibit D.5, Section 3.4](#), [Exhibit D.9, Section 3.3](#), and [Exhibit B.12](#))

DCPP has a program called Seismically Induced Systems Interaction (SISI) Housekeeping Program, which is used to assure that safety- and non-safety-related components cannot adversely interact with safety-related components during an earthquake.

DCPP's SISI program is designed to protect plant equipment needed for safe operation and shutdown. However, DCPP did not have a similar program to protect plant personnel in office spaces and other workspaces from tall furniture which could be toppled by an earthquake and injure them or block their safe egress, so they couldn't gain access to critical plant areas. The DCISC began getting the plant's attention on this issue in May 2010, and DCPP management began taking ownership of this issue shortly after that time. Subsequent DCISC visits observed that DCPP was steadily addressing this issue, and station emphasis on the issue increased over time. DCPP had made substantial progress, and DCPP advised that all remaining deficiencies would be identified and documented for tracking of resolution by June 2014 and that all deficiencies would be resolved by December 2014.

Nevertheless, during various DCISC visits over the most recent two years, the DCISC continue to identify heavy, tall office furniture that needed to be braced in order to avoid harming personnel in the event of a significant earthquake. The DCISC was able to identify a number of tall, heavy, unsecured pieces of office furniture that would be expected to topple during an earthquake. The furniture is located on the 5th Floor of DCPP's Administration Building. A Corrective Action Program Station Notification (50705251) was written to provide for coordinating future seismic safety inspections with fire safety inspections. The DCISC believes that such coordination will be beneficial to the quality of both inspections.

Although DCPP has made much progress in recent years in the seismic bracing of tall furniture, there continue to be instances where seismic bracing is needed. The recent personal involvement of a senior station manager in this issue is a noteworthy expression of the station's interest in completely resolving the issue. DCPP's intent to conduct seismic safety inspections in conjunction with fire safety inspections can be expected to increase the safety benefit of each type of inspection. The DCISC will continue to actively monitor this issue.

Tsunami Hazard and Risk Update (Volume II, [Exhibit D.5, Section 3.7](#) and [Exhibit D.7, Section 3.1](#))

At its June public meeting, the DCISC learned from a comment by a member of the public that a 2003 report by Dr. Robert Sewell on tsunami hazards at the DCPP site, developed with NRC support, had never been publicly released by the NRC. After that public meeting, the DCISC first asked the NRC resident inspector at Diablo Canyon to help obtain the report (in late June), and then filed a Freedom of Information Act request with the NRC in September 2014. The Sewell report was

then released to the public by the NRC on November 6, 2014.

For several years PG&E has been performing a reanalysis of the DCPD tsunami hazard, including tsunamis originating from distant seismic sources, as well as near-source tsunamis induced by submarine mass failure (e.g., and underwater landslide). These studies are not yet complete, but were documented in the PG&E Hazards Assessment that was submitted to the Nuclear Regulatory Commission on March 15, 2015. The tsunami modeling used the 3-dimensional NHDWAVE hydrodynamic model for modeling bottom motion of the sea floor. This tsunami source was propagated using the FUNWAVE-TVD model. Key phenomena that were assessed include wave run-up, inundation and drawdown analysis, hydrostatic and hydrodynamic force analysis, debris and water-borne projectile analysis, and sediment erosion and deposition.

PG&E's second-phase work, undertaken over the past few years, has involved a considerable program of field measurements offshore of the DCPD site, as well as major new modeling and analysis, some of it using advanced hydrodynamic simulations and some of it using advanced three-dimensional modeling of energy, momentum, and mass balances occurring during a major tsunami as it approaches the coast and ultimately runs up the shore. In mid-March 2015, PG&E completed a new report, "DCPD Units 1 and 2 Flood Hazard Reevaluation Report", DCPD document DCL-15-034, submitted to the NRC in response to an NRC information request of March 2012. This was part of the NRC's post-Fukushima-accident activities to understand tsunami and other flooding hazards more fully. This new report covers several other external-flooding hazards at the DCPD site, too—the tsunami-hazard section is but one part of the larger report. The tsunami-hazard section of this report, in turn, is but a summary of a considerable amount of underlying technical work that formed the basis of the PG&E presentation to the DCISC at this Fact-finding Meeting.

Another important piece of background is that the original "design basis" tsunami hazard that was accounted for in the DCPD plant's design prior to obtaining its original NRC license in the 1980s considered mainly tsunamis generated from distant sources whose energy would need to travel great distances across the Pacific Ocean. It did not consider tsunamis that might arise from sources closer to the DCPD site itself, generated by possible submarine landslides or other similar phenomena occurring within the relatively nearby ocean close to the plant. It is these closer sources that are the major focus of the new tsunami studies that PG&E has undertaken in recent years, and that were the focus of discussion at this Fact-finding Meeting.

The principal technical presentation of PG&E's recent work was made by Dr. Grilli of URI, supported by other members of the PG&E study team. Grilli's presentation included extensive graphics and animated videos, which served to illuminate the major issues and topics covered. He emphasized the examination of several potential locations in the near offshore of the DCPD site which hold the potential for generating a tsunami due to large movements of sub-ocean-floor mass, triggered most likely by a major nearby earthquake. These submarine "landslides" or "slumping" events, in turn, can occur only when the conditions on the seabed have the "right" combination of properties. Examples include areas with appropriate spatial extent, composition of the soil/rock, extent of saturation with water, and lubrication of surfaces between the material susceptible to movement and the underlying (more stable) rock. The dynamics of how such a large mass might move—its

velocity, the duration of the movement, the total mass that would move, and the timing—are vital to understanding the properties of any resulting tsunami.

A major aspect of the new tsunami study was the identification of those few zones on the nearby seabed with the potential to produce an important tsunami. Grilli explained how the study team, using criteria from other tsunami studies, determined which of several potential sources had enough potential so that detailed modeling of them would be worthwhile. He also described the modeling itself—the data gathered, the analysis methods used, how the data were used in part as benchmarks and in part as inputs to the analysis, and the sources of the major uncertainties.

One major result of the new work, reported in the NRC submittal and also discussed in Grilli's presentation, is PG&E's report's conclusion that no tsunami arising from any of the nearby sources of sub-sea landsliding or slumping could threaten the overall safety of the plant. While uncertainties remain, the report concludes that direct tsunami waves will not compromise the function of any plant safety system. This includes the Auxiliary Salt Water (ASW) System, which is the most vulnerable safety system located near ocean level because of its location. Also, PG&E concludes that while run-up resulting from the largest tsunamis can bring water inland to a considerably higher level than the level impacted by the direct tsunami wave (although well below the grade of the plant itself which is 85 feet above the Pacific Ocean), this is a short-term transient effect that PG&E concludes cannot cause significant damage, either from the water itself (wetting and flooding) or from the dynamic impulse loads brought along by the waves. This is explained in the report, and Grilli provided detailed explanations of the underlying phenomena.

A more detailed DCISC evaluation of the underlying technical work will need to be done in the future, based in part on careful study of the Grilli presentation and in part on the study of other underlying technical material that PG&E has not yet provided to the DCISC, nor to the NRC in the March submittal.

PG&E submitted its most recent report to the NRC on tsunami hazards in mid-March, 2015. One major result of the report is PG&E's conclusion that no tsunami arising from any of the nearby sources of sub-sea landsliding or slumping could threaten the overall safety of the plant. The work contained in this report is clearly an important advance over previous analyses of the tsunami hazard at the DCP site, being based on considerably more site-specific data and much more advanced modeling methods than previous analyses. The DCISC will continue to review this topic as it gains access to the underlying technical data and reports.

Seismic Fragility Probabilistic Risk Assessment (PRA) (Volume II, [Exhibit D.2, Section 3.7](#))

In 1987-1988, the plant completed a seismic Probabilistic Risk Assessment (PRA), which broke new ground in a number of methodological areas, and was also the first seismic PRA ever performed at a nuclear power plant site with very high seismicity. It is now out-of-date, and over two years ago the plant began an effort to update it. This means (a) updating the probabilistic seismic hazard analysis, being done in a separate project; (b) updating the probabilistic analysis of the seismic fragilities of the structures and components (the topic here); and (c) updating the plant probabilistic systems-

analysis model, an effort that is also underway.

The NRC, in a generic letter to all power-reactor licensees under 10 CFR 50.54(f), regarding lessons learned from the Fukushima accident in Japan, has required each power plant to reassess its seismic hazard, and for western plants in high-seismicity areas, like Diablo Canyon, to update the plant's seismic PRA as well. Today this seismic-fragility work is formally being done in response to the NRC's 50.54(f) letter of 2012, but it had begun earlier and would have been undertaken in any event.

A major finding at the time of the 1988 seismic PRA was that the seismic capacity (or "fragility") of each item of equipment and each structure was strong enough that failures due to seismic causes would only occur for earthquake motions significantly in excess of the plant's design basis earthquake. The objective of the current seismic-fragility effort is to repeat that analysis, but using the current plant configuration (which differs in a few ways from the configuration in 1988.) The fragility analysis will also use the best current information about the seismic hazard at the site and will include a modern analysis of how the seismic energy from a large earthquake would enter the site from below, propagate into the structures, and produce seismic motions at the base of each equipment item or structure being studied.

The status of the analysis is that a team of experts has been placed under contract to perform the analysis, working in conjunction with DCCP staff engineers. DCCP has also put together an outside group of experts to perform a peer review of the analysis. This group's assignment is to meet regularly throughout the two-year duration of the fragility project to provide feedback and review. DCCP considers the contractor analysis team members and the group of outside peer reviewers to be among the top experts nationally in this field.

Components are analyzed at their dominant frequencies (highest failure mode potential), typically in the range 3–8.5 Hertz. The fragility analysis uses time history data, which takes duration into account. The PRA focuses on the immediate damage that the earthquake might cause, and thus doesn't take into account Phase 2 and 3 FLEX mitigation strategies or equipment. Because the seismic PRA provides improved information on the most probable plant damage states that could be caused by an earthquake, the DCISC recommends that this information be used in developing the DCCP FLEX strategy to respond to beyond design basis earthquakes.

No analysis problems have arisen so far, although it is too early to predict the outcome of the fragility analysis. The fragility analysis at this stage is using the seismic hazard information available earlier, not the new seismic hazard information being developed concurrently by the plant. When that new seismic-hazard information is finally available, it will then be used to update the fragility analysis before finalizing this project.

The current schedule is expected to produce final seismic-PRA results sometime in mid to late 2015. DCCP expects to submit its updated 1988 Seismic PRA to the NRC by 2017.

DCCP is proceeding satisfactorily with its Seismic Fragility Probability Risk Assessment (SFPA) analysis using the latest methodology and seismic response spectra. SFPA is a very useful tool,

because it provides information about the likelihood of different plant damage states caused by earthquakes. Although early, there have been no problems identified. Because the seismic PRA provides improved information on the most probable plant damage states that could be caused by a beyond-design-basis (BDB) earthquake, the DCISC recommends that this information be used in developing the DCPD FLEX strategy to respond to beyond-design-basis earthquakes. We understand that a seismic analysis of the FLEX equipment for BDB seismic motions is under way and expect to review it sometime soon. We believe that it is equally important that all other factors that could affect the plant staff's ability to implement FLEX procedures effectively following a BDB earthquake, including workspace seismic safety and post-earthquake access/egress for plant staff, also be identified and evaluated. The DCISC will continue to monitor the SFPRA analysis and review how the DCPD FLEX program uses SFPRA results and assessments of BDB earthquake impacts on plant staff safety and access/egress capabilities, to develop its FLEX mitigation strategies for BDB earthquakes.

PG&E Seismic Studies (Volume II, [Exhibit D.7, Section 3.2](#), [Exhibit B.6](#) and [Exhibit B.12](#))

The DCISC has performed several earlier reviews of the seismic hazard topic, the most recent being during its Public Meeting on October 14, 2014 when Dr. Abrahamson and Dr. Nishenko made an extended public presentation, concentrating at that time on the newly published PG&E report on the "Central Coastal California Seismic Imaging Project". Since that time, PG&E has completed its major multi-year DCPD site-specific probabilistic seismic hazard study, the "Senior Seismic Hazard Analysis Committee (SSHAC) Level 3 Study", and submitted the results to the NRC in mid-March as the "*Seismic Hazard Reevaluation Report*". This report was submitted to the NRC in response to an NRC information request of March 2012, which in turn was part of the NRC's post-Fukushima-accident activities to understand seismic hazards more fully at each U.S. nuclear power-plant site.

One of the important uncertainties in the recent SSHAC-3 seismic-hazard study is the issue of uncertain path effects in the ground motion propagation from source to site, which are in turn affected by the site's underground rock profile. Because recent data have provided much more site-specific information about the subsurface, there is much less uncertainty now than had been the case, say, 10 or 15 years ago on this topic, but that the remaining uncertainties are still among the most significant sources of overall uncertainty in the site hazard. To overcome this, one needs an extended array of seismic instruments in and around the site, and then one needs to "wait for some earthquakes" (using continuous monitoring in the vicinity) so that path effects and other site effects can be directly measured. This may take 5 or 10 years of waiting for several small nearby earthquakes to occur before enough data will accumulate.

Another area where new information could help is better geodetic data in the near vicinity, to help in the understanding of slip rates and other phenomena on the nearby faults. At present not enough is known to pin down some of the parameters important to quantifying the hazard in a way that could be done with a few years of refined geodetic data. The recent "*Seismic Hazard Reevaluation Report*" has done an excellent job of capturing the "center, body, and range" of understanding of the various parameters of the site seismic hazard. (Those three words, commonly called the "CBR" by researchers in the field, are a major measure of the quality of a seismic hazard

study, emerging as they have from the original 1997 SSHAC guidance on how to perform a modern seismic hazard study.) Confidence that the CBR has been captured for each of the major seismic-hazard parameters is one measure of the success of such a study. It is clear to the DCISC that an indication of the success of this new study would be if extensive reviews of it by other experts outside of the study team, and by the NRC, reveal that there is broad concurrence that the CBR has indeed been captured.

Another issue of major interest, and where important uncertainties remain, involves whether the large ground motions on the important nearby faults are in fact mainly described by a “stationary Poisson” process, or are better described by a process with some (or even considerable) bunching of seismicity in time. This is not known, and only more earthquake data, to be gathered over time in the future, can help reduce the uncertainties on this topic.

Another issue that contributes importantly to the uncertainties (and that in principle is amenable to reduction with future work) is the extent to which various faults are “linked”, where a rupture on one fault would induce a rupture on the other fault also. PG&E has tried to “bound” this effect in their new study by assuming that the Shoreline and Hosgri faults are indeed linked, although whether they are or are not is still unknown. This assumption then produces what was characterized as a “conservative” hazard result, meaning a result that is likely to be on the “high side” of the actual site hazard. Again, only further study (in the future) can help reduce the uncertainty on this issue.

PG&E submitted its most recent report to the NRC on the site seismic hazard in mid-March 2015. The work contained in this report is clearly a major advance over previous analyses. It will be reviewed in the near future both by the NRC staff and by other outside experts. The DCISC will continue to review this topic too, by studying the underlying technical data and reports and reviewing the reviews of others.

Seismically Induced Systems Interaction (SISI) Housekeeping Program (Volume II, [Exhibit D.9, Section 3.5](#))

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.

The procedure provides a lengthy list of examples of temporary equipment and components that could damage plant equipment if stored unrestrained in unacceptable areas of the plant, and/or inadequately secured, and if an earthquake were to occur. Some examples are tools, ladders, gas bottles, work-benches, rigging equipment, test equipment, temporary power load centers, and parts resulting from operations, maintenance, modifications, or testing activities.

One method to help prevent an undesirable seismic impact on plant systems has involved the

designation of “SISI Safe Areas”, which have been evaluated by Engineering and are predesignated throughout the plant. As such, these areas are intended for repeated use and do not require an SISI evaluation by engineering when the need occurs to store items temporarily in those areas. Such areas are identified by NOTICE signs located throughout the Turbine Building, Auxiliary Building, and Fuel Handling Building.

The Engineering Evaluation resulting in the identification of an “SISI Safe Area” involves identifying potential “Targets”, which are defined by Procedure AD4.ID3 as systems, structures, and components that are required to “safely shutdown the plant, maintain the plant in a safe shutdown condition, and/or maintain the function of accident mitigating systems.” Targets also include related tubing, instrumentation, electrical circuitry, and component supports that are necessary to ensure that the associated systems, structures and components can perform their design functions. Thus, the “SISI Safe Areas” are locations where stored equipment, tools, or components could not negatively affect “Targets” and therefore could not have a negative impact on nuclear safety in the event of an earthquake.

Procedure AD4.ID3 also provides guidance to help inspect for and evaluate potential SISI housekeeping issues. As would be expected, this process depends to a great extent on examining areas outside the “SISI Safe Areas” as well as examining the adequacy of restraints applied to materials being temporarily stored in the vicinity of SISI “Targets”.

DCPP has a programmatic requirement to perform, and to report on, a quadrennial SISI Program Self-assessment. DCP’s formal Self-assessment had one Deficiency, no Strengths, six positive findings, and six gaps representing opportunities for improvement. The Deficiency was that DCP did not have an SISI Walkdown Checklist for conducting area walkdowns. Strengths included the overall conservatism of the program, plant cleanliness and housekeeping, procedure adherence by workers, worker knowledge of SISI Program requirements, definition of General Plant Personnel Responsibilities, and a number of effective procedural elements. The gaps primarily pertained to clarity of some aspects of procedures, to the inadequacy of some performance metrics for clearly identifying some trends and for providing insights, and to not modeling SISI concepts in training labs.

Station performance with respect to the SISI Housekeeping Program is reported in DCP’s monthly Plant Performance Improvement Report. Each monthly report tracks SISI performance for each month during the prior twelve. Performance is graded each month on a point basis with 100 being the maximum achievable. These points are translated into a color-coding system with Green being the best.

From January 2013 through January 2014, each of the monthly indicators was Green. In February 2014 two issues were identified, which resulted in a White rating. In March 2014, five issues were reported, yielding a Red rating; and April and May 2014 were rated Green. The indicator for June 2014 was Red due to some issues identified by the NRC during plant inspections. The monthly indicators then returned to Green from July 2014 through April 2015, except for September 2014, which was White due to some outage work related issues.

DCPP's Performance with respect to its Seismically Induced Systems Interaction Program appears to have been reasonably strong and stable during the past few years, with the exception of a few nonconformances. Given the heightened attention to seismicity during this same period, DCISC will review this program at a frequency of at least once every 2 years.

Seismic Reviews of DCP's Steam Generators and Reactor Vessel Heads (Volume II, [Exhibit D.9, Section 3.6](#))

During the DCISC's review of the status of DCP's Licensing Basis Verification Project in its April 2015 Fact-finding Visit (Reference 6.6), the DCISC Fact-finding Team drew the following conclusion with respect to the seismicity of DCP's Steam Generators and Reactor Vessel Heads:

DCP's Licensing Basis Verification Project (LBVP) continues to progress on schedule with a completion date of year-end 2015. An issue identified by the Project, incorrect specification of the seismic and loss-of-coolant accident loads on the new reactor vessel heads and steam generators, is being re-evaluated, and is expected to be completed by September 2015.

PG&E is also engaged in a "Seismic Fragility Probabilistic Risk Assessment (PRA)". This topic was last reviewed by the DCISC in August 2014 (Reference 6.7) when it concluded:

DCP is proceeding satisfactorily with its Seismic Fragility Probability Risk Assessment (SFPR) analysis using the latest methodology and seismic response spectra. SFPR is a very useful tool, because it provides information about the likelihood of different plant damage states caused by earthquakes. Because the seismic PRA provides improved information on the most probable plant damage states that could be caused by an earthquake, the DCISC recommends that this information be used in developing the DCP FLEX strategy to respond to beyond design basis earthquakes. Although early, there have been no problems identified. The DCISC should continue to monitor this analysis, and review how the DCP FLEX program uses SFPR results to develop mitigation strategies for beyond design basis earthquakes.

As noted above, the DCP-specific requirements for procurement of these major pieces of equipment had been overlooked when they were ordered as replacements, and this equipment had been designed rather to generic industry seismic load requirements and those pertaining to Loss of Coolant Accident (LOCA) loads. This particular issue is being addressed through a re-analysis being performed as part of the LBVP, and this re-analysis is expected to be complete by September 30, 2015.

There is an additional commonality between the hazards to the new Steam Generators and hazards to the new Reactor Vessel Heads. That is, since both types of equipment are replacements for original equipment, both also may need to be examined collectively, as well as individually, for their ability to withstand a Loss of Coolant Accident (LOCA) occurring simultaneously with an earthquake, as were the original pieces of equipment.

In addition, it may be advisable to install seismic instrumentation on these large vessels in order to be able to verify how any future seismic ground motion and acceleration affects the shaking of this equipment. Nevertheless, it can be stated that thus far, since the replacement of this large equipment, all of this equipment has been functioning properly.

Ongoing seismic re-evaluations include verifying the capability of DCP's Steam Generators and Reactor Vessel Heads to withstand a Design Basis Earthquake. They have also been separately analyzed to withstand a Design Basis Loss of Coolant Accident. However, more analysis may be needed in to confirm that this equipment can also withstand a Design Basis Earthquake that occurs concurrently with a Design Basis Loss of Coolant Accident. Also the re-analysis of the seismic and loss of coolant accident loads on this equipment is expected to be complete by September 2015. In addition, it may be appropriate to install seismic instrumentation on this equipment in order to verify how future seismic events affect the motion of this equipment.

4.20.3 Conclusions and Recommendations

Conclusions:

DCP's progress on resolving its Workplace Personnel Seismic Safety issues has been satisfactory and responsive to the DCISC's concerns. PG&E's technical work on tsunami hazards at the DCP site is well-planned, proceeding very well so far, and working on the correct set of problems. The DCISC concluded that the full DCISC should be engaged in reviewing whether the controversy over the plant's seismic licensing basis raises a safety concern. The DCISC finds that the current project to develop probabilistic seismic hazard information about the Diablo Canyon site is going well. The DCISC will continue to follow the progress of this important work.

Recommendations:

None

[25th Annual Report](#), [Volume 1](#), Section 4.21, Fire Protection

4.21.1 Overview and Previous Activities

Fire protection requirements are contained in NRC's regulations in 10CFR50 Appendix R. Appendix R specifies 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. The NRC periodically performs inspections of the DCPD fire protection program implementation

The DCISC has looked into the following aspect of DCPD fire protection in the previous reporting period (2013–2014):

- Fire Protection Issues

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.

4.21.2 Current Period Activities

The DCISC reviewed the following fire protection items during the reporting period:

- NFPA-805 Fire Protection Update
- Fire Doors Update

NFPA-805 Fire Protection Update (Volume II, [Exhibit D.2, Section 3.8](#))

NFPA-805 is an alternative approach to the Fire Protection Program (FPP) standards for nuclear plants that is endorsed by the NRC and incorporated into Federal regulations as 10CFR50.48(c). DCPD is transitioning to NFPA-805 and submitted their License Amendment Request (LAR) to the NRC in June 2013. NRC has sent 40 Requests for Additional Information (RAIs) to DCPD. The NRC approval (Safety Evaluation) is expected by fall of 2015. DCPD would have 180 days to fully implement NFPA-805, which includes compensatory/alternate measures in place until modifications can be installed and operational.

The current “deterministic” FPP assumes any fire will damage/destroy all cables and equipment within a Fire Area. A Fire Area is a distinct area separated by fire barriers or space in order to contain a fire starting in that area. DCPD has 105 separate and distinct Fire Areas. The new “Risk-Informed” FPP of NFPA-805 takes into account the probability of an event occurring and its potential consequences, based on actual plant design, equipment location, combustibles and other actual, identified fire risks. NFPA-805 continues the deterministic method but adds Risk-Informed, Performance-Based (RIPB) evaluation methods as an acceptable means of demonstrating compliance.

The new “Risk-Informed” FPP of NFPA-805 takes into account the probability of an event occurring and its potential consequences, based on actual plant design, equipment location, combustibles and other actual, identified fire risks. NFPA-805 continues the deterministic method but adds Risk-Informed, Performance-Based (RIPB) evaluation methods as an acceptable means of demonstrating compliance.

In addition to the FPP risk analyses, NFPA-805 also requires the following analyses:

- Nuclear Safety Capability Assessment—an at-power evaluation of every Fire Area
- Non-Power Operations Evaluation—similar to the above, but identifies fire impacts during non-power operations (e.g., outages)
- Radioactive Release Evaluation—examination of all Fire Areas to assess the plant’s ability to prevent radiation release due to firefighting efforts
- Identification of High Risk Areas for at-power and non-power operations

Implementation of NFPA-805 will affect every work group because of new training, new and revised procedures, many program documents and processes, and physical modifications. DCPD is committed to the following eight modifications being completed by 1R20 and 2R20 outages:

1. Unit 1/Unit 2 Electrical Raceway Fire Barrier System
2. Unit /Unit 2 Enhance ability to shut down from Hot Shutdown Panel (HSDP)
3. Unit 1/Unit 2 Incipient Fire Detection: Install incipient fire detection in Cable Spreading Room (CSR) Cabinets and Solid State Protection System Room Cabinets
4. Unit 1/Unit 2 Reactor Coolant Pump Seal Cooling: Reduce the risk from loss of seal cooling loss of coolant accident (replace pump seals with new, improved seals)

NFPA-805 will bring about the following changes to the Main Control Room (MCR):

- New Abnormal Operating Procedure for MCR and CSR non-abandonment scenarios
- Operator actions will be allowed in MCR prior to abandonment
- No more requirement to achieve Cold Shutdown within 72 hours
- Modifications to HSDP as described above

The benefits of NFPA-805 are improved nuclear safety, cost savings in fire watches, and avoidance of expensive modifications to be in compliance with Appendix R, and it helps toward implementing risk-informed Technical Specifications

DCPP appears to be appropriately transitioning from its current “deterministic” Fire Protection Program (FPP) to the new “deterministic and risk-informed” National Fire Protection Association Standard NFPA-805. The new program brings about benefits in improved nuclear safety, cost savings, and a more realistic fire protection program.

Fire Doors Update (Volume II, [Exhibit D.4, Section 3.3](#))

At the March 25, 2014 Plant Health Committee meeting the Appendix R Program Manager reported that this fire protection program health was Red, unsatisfactory, due to the following:

- Excessive Critical Component Failure/Adverse Equipment Trend (one or more critical component failures without an action plan) because of 16 impaired fire doors for several years due to financing deferrals. The impaired doors require fire watches, an unsatisfactory long-term substitute for fully functional fire doors. DCPD has an action plan to replace/repair these doors, but funding has been deferred through 2016. This deferral was a concern to the DCISC, and the earlier Fact-finding Team recommended that the DCISC look further into the deferrals.

There are a total of 94 doors needing replacement. Of these, nine are Appendix R fire doors with compensatory measures in place consisting of roving fire watches. An additional 31 doors are in the DCPD Equipment Control Guidelines (ECGs) as doors which cannot be repaired and require replacement. The funding for these doors in the original Door Replacement Program had been deferred from 2012 until 2017, which appeared unacceptable to the DCISC. Six of these 16 doors have now been repaired or replaced, leaving 10 doors needing resolution. These ten remaining doors have been included as highest priority in the Plant Door Life Cycle Management Plan.

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.

The Project Review Committee, in its July 15, 2014 meeting, approved including the 2015 Power Block Project scope in the DCPD Five Year Plan and review additional funding in the future.

The DCISC concern regarding the needed, but delayed, replacement of fire doors and other safety function doors has been somewhat alleviated by DCPD funding for the new Power Block Project high-priority doors for 2015 and consideration of additional funding for future years. The DCISC notes that 6 of the 16 highest priority fire doors have been replaced. The DCISC should continue to monitor the replacement of DCPD fire and other safety function doors.

4.21.3 Conclusions and Recommendations

Conclusion:

DCPP appears to be appropriately transitioning from its current “deterministic” Fire Protection Program (FPP) to the new “deterministic and risk-informed” National Fire Protection Association Standard NFPA-805. The DCISC concern regarding the needed, but delayed, replacement of fire doors and other safety function doors has been somewhat alleviated by DCPP funding for the new Power Block Project high-priority doors for 2015 and consideration of additional funding for future years. The DCISC notes that 6 of the 16 highest priority fire doors have been replaced. The DCISC should continue to monitor the replacement of DCPP fire and other safety function doors.

Recommendations:

None

[25th Annual Report](#), [Volume 1](#), Section 4.22, Training 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 training topics during the previous reporting period (2013–2014):

- Simulator Training on Anticipated Transients without Scram (ATWS)
- Observation of Mechanical Power Transmission Class
- Engineering Training Program

The DCISC concluded the following during the previous reporting period:

DCPP includes both classroom and control room simulator training on Anticipated Transients Without Scram (ATWS) as part of its Continuing Training Program for Control Room Operators, and the training appeared to be appropriate. The DCPM Mechanical Maintenance Course on Mechanical Power Transmission appeared to be well prepared with good materials, appropriate for the type of students enrolled, and effectively instructed. DCPM’s Engineering Training Group appears to have strengthened the depth and rigor of its program with respect to the many and varied technical disciplines that comprise the Engineering function. As the station has noted, continued attention is needed to address knowledge transfer from the experienced, aging staff to newer engineers.

4.22.2 Current Period Activities

During the current period (2014–2015) the DCISC reviewed the following topics related to training and development:

- Operations Training
- Engineering Training
- Maintenance Training Program

Operations Training (Volume II, [Exhibit D.1, Section 3.12](#))

This training, observed by the DCISC, was on the topic of Time Critical Operator Actions (TCOA). A TCOA was defined as “a manual action or series of actions with a specified time limit to meet a plant

licensing basis requirement”. Each section of the lesson guide listed what were referred to as “Need to Know” and “Nice to Know” elements of the training.

The instructor demonstrated great familiarity with the training materials and knowledge of the subject. He noted to his students that during training critiques in the third quarter of 2013 the cases in which operators were not able to meet the TCOA were not due to a lack of knowledge on how to perform the TCOA but were rather to the lack of realization that they were in a TCOA situation. Therefore, a major thrust of this training was devoted to the instructor posing hypothetical situations to the students and the asking them whether or not the situation was a TCOA. When the situation was, in fact, a TCOA, the instructor then questioned the students regarding the specific actions that were required and the specific time constraints of the various cases.

The instructor was engaging and showed great interest in the students and the learning process. Throughout the major portion of the training, as he was discussing various TCOAs, he posed clear, relevant questions to the class and often called on various students at random and in different areas of the classroom to answer his specific questions. He followed many of the individual student questions and their answers to his questions with clear explanations of the TCOAs being discussed and the reasons for the actions. Alternatively, he would call upon other students to provide that additional information. This dialogue stimulated the students to become actively engaged in the training and to ask numerous questions for clarification. The questions arose from all areas of the large classroom, including the back rows. Almost the entire time period was devoted to this active dialogue with the students.

The instructor also reinforced the importance of employing various error prevention techniques when performing TCOAs. He stressed that there is no need to rush through the actions but rather it is important to employ an informed, disciplined approach to ensure that the TCOAs are performed properly, and he reviewed a number of error prevention techniques that can be used by operators. The instructor also cautioned the students to maintain a disciplined approach when performing TCOAs to counteract the tendency to rush through the process.

The refresher training on Time Critical Operator Actions (TCOAs) for Licensed and Senior Licensed personnel was an exemplary training session. The instructor was highly knowledgeable and employed a variety of effective training techniques to keep the students engaged throughout the entire training period. Students from all areas of the classroom actively participated in the training. This training session could serve as a model for other refresher training sessions if the need should ever arise.

Engineering Training (Volume II, [Exhibit D.1, Section 3.13](#))

This engineering training session on DCP's 125 V and 250 V DC Power Systems observed by the DCISC was extensive and detailed. The introduction included a thorough discussion of the design and structure of the systems including their ability to function during a Design Earthquake, Double Design Earthquake, and Hosgri Earthquake. The introduction also covered the separations and redundancies that are designed into the systems so that a single failure or passive failure will not

disable the systems. It was also mentioned that the systems support a safe shutdown of the units from either the Control Room or the Hot Shutdown Panels. Also discussed was the diversity of separation of the three dedicated battery chargers and the two backup chargers for the three DC buses.

What then followed was a lengthy and detailed discussion of the components of the DC Systems. It was primarily a subdued lecture, with occasional questions being asked by the instructor. Few questions arose independently from the large number of students in the class. The DCISC Fact-finding Team understood this was the instructor's first delivery of this training session. A number of other images were on the students' computer screens.

The engineering training session on DC Power Systems was extensive and detailed. However, the interaction between the new instructor for this topic and the students was subdued, and the training session consumed considerably more time than had been planned for this topic.

Maintenance Training Program (Volume II, [Exhibit D.5, Section 3.6](#))

The Maintenance Learning Services Department consists of the Mechanical, Electrical, and Instrumentation and Control training sections, each headed by a training supervisor and staffed with full-time training instructors for the respective technical disciplines. In addition, the department has separate sections that provide training to Chemistry and Engineering personnel as well as General Employee Training.

Station personnel need to be formally qualified to perform various work activities in one of the three maintenance disciplines mentioned above. It is possible that some personnel who are hired to work at DCPD have already been qualified for certain activities upon arrival on site. However, such personnel need to provide documentation of this current, transferable qualification from their previous employer. If there is any doubt as to the transferability of the previous qualification, the individual is provided the required training by DCPD staff.

The approach to each training topic is affected by the Difficulty, Importance, and Frequency of the activity. Also, two broad classifications of training at DCPD are initial training and continuing training. Continuing training may consist of a refresher course or elements of a broader topic, or it may focus on selected aspects of a particular area, based on station operating experience.

Refinements to training can be driven by observations of training by managers and supervisors, by DCPD's Quality Verification personnel, or by peer reviewers from the industry. In addition, a comprehensive training self-assessment is conducted every other year. Focused self-assessments of training are conducted on particular aspects of training, and student feedback is also used as input for assessing the effectiveness of training.

The DCISC Fact-finding Team was provided with one example of a "Program of Instruction" for a maintenance discipline: a 76-page document pertaining to and identifying the elements of the Initial Training for Mechanical Maintenance Personnel. The Table of Contents listed 14 training

topics pertaining to qualification in ““Fundamentals”, another eight topics pertaining to “Basic Qualifications”, and 12 more pertaining to “Selected Qualifications Courses”, such as Reactor Coolant Pump Seals, Safety and Relief Valve Repair, Couplings Maintenance, Air Compressors, Freeze Seals, etc. Each of those “topical” pages in the Program of Instruction contained listings of the various prerequisites for the specific topical qualification as well as the specific training courses and evaluations that are required in order to be qualified for that particular component or piece of equipment.

One example topic was Safety and Relief Valve Repair. The qualification page for this topic listed 13 prerequisite topics on which the trainee had to first be qualified. In addition, the document identified three more courses beyond “Safety and Relief Valve Repair” that the trainee needed to pass in order to become qualified to perform repair of safety and relief valves.

Another additional source of input that is used to help identify the potential need for additional training in any given area comes from the industry’s sharing of its events, issues, and activities. DCP’s Performance Improvement group reviews such information and relays it appropriately within the station.

During the first half of 2014 DCP performed a self-assessment of its maintenance and technical training programs. The following listing is a summary of the self-assessment’s conclusions related to the structuring and performance of training:

- In a few cases plant modifications that affected training were not sufficiently evaluated.
- In some cases adherence to task retraining was not sufficiently reinforced.
- A strength was noted in DCP’s maintenance and technical labs where the station has been using innovative mockups to provide the training. This strength is consistent with DCISC’s assessment several years ago when visiting DCP’s facility for training personnel in the area of human performance.
- A positive comment was made regarding the station’s rigor in implementing on-the-job training and task performance evaluations.

DCISC’s Maintenance Training Program was extensive and rigorous. The number and variety of inputs to training, both in-house and external to DCP, contribute to the rigor of this program. DCISC’s future focus should be on individual, or related, issues that arise at DCP and may have ties to training.

4.22.3 Conclusions and Recommendations

Conclusions:

The refresher training on Time Critical Operator Actions (TCOAs) for Licensed and Senior Licensed operations personnel was an exemplary training session. The instructor was highly knowledgeable and employed a variety of effective training techniques to keep the students engaged throughout the entire training period.

Students from all areas of the classroom actively participated in the training. This training session could serve as a model for other refresher training sessions if the need should ever arise. The engineering training session on DC Power Systems was extensive and detailed. However, the interaction between the new instructor for this topic and the students was subdued, and the training session consumed considerably more time than had been planned for this topic. DCISC's Maintenance Training Program was extensive and rigorous. The number and variety of inputs to training, both in-house and external to DCP, contribute to the rigor of this program. DCISC's future focus should be on individual, or related, issues that arise at DCP and may have ties to training.

Recommendations:

None

[25th Annual Report](#), [Volume 1](#), Section 4.24, Closed Loop Cooling

4.24.1 Overview and Previous Activities

The purpose of the section is to describe the DCISC’s review of the Environmental Protection Agency’s (implemented by the California State Water Resources Control Board) proposed new rules on requiring closed loop cooling, i.e., cooling towers, on power plants with once-through cooling. The DCISC reviewed the following during the previous reporting period:

- DCP’s Examination of Options to Once-Through-Cooling
- DCISC Approval of Bechtel Report on Cooling Towers

The DCISC has found a number of potential nuclear safety issues with the use of cooling towers at DCP. The DCISC intends to follow this issue over the next year or more and to review the operational safety implications of any proposal that would replace Once Through Cooling with a cooling towers or different technologies.

4.24.2 Current Period Activities

During the current period, the DCISC reviewed the following closed loop cooling items:

- SWRCB Follow Up
- Salt Deposition at DCP

State Water Resources Board (Volume II, [Exhibit D.5, Section 3.3](#))

The State of California regulates the use of Once-Through-Cooling (OTC) through the State Water Resources Control Board (SWRCB). OTC is a method of cooling that draws water from a large body (e.g. the Pacific Ocean) and pumps it through heat exchangers where it absorbs the heat from other systems and is returned to and gives up its heat to the same body from which it was initially drawn. In DCP’s case, the station draws water from the Pacific Ocean, pumps it through the main condenser in which it condenses steam (that had been used to spin the turbine generators, as well as a variety of other much smaller heat exchangers, and is now “spent”) into water so that the water can be pumped back to the steam generators in a closed loop. In the steam generators, this same water is reheated to steam by the reactor coolant system, which is a separate closed loop. The water coming from the Pacific Ocean returns in a warmed condition back to the Pacific, where it gives up its heat to the Pacific. The OTC system impacts fish and other living organisms that are drawn into the intake or that live in the warmed ocean water.

California adopted a new OTC-Policy in October 2010, which requires users of OTC to examine

alternative cooling methods to reduce or eliminate the environmental effects the OTC system is having on the Pacific. The state policy acknowledges the special contributions that nuclear plants make to the environment and to the electric generation system in that the plants are not producers of greenhouse gases and they provide a reliable base load of electric generation. Nevertheless, the policy requires that each nuclear generating station evaluate alternatives to OTC by comparing the alternatives to OTC against current OTC from the standpoints of environmental protection, safety, and economics, which includes reliability and availability of electric generation. The SWRCB will review the results of the evaluations, and it has established a special Nuclear Review Committee to oversee the special studies being performed by California's nuclear utilities, who have engaged third-party contractors to perform these studies.

On July 3, 2014 the DCISC received a copy of Bechtel's draft Addendum on the use of salt water cooling towers south of DCP and on August 6, 2014, DCISC posted its draft evaluation of Bechtel's report. On August 8, 2014, DCISC held a public meeting to review comments received from the Public. The comment period was then extended further, and 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 of Modification 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." DCISC's Preliminary Evaluation was provided for the SWRCB's consideration at its meeting on November 18, 2014. The DCISC also specifically noted in its report that it would continue to study the safety implications of alternatives to once-through cooling, recognizing that additional information might be developed concerning these issues by Bechtel and/or PG&E. Therefore, it was (and is) possible that DCISC might modify its own evaluations of these open issues.

Some of the major issues noted by DCISC's review are as follows:

- Although the majority of construction work would occur during a 6.3 to 6.5 year period during which plant operation would continue, both units would need to be offline during the final 2.3 years of construction.
- Two major safety-related systems are impacted substantially: Auxiliary Salt Water, (ASW), which provides safety related heat-removal for the reactors, spent fuel pools, and other safety-related equipment; and the Emergency Diesel Generators (EDG), which provide the last supply of electricity to the plant. The ASW piping must be rerouted and replaced with underground piping; and two 50,000 gallon underground diesel fuel tanks must be removed and replaced.)
- Although the plant training facility and the security facility would remain continuously available during the entire construction period, twenty-two buildings would need to be demolished and reconstructed, including the fire department building and the fire operations garage
- A new service water system to provide once-through-cooling is anticipated to be needed.
- 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-911 security changes

In summary, the DCISC's October 14, 2014 report contained a number of Conclusions and Recommendations: (The Conclusions are listed in their respective section at the end of this topic of the Fact-finding Report. DCISC's Recommendations are listed immediately below. They are included as documentation of DCISC's Recommendations in its October 17, 2014 Report to the California State Water Resources Control Board and, therefore, do not require a Response or action by PG&E at this time. Therefore, these Recommendations will not be included in the "Recommendations" Section of this Fact-finding Report.)

DCISC Recommendation 1: An evaluation should be performed to understand the impact of southern-sited cooling towers on plant security and emergency response capabilities.

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 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.

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.

DCISC's October 14, 2014 report also reflected on other earlier major DCPD construction projects that have affected plant access, most notably the major post 9/11 security upgrades, where all of the plant security modifications were assessed for their safety impacts, where temporary security measures were implemented, and where the modifications were examined with respect to their effect on operations and maintenance.

In addition, DCISC's October 14, 2014 report to California SWRCB revisited DCISC's earlier review and assessment of Bechtel's initial study of closed cooling tower options as well as DCISC's conclusions regarding that Bechtel study, as contained in DCISC's May 25/26, 2014 Fact-finding Report. Since DCISC's specific four major conclusions for this earlier review have already been documented and discussed in DCISC's May 2014 Fact-finding Report, they will not be duplicated in this December 2014 Fact-finding Report. However, this December 2014 Fact-finding notes that those four major conclusions remain valid.

The DCISC Fact-finding Team also briefly toured the 85-foot level of the Turbine Building to inspect potential flooding hazards associated with the turbine condensers located at this elevation. This "85-foot" level is actually "ground level" which is 85 feet above the Pacific Ocean. With cooling

towers, the large-diameter circulating water piping, water boxes, and condenser tubes would operate at higher pressure, with their water supply located above the condensers rather than below. The key concerns for flooding involve the emergency diesel generators and safety related electrical switchgear that are at the same elevation and adjacent to the condensers. This equipment is housed in rooms separate from the condenser area, so the primary flooding risks would come from the doors that connect these areas. Any large-scale flooding from the condensers would most likely flow out exits from the west side of the turbine building, but a detailed flooding assessment will be needed to confirm this.

To reduce the size of the cooling towers in order 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 cooling towers being considered are sized to operate with higher circulating water temperature than the earlier design that was considered. This results in a somewhat higher condenser back pressure and somewhat lower output from the plant turbines. However, the turbine vendor has indicated that these low pressure turbines can operate reliably at a higher condenser pressure of 4 to 5 inches Hg.

The impacts of southern siting of cooling towers on plant access during construction, and the 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.

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.

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 will 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. The 85-foot elevation is “ground level” for the Turbine Building because the plant is on a cliff that is 85 feet above the Pacific Ocean. Southern siting would also require redesign and replacement of the underground Auxiliary Saltwater System piping, which, when modified by DCCP 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.

The design of the proposed temporary emergency diesel generators will require very careful review to assure that safety can be maintained.

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.

The use of salt water cooling towers could result in an increase in the rate of deposition of salt on DCPD 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 Independent Spent Fuel Storage Installation (ISFSI), although these effects should be much less because of the longer distance from the ocean to the ISFSI.

Operation of the DCPD condensers at a higher pressure of 4 to 5 inches Hg is unlikely to affect plant safety significantly.

Salt Deposition on Equipment at DCPD (Volume II, [Exhibit D.8, Section 3.4](#))

DCPD shared data for the following areas of the plant:

Plant Area	Salt Contamination Level (ESSD)
230 kV Switchyard Buses	Light
230 kV Switchyard Insulators	Medium to Extra Heavy
230 kV Transformer Yard Insulators	Light
500 kV Transformer Yard Ho Bushing (Unit 1)	Heavy
500 kV Transformer Yard H1 Bushing (Unit 1)	Medium to Extra Heavy
500 kV Transformer Yard Ho Bushing (Unit 2)	Heavy
500 kV Transformer Yard H1 Bushing (Unit 2)	Medium to Heavy

Where

Light = 0.03–0.08 mg/cm² (Equivalent Salt Deposit Density)

Medium = 0.08–0.25

Heavy = 0.25–0.6

Extra Heavy = > 0.6

These data were measured in the February—March, 2015 timeframe. The salt came from the Pacific Ocean spray, primarily from water exiting the plant discharge cascading down the discharge outfall. The level of deposition depended on the distance from the ocean and the exposure to the ocean.

The frequency and level of cleaning were directly proportional to the salt contamination level and other contaminants such as dirt and dust.

4.24.3 Conclusions and Recommendations

Conclusions:

The DCISC has found a number of potential nuclear safety issues with the use of cooling towers at DCP. The DCISC intends to follow this issue over the next year or more and to review the operational safety implications of any proposal that would replace Once Through Cooling with cooling towers or different technologies.

Being an ocean-sited power plant, DCP is susceptible to salt contamination from ocean spray. DCP measurements of contamination levels on outdoor components showed what one would expect: contamination levels were directly proportional to the closeness and exposure to the ocean. Contamination levels ranged from Light to Extra Heavy.

Recommendations:

None

Appendix 1

Diablo Canyon Independent Safety Committee's Evaluation of Safety Issues for "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"

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:

1. Seismic issues
2. Operability
3. Transient analyses
4. Nuclear fuel (accident analyses)
5. Single failures
6. Hydraulic design
7. probabilistic risk assessment
8. 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 DCP 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 DCP 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?¹

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 (using once-through cooling)—and we believe that nobody else can fully determine this yet either.

Summary of DCISC findings and conclusions

- 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. Crucially, more analysis is needed, and until more design detail is available, whether our DCISC safety criterion will be met remains an open question.
- 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. Significant additional design and analysis are needed to assess the likely effects of the alternative cooling methods on plant reliability.

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

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2. Bechtel Power Corporation, “Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling System for the Diablo Canyon Power Plant,” Report No. 25762-000-30R-G01G-00010 (August 2013)
3. U.S. Nuclear Regulatory Commission, Title 10 Code of Federal Regulations Part 50.59, “Changes, Tests, and Experiments” (64 Federal Register (FR) 53613, Oct. 4, 1999, as amended at 66 FR 64738, Dec. 14, 2001; 72 FR 49500, Aug. 28, 2007)
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 DCPD)
5. Pacific Gas and Electric Company, “Long Term Seismic Program Final Report,” submitted to the NRC in Dockets No. 50-275 and 50-323 (31 July 1988)
6. American Society of Mechanical Engineers (ASME) and American Nuclear Society (ANS), “ASME-ANS RA-Sa-2009, Addendum A to RA-S-2008, “standard for Level 1-Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications”

(2009). A new “Addendum B” to this standard is in the final stages of editing now and will be published in late 2013.

7. Brookhaven National Laboratory, “Review of the Diablo Canyon Probabilistic Risk Assessment,” NUREG/CR-5726, prepared for the U.S. Nuclear Regulatory Commission (1994)
 8. U.S. Nuclear Regulatory Commission, “Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance,” Report NUREG-1560 (1977)
 9. U.S. Nuclear Regulatory Commission, “Perspectives Gained from the Individual Plant Examination of External Events (IPEEE) Program,” Report NUREG-1742 (2002)
 10. Nuclear Energy Institute, “Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,” Report No. NEI 12-06, Washington DC (August 2012)
 11. “Diablo Canyon Independent Safety Committee Twenty First Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011”, Approved October 11, 2011, Volume II, Exhibit D.7, Section 3.1, “EPA Closed Cooling.”
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25th Annual Report, Volume 1, Section 4.25, Beyond Design Basis Events

4.25.1 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:

- Update on DCPD Fukushima Response
- DCPD FLEX Status
- Plans to Assure Spent Fuel Pooling Cooling and Monitoring

The DCISC concluded during the previous reporting period that the DCPD responses on Fukushima to NRC and the FLEX Initiative (post-Fukushima analysis and modifications) appeared well resourced, comprehensive, and on schedule to meet NRC and industry requirements.

4.25.2 Current Period Activities

During the current period, the DCISC reviewed the following:

- New Spent Fuel Pool Level Instrumentation
- EASW System Layout Test
- FLES Quick Hit Assessment and Update
- External Flooding Assessment

New Spent Fuel Pool Level Instrumentation (Volume II, [Exhibit D.2, Section 3.3](#))

To assure that similar consequences to those which were experienced at Fukushima never happen at U.S. nuclear power plants, NRC ordered nuclear utilities, including DCPD, to implement flexible strategies to cope with beyond design basis events similar to that which took place at Fukushima. Part of the coping strategies addresses the use of installed plant equipment and includes monitoring the Spent Fuel Pools (SFP) levels with new instrumentation and removing spent fuel pool heat by boiling the water in the pools. Boiling would be expected to begin about six hours after loss of forced cooling to the SFPs, which is an acceptable and effective way to remove heat from the pools if normal cooling is not available. Boiling keeps the fuel temperatures well below damage thresholds (well below the temperatures that the fuel operates at inside the reactors), and thus prevents damage and radiological release. There is adequate water inventory in the pools to maintain water levels at least ten feet above the fuel for 30 hours immediately after fuel has been offloaded from a reactor during refueling, and for significantly longer time periods after off-loaded fuel has cooled for a few months. The ten-foot water barrier is important not only from the perspective of cooling the fuel but also for purposes of providing adequate radiation shielding for workers who might be on the SFP decks. DCPD is installing new instrumentation to ensure it has the capability at all times to monitor water levels in its SFPs over the full range of possible levels. Existing instrumentation for SFP level consists of a level indication on the wall of the SFP. This is a visual indication requiring an individual to go into the SFP building. Because access may not be possible in beyond design basis conditions, the new remote monitoring level instrumentation is being installed.

Hoses to support SPF make-up would be staged prior to conditions in the building becoming adverse (e.g., the onset of boiling). This will be included in the new FLEX set of procedures. Full implementation of this coping strategy is expected to be complete by Fall 2015 for Unit 1 and by Spring 2016 for Unit 2. Some equipment is already on the site and available for use.

The NRC ordered SFP level instruments installed which meet the following requirements, among others:

- A primary and back-up level instrument that will monitor water level from the normal level to the top of the used fuel rack
- A display in an area accessible following a severe event
- Independent electrical power to each instrument channel and provision of an alternate remote power connection capability

To meet these requirements DCP's instruments have the following design features:

- Two independent instruments located at opposite corners of each of the two SFPs
- Power supplied from different non-vital busses with battery backup power for 72 hours
- Local display in the Fuel Handling Building
- Remote display at the Auxiliary Board with Plant Data Network feed to the Control Room for normal operation

Additionally, the instruments are seismically mounted and reliable in high temperature, humidity and radiation conditions.

The DCP instruments consist of Westinghouse's guided wave radar system, which uses a microwave beam and variation in di-electric constant at water/air interface to detect level. This process is called domain reflectometry. This system has been satisfactorily tested by Westinghouse and approved by NRC. DCP plans to have the Unit 1 level system installed by May 28, 2015 and Unit 2 by June 28, 2015.

Another phase of the coping strategies addresses use of onsite portable equipment including the deployment of a diesel-driven emergency SFP make-up pump and providing make-up water to a SFP as water boils off.

DCP appears to be on track in developing and installing its Spent Fuel Level Instrumentation required by the NRC as a result of the Fukushima accident. The use of a video camera to monitor the pool level, as was suggested by a member of the public during the October 9-10, 2013 DCISC Public Meeting, would not be practical due to steam causing fogging of the lens. The DCISC should follow up after the new level measurement systems are installed and tested.

Emergency Auxiliary Saltwater (EASW) System Layout Test (Volume II, [Exhibit D.2, Section 3.4](#))

The DCP Auxiliary Saltwater (ASW) System utilizes four electrically-powered pumps, forming two trains of permanently installed piping and valves for each unit with cross-ties between units. ASW provides ocean water to the plant for emergency cooling of components required to bring and maintain the plant in a safe state for design basis events. It is important to note that the aluminum piping and connections used in the EASW system are of the type routinely used for temporary irrigation piping, and thus are designed to be installed manually.

The EASW utilizes one portable Diesel-driven pump train and associated temporary piping per unit, though DCP

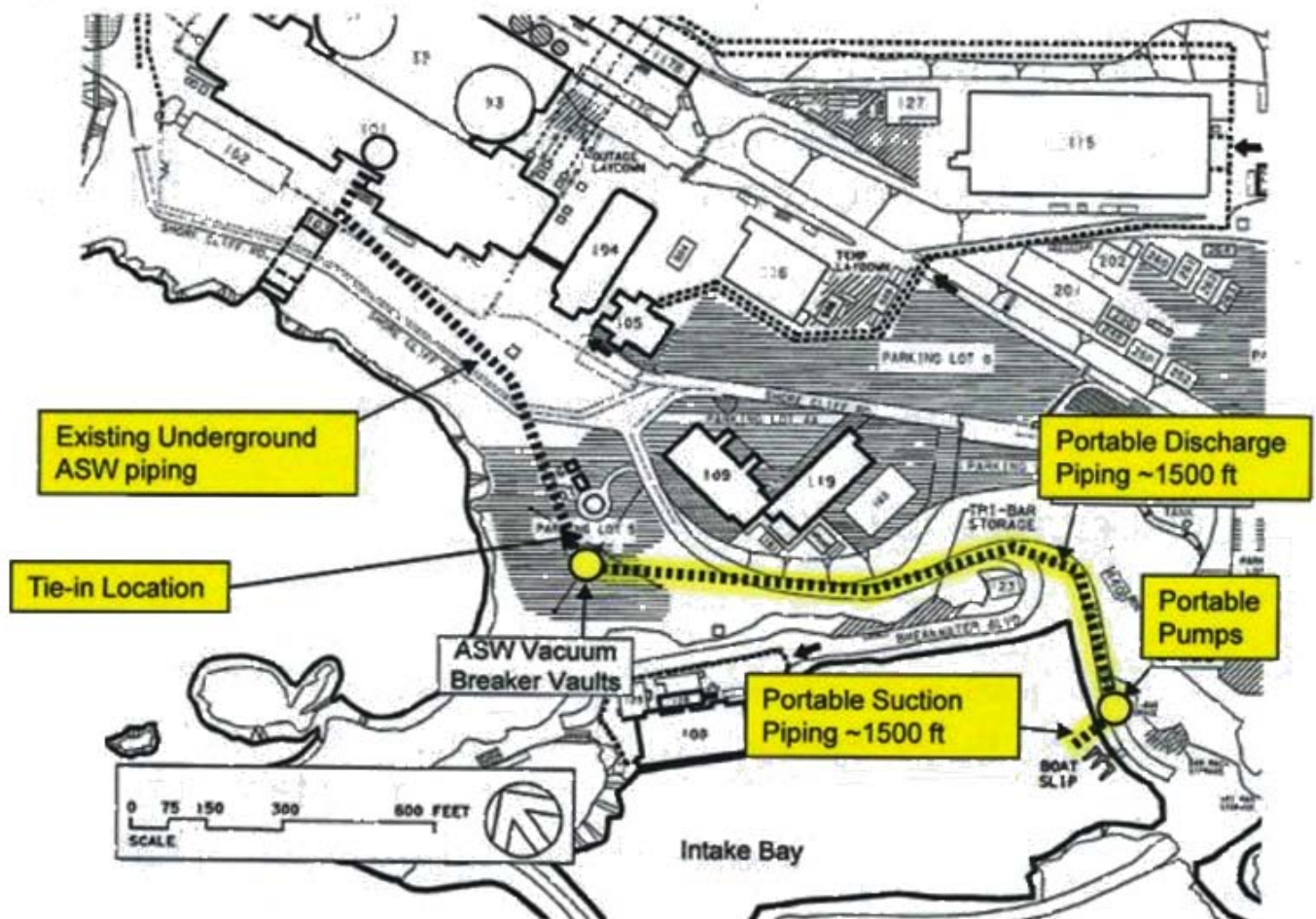
maintains components for two full EASW trains per unit. It is used in place of normal ASW for beyond design basis events. The EASW is to be set up prior to the time it is thought to be required.

DCPP tested the process of laying out the EASW system in May 2014. The layout consisted of laying and connecting approximately 1500 feet of suction piping with kelp cage to the intake bay, moving and connecting the portable Diesel-driven EASW Pump, and laying out and connecting approximately 1500 feet of discharge piping to the tie-in location to existing underground ASW piping. DCPP timed all steps and recorded manpower and equipment used. The following items were purposely excluded:

- Suction piping was not lowered into the ocean but was staged over the ocean due to not yet having the environmental permit
- The ASW Vacuum Breaker Vault covers were not removed nor tie-in to existing ASW piping because the plant was in operation
- The EASW Pump was not run due to not yet having the environmental permit

All EASW layout parameters were satisfactorily verified and improvements identified for consideration. One item for improvement is the kelp cage, although it was not tested, but questions remain about its capability. Below are a system layout diagram and photos of the components.

System Layout





Per Peterson and Ferman Wardell inspect EASW piping on trailers.



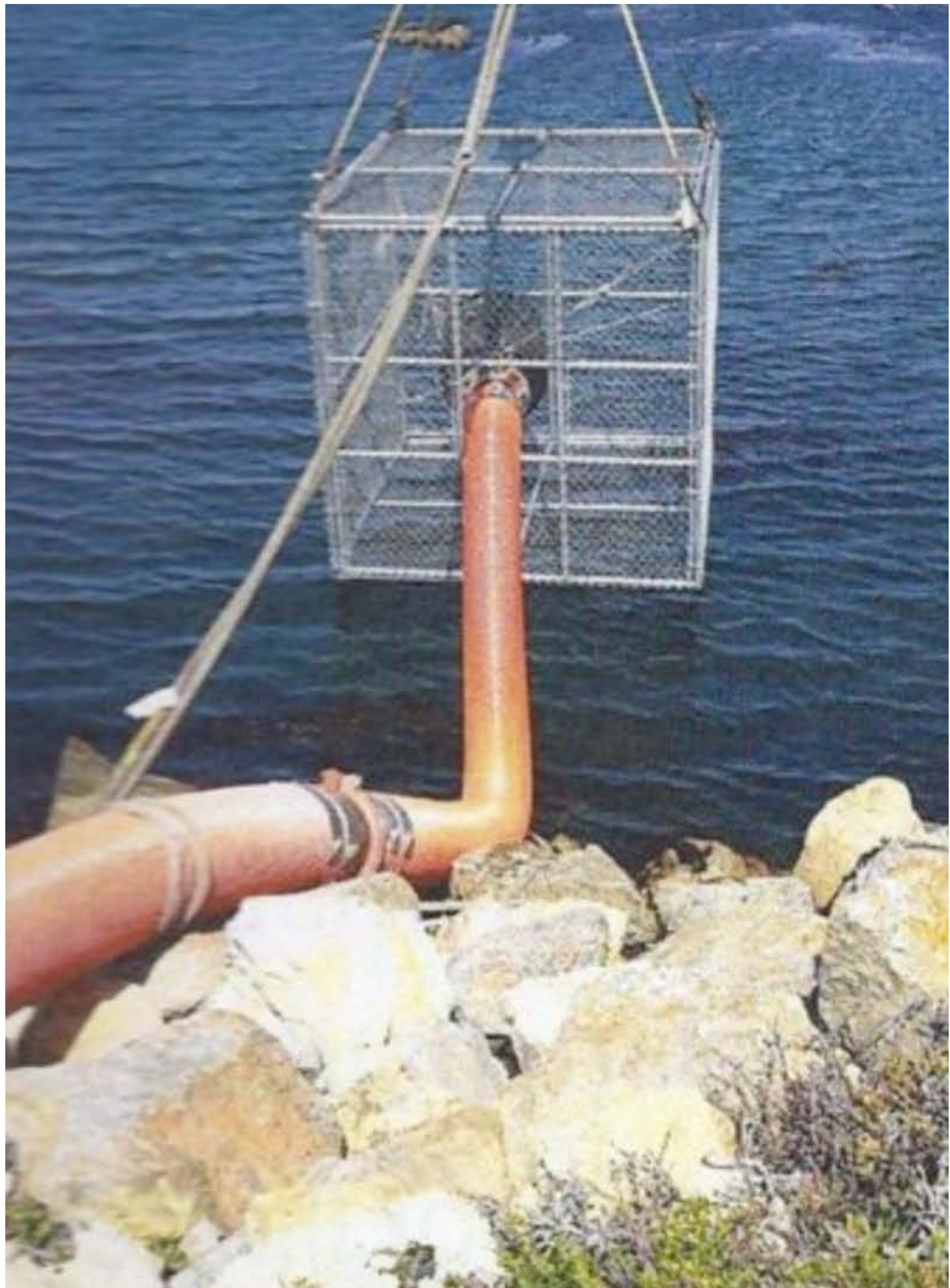
EASW pump mounted on trailer.





EASW suction piping from Intake Bay







EASW kelp cage over Intake Bay

Separately, the four EASW Pumps were tested in June 2014. Two pumps tested satisfactorily; however, the other two were problematic. These were all previously-owned farm irrigation pumps. DCPD will either overhaul or replace the pumps. This is the purpose of component testing—to determine initial and ongoing operability and reliability and to take appropriate steps if there are problems.

DCPD's Emergency Auxiliary Saltwater (EASW) System layout tests were satisfactory; however, separate EASW Pump testing identified some problems. DCPD will overhaul and/or replace these pumps. The DCISC will continue to follow this issue.

FLEX Quick Hit Assessment and Update (Volume II, [Exhibit D.6, Section 3.1](#) and [Exhibit D.8, Section 3.8](#))

This Quick Hit Self-Assessment (QHSA) was conducted in late September 2014 and report approved November 5, 2014. The objectives of the QHSA were as follows:

- Simulate an NRC inspection using NRC's draft temporary inspection instruction
- Develop an electronic "binder" of documentation to support a future NRC inspection
- Review the Overall Integrated Plan (OIP) to assure that it is up-to-date
- Compare DCPD responses and implementation plans to industry guidance documents
- Verify that the top DCPD procedure requirements are being satisfied

The QHSA Team included three DCPD FLEX personnel, the Westinghouse Project Manager, and an external industry consultant.

Overall, the QHSA concluded that DCPD's program is in compliance with NEI-1206, "FLEX Mitigating Strategies for Beyond Design Basis External Events", which was endorsed by the U.S. Nuclear Regulatory Commission (NRC) to meet the requirements of its post-Fukushima Order EA-12-049. Additionally, there were some clarifications and additional documentation recommended, mostly in the training and procedures areas. Specific results of the QHSA are as follows:

1. Clarify the site strategy for portable lighting and communications in a FLEX master procedure.
2. Establish a list of operator actions for the first eight hours of an event and review the Seismically Induced System Interactions Program (SISIP) to assure FLEX routes would be available for operators to access selected areas of the plant.
3. Develop a method to control equipment/material on FLEX routes.
4. Combine Pressurized Water Reactor Owners Group (PWROG) FSGs 14/15 into the new FLEX master procedure.
5. Develop a Corrective Action Program (CAP) Notification for acceptance of Warehouse B calculation.
6. Complete the plan to identify tow vehicles and parking locations.

Each of the above recommendations had been entered into a separate CAP Notification to begin the evaluation of

the appropriate course of action. DCPD plans to complete resolution of the recommendations by the end of June 2015 to meet their planned FLEX implementation dates of October 2015 for Unit 1 and May 2016 for Unit 2.

The DCISC reviewed the QHSA and found it to be comprehensive and thorough. Included in the six recommendations above were specific items needing to be addressed. Many of them were actions, which DCPD had already planned to address, such as the detailed SFP instrumentation design, which is currently underway.

NRC performed a remote FLEX audit in December 2013 based on DCPD submittals and was satisfied with DCPD's progress and actions. They will perform a pre-implementation audit in August 2015 and a full inspection about December 2016 following DCPD full FLEX implementation in May 2016.

DCPD appears to have satisfactorily performed the Quick Hit Self-Assessment of its FLEX Program and Spent Fuel Pool Instrumentation Project. The overall conclusion was that the FLEX Program was in compliance with industry and NRC guidance with specific recommendations for program enhancements and remaining work. The DCISC Fact-finding Team concluded that the Assessment and resulting action plans were appropriate. The DCPD FLEX program is on-schedule for on-time completion.

The overall status of individual Fukushima/FLEX initiatives is as follows:

1. Seismic and Flooding Hazard Re-evaluation
 - a. Flooding and Seismic Re-evaluation Reports were submitted to NRC on March 12, 2015. NRC has separated these results from the plant design basis.
 - b. Results of analyses using Local Intense Precipitation and Probable Maximum Flood show some ponding in areas around the Turbine and Auxiliary Buildings, which can be mitigated by use of sandbags. There were no other exceedences.
 - c. Results of tsunami analyses show a one foot decrease in tsunami wave height, which is bounded by the original design basis.
 - d. Two exceedences, drawdown for the Auxiliary Saltwater (ASW) Pump and run-up/scouring above the ASW Bypass Piping, do not affect current designs.
 - e. New seismic analyses are generally bounded by existing Hosgri analysis with some exceedences in high and low frequency ranges.
 - i. No safety-related equipment is susceptible to the high and low frequencies in question
 - ii. New ground motion spectra are bounded by the Long-Term Seismic Program spectra.
 - iii. All equipment meets both spectra.
2. Seismic and Flood Walkdowns
 - a. No issues
 - b. No further work expected in this area at this time
 - c. Potential flood seal issue in ASW Pump Vault, which plant is reviewing
3. New NRC Station Blackout Rule underway—draft expected Summer 2015 earliest. DCPD will use Licensing Basis Verification Project to handle.
4. FLEX Strategy Design Packages
 - a. SFP Cooling—issued

- b. Raw Reservoir—issued
 - c. Primary Storage in Warehouse—issued
 - d. Emergency Auxiliary Feedwater (EAFW)—issued
 - e. Emergency Reactor Coolant System (ECRS) Make-up—issued
 - f. Safety Function Support—April 17, 2015
 - g. Emergency Auxiliary Saltwater (EASW)—issued
 - h. Debris Mitigation—May 15, 2015
 - i. Units 1 and 2 Mechanical and Electrical Modifications—issued
 - j. Communications Modifications—issued
5. Storage Locations
- a. Primary On-site Storage—begin moving in June 1, 2015
 - b. Secondary On-site Storage (near ISFSI)—design to be issued May 15, 2015
6. Equipment Procurement
- a. Front-end loaders and ERCS pumps on-site
 - b. Mobile generators and EASW pump stored off-site until air permits received
7. FLEX Support Guidelines drafted and ready for training
8. National SAFR Response Center—design to be issued by June 15, 2015
9. NRC Pre-Implementation Audit—week of August 17, 2015
10. Spent Fuel Pool Instrumentation
- a. Design to be issued by April 23, 2015
 - b. Equipment delivery scheduled for June 30, 2015
 - c. Installation scheduled for July 15—September 15, 2015
11. On-Site Emergency Response Center Staffing Study
- a. Phase 1 study completed in 2013
 - b. Phase 2 study begun April 2015—possibly need one engineering position filled.
 - c. Report to NRC by May 26, 2015
12. Emergency Preparedness
- a. Final multi-unit dose assessment program complete
 - b. MIDAS software enhancement underway
13. INPO review visit scheduled for first week of June 2015

The DCP Fukushima/FLEX modifications, analyses, equipment, procedures and training appear to be on-schedule.

External Flooding Assessment (Volume II, [Exhibit D.9, Section 3.10](#))

This PG&E assessment of external flooding was conducted in response to an NRC Request for Information dated March 12, 2012. In it the NRC requested DCPD to re-evaluate site seismic and flooding hazards using updated flooding information and present-day regulatory guidance and methodologies. In essence, the review was to be conducted in the same way as if DCPD were a new plant. With respect to the flooding aspects, PG&E's 90 day response letter, DCL-12-058, stated that PG&E would submit the flooding hazards reevaluation to the NRC by March 12, 2015. (PG&E's Response was submitted on March 11, 2015 in PG&E Letter DCL-15-034.) PG&E further committed that if its flooding reevaluation was not bounded by the Current Licensing Basis (CLB), then PG&E would evaluate and/or discuss mitigation actions in an Integrated Assessment by March 2017.

In addition to following the NRC's formal regulatory guidance for a response to a Request for Information, PG&E adhered to the requirements of the following NRC documents pertaining to this specific request:

- Regulatory Guide 1.59: "Design-Basis Floods for Nuclear Power Plants"
- NUREG/CR-7046: "Design-Basis Flood Estimation for Site Characterization at Nuclear Power Plants in the United States of America"
- NUREG/CR-6966 "Tsunami Hazard Assessment at Nuclear Power Plant Sites in the United States of America—Final Report"
- JLD-ISG-2012-06: "Guidance for Performing a Tsunami, Surge, and Seiche Flooding Safety Analysis"

The analysis was performed in a hierarchical fashion. That is, the most conservative assumptions were embedded in the first analysis, such as assuming that no active components remain functional and the site drainage network is completely blocked. After this, another analysis was performed using assumptions that were more realistic. This progression of analyses is referred to as a Hierarchical Hazard Assessment (HHA).

Historical data was used to determine the values that are relevant. For example, to obtain Probable Maximum Precipitation (PMP) historical California data was extracted for all-season data, seasonal data, and local storm data. Local Intense Precipitation (LIP) (i.e. microbursts) was also examined over the entire site drainage basin.

Tsunami/Ocean analyses had been performed to calculate the effects of distant and near source tsunamis due to earthquakes as well as offshore landslides, including the effects of updated hydrostatic and hydrodynamic forces, debris and water-borne projectiles, and sediment & erosion. Likewise storm surges were also incorporated using historical wave data.

The historical records of local intense precipitation (LIP) were also reexamined along with the flow paths for the accumulating water that could enter the plant and affect equipment. To determine areas and equipment that could be affected, site walkdowns were performed, including the identification of potential entry points providing flow paths to equipment that is important to safety. The determination of maximum water surface elevations then allowed the assessment of whether equipment would be affected. This reanalysis indicated that there is a potential for inundation of power block structures during a LIP event. PG&E's Letter DCL-15-034 noted: "The flood hazard reevaluations are distinct from the current design and licensing bases of DCPD and do not alter the terms of the license. NRC staff considers the flood hazard reevaluations being performed to be beyond the current design/licensing basis of operating plants (NRC, 2012c)".

Findings of the report are as follows:

- Reevaluation results showed there is the potential for water intrusion into power block structures during a local intense precipitation (LIP) event.

- It was determined that the 230kV Switchyard would not experience flooding.
- Tsunamis were determined not to be a threat based on historical information for distant and near term sources as well as analyses of potential landslides.
- Raw water reservoirs on the hill above the plant, which had been evaluated in the Current Licensing basis, were determined not to have a contribution to power block flooding.

Based on the determination of the potential impact of a local intense precipitation event on plant safety, this type of event will be examined further and addressed in an Integrated Assessment that is required to be submitted to the NRC prior to March 13, 2017.

PG&E's Flood Hazard Reevaluation of the DCPD site appears to be detailed and thorough. Local intense precipitation (LIP) was determined to present the only potential risk of inundation of the power block structures. PG&E further noted that NRC has considered LIP to be beyond the current design and licensing basis of the plant. In conformance with a commitment that PG&E made to the NRC, PG&E will conduct further examination of LIP and address the results in an Integrated Assessment that will be submitted to the NRC prior to March 13, 2017.

4.25.3 Conclusions and Recommendations

Conclusions:

The DCPD responses on Fukushima to NRC and the FLEX Initiative (post-Fukushima analysis and modifications) appeared well resourced, comprehensive, and on schedule to meet NRC and industry requirements. The DCISC will follow up periodically to assess DCPD's progress.

Recommendations:

None

[25th Annual Report, Volume 1, Section 1.1, Formation of the Diablo Canyon Independent Safety Committee](#)

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.

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-four annual reports since then. This twenty-fifth Annual report covers the period July 1, 2014—June 30, 2012 and was adopted by the DCISC at a public meeting on October 20, 2015.

25th Annual Report, Volume 1, Section 1.2, Appointment of Committee Members

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](#)

[25th Annual Report](#), [Volume 1](#), Section 1.2.4, Appointment of 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. 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. David C. Linnen, holds a Bachelor in Mathematics and a Master in Business Administration from the University of Michigan. He is a 35 year veteran of the nuclear power industry. He served for five years as a division officer in the navy's nuclear submarine program in which he was responsible for the operation of his submarine's nuclear power plant. Mr. Linnen then served Consumers Power Company for 11 years as an engineer at the Palisades Nuclear Generating Station and in the corporate office as an internal consultant and as staff assistant to the Vice President, Nuclear. He then was employed for 19 years as a plant evaluation Team Manager at the Institute of Nuclear Power Operations, where he also served as staff assistant to the Chief Executive Officer and held other management positions in the corporate office. Mr. Linnen became a DCISC Consultant in mid-2009.

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.

[25th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2014—June 30, 2015](#)

[Preface](#) | [Executive Summary](#)

[Volume 1 TOC](#) | [Volume 2 TOC](#) | [PG&E Response](#) | [Contact the DCISC](#)

25th Annual Report, Volume 1, Section 1.3, DCISC Public Meetings and Plant Tours

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

[August 8, 2014, Public Meeting/Teleconference](#)

[October 14–15, 2014, Public Meeting and Public Plant Tour](#)

[February 4–5, 2015, Public Meeting and Public Plant Tour](#)

[May 14, 2015, Public Meeting \(Berkeley, CA\)](#)

[June 16–17, 2015, Public Meeting and Public Plant Tour](#)

These are described in [Section 2.0](#).

[25th Annual Report, Volume 1, Section 1.4, Committee Member Site Inspection](#)

Tours and Fact-finding Meetings

The DCISC Members and Consultants visit DCPD 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 2](#), Exhibits D.1–D.9, and plant tours and inspections are listed in [Exhibit E](#).

1.4.1 Inspections and Fact-finding meetings by Robert J. Budnitz

To DCPD on November 19–20, 2014, with Consultant R. Ferman Wardell to review and receive updates on: pressurizer weld overlay issues, Containment fan cooler unit modifications, issues with the fire doors, concrete inspection and repairs to the Intake structure, safety system functional failures, the results of refueling outage 2R18, the radioactive waste systems, the Equipment Qualification Program, steam generator performance and inspections through refueling outage 2R18, the long term strategy for the Radiation Monitoring System, a summary session of PG&E's Nuclear Safety Oversight Committee; and to meet with the NRC Resident Inspector and PG&E's Chief Nuclear Officer.

To PG&E's San Francisco headquarters and to DCPD on March 30—April 1, 2015, with Consultant David Linnen to review and receive updates on: PG&E's tsunami risk analysis and seismic study, the Probabilistic Risk Assessment Program, the program health of the Fire Protection System, spent fuel pools and related equipment, the safety injection pumps, the Safety Conscious Work Environment, the Human Performance Program, the System Engineering Program, the Compressed Air System; and to meet with the NRC Resident Inspector and PG&E Vice President Nuclear Services and Site Vice President.

To DCPD on June 10–11, 2015, with Consultant Wardell to review and receive updates on: the Air Operated Valves Program, refueling outage 1R19, the emergency diesel generators, the control room simulator, control room shift turnover, the Integrated Risk Assessment Program, the Reactor Protection System digital upgrade, integrated equipment reliability; to lunch with the North American Young Generation in Nuclear group and to meet with the NRC Senior Resident Inspector and Diablo Canyon Station Director.

1.4.2 Inspections and Fact-finding meetings by Peter Lam

To DCPD on September 17–18, 2014, with Consultant Linnen to review and receive updates on: performance of the Maintenance Department, the results of recent audits by the Quality Verification organization, the Self-Assessment Program, the system engineering function, the Direct Current Power System, the Reactor Coolant System, the Vibration Monitoring Program, the health

of the Compressed Air System, the Margin Management Program, and to meet with the NRC Senior Resident Inspector and the DCPD Site Vice President.

To DCPD on January 21–22, 2015, with Consultant Wardell to review and receive updates on: the FLEX quick-hit self-assessment, PG&E's seismic studies and submittals to the NRC, an overview of the Performance Improvement Program, clearance performance during refueling outages 1R18 and 2R18, the Reactor Coolant Pumps, the Troubleshooting Program, the state of the plant, untimely corrective action for potential gas intrusion into the Containment Spray System, single point vulnerabilities; and to meet with the NRC Senior Resident Inspection and PG&E Chief Nuclear Officer.

To DCPD on April 21–22, 2015, with Consultant Wardell to review and receive updates on: the status of the emergency diesel generators, the Meteorological Dose Assessment System, the rate of salt deposition at the plant site, design quality status, the Spent Fuel Cooling System, the Plant Health Committee, the industry's FLEX initiative, Licensing Basis Verification Project, winter storm experiences, the Operational Decision Making Program; and to meet with the NRC Senior Resident Inspector and Diablo Canyon Site Vice President.

1.4.3 Inspections and Fact-finding meetings by Per F. Peterson

To DCPD on August 13–14, 2014, with Consultant Wardell to review and receive updates on: the Meteorological Dose Assessment System, the safety-security interface, new spent fuel pool instrumentation, the layout test of the emergency Auxiliary Saltwater System, efficacy evaluation of design quality, reactor trip commonalities, the seismic fragility probabilistic risk assessment, the conversion to National Fire Protection Association 805 standards, reactivity management, the outage safety plan for refueling outage 2R18, the Chemistry Program; and to meet with the NRC Resident Inspectors and the Diablo Canyon Site Vice President.

To DCPD on December 2–3, 2014, with Consultant Linnen to review and receive updates on: the status of large station transformers, the Foreign Material Exclusion Program, responses to the State Water Resources Control Board's initiative on closed loop cooling, office/personnel seismic safety, the Residual Heat Removal System, the Maintenance Training Program, tsunami hazards, the Management Observation Program, the status of the Independent Spent Fuel Storage Installation, flexible power operations; and to meet with the NRC Senior Resident Inspector and PG&E Chief Nuclear Officer.

To DCPD on May 19–20, 2015, with Consultant Linnen to review and receive updates on: office seismic safety, the Seismically Induced System Interaction Program, seismic review of the replacement steam generators and reactor vessel heads, the Benchmarking Program, the Operating Experience Program, the potential for stress corrosion cracking of the multipurpose canisters in the Independent Spent Fuel Storage Installation, the external flooding assessment, the Plant Health Committee and the Quarterly Station Performance Review Committee and to meet with the NRC Senior Resident Inspector and PG&E Chief Nuclear Officer.

1.4.4 Tours of DCPD by DCISC Members and Members of the Public During the Period July 1,

2014—June 30, 2015

The DCISC had historically performed a public tour of Diablo Canyon Power Plant each year with members of the public in conjunction with its January/February public meetings (except for two years following the terrorist activities of September 11, 2001 because of tightened security at nuclear power plants, including DCPD). With its June 2004 public meeting, the Committee resumed conducting tours of DCPD with members of the public, offering a tour in conjunction with each of its public meetings since that time, unless precluded by security concerns. 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 proven to be very popular with the local residents and are considered by the DCISC as an important aspect of its public outreach activities. Public tours were conducted at the October 15, 2014, February 4, 2015, and June 17, 2015 Public Meetings, with the DCISC Members, and DCISC Consultants. Each of the tours was well attended with 17, 15 and 25 members of the public attending each of the tours, respectively. Beginning with the February 2015 public tour, the DCISC tour groups have once again resumed visiting within controlled area in the plant including the Main Turbine Deck and to observe through an observation window actual plant operations within the control room. This requires the group to observe security protocols to enter within the protected areas of Diablo Canyon. The DCISC appreciates PG&E's cooperation in facilitating these tours with members of the public. These tours are described in Volume II, [Exhibit E](#). While public interest remains, the DCISC will continue to host public tours at each of its public meetings.

[25th Annual Report, Volume 1, Section 1.5, Visits by DCISC Members to California State Agencies](#)

On October 1, 2014, DCISC Member Peter Lam and Assistant Legal Counsel Robert Rathie met in Sacramento, CA with California Energy Commission Chair Robert B. Weisenmiller, Ph.D., his advisor Mr. Kevin Barker, CEC Executive Director Rob Oglesby and Senior Nuclear Policy Advisor Danielle Osborn Mills to discuss matters concerning the State Water Resources Board’s proposal for closed loop cooling, incidents involving DCPD insulators including the use of polymer bushings, the plant’s seismic design basis and other seismic-related issues, the plant’s Differing Professional Opinions Program, Diablo Canyon fuel performance and dry cask storage plans, and the DCISC’s public outreach efforts and recent events and activities of the DCISC.

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.

Dr. Peterson attended and Dr. Budnitz tied in remotely by phone to a meeting of the State Water Resources Control Board (SWRCB) on November 18, 2014, in Sacramento for which the DCISC provided its (1) Preliminary Evaluation of the Bechtel Addendum (Diablo Canyon Independent Safety Committee’s Preliminary Evaluation of Safety Issues for “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” October 15, 2014); and its (2) Evaluation of Safety Issues for the Bechtel Assessment (Bechtel Power Corporation, “Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling System for the Diablo Canyon Power Plant,” Report No. 25762–000–30R–G01G–00010 (August 2013) September 8, 2013).

The CPUC’s Independent Peer Review Panel on DCPD seismic studies met on January 8, 2015 in San Francisco, and both Drs. Peterson and Budnitz attended.

[25th Annual Report](#), [Volume 1](#), Section 1.6, Documents Provided to the DCISC

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 Nuclear Power Plant, 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 2, [Exhibit A](#).

25th Annual Report, Volume 1, Section 1.7, Documentation of DCISC Activities

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.

DCISC public meetings are webcast in real time and cablecast over the San Luis Obispo local public access television channel and are available through indexed, archived streaming video through the link on the Committee's website to County Meetings on www.slospan.org.

The DCISC issues press releases before and after its public meetings concerning topics it believes to be of particular interest within the community.

[25th Annual Report](#), [Volume 2](#), Exhibit B6, Minutes of the Diablo Canyon Independent Safety Committee on October 14–15, 2015 Public Meeting (Approved at the February 4, 2015 Public Meeting)

Tuesday & Wednesday, October 14–15, 2014, Point San Luis Conference, Room, Avila Lighthouse Suites, First & San Francisco Streets, Avila Beach, California

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 meeting agenda were also posted on the Committee's website at www.dcisc.org.

Agenda

I Call to Order–Roll Call

The October 14, 2014 public meeting of the Diablo Canyon Independent Safety Committee (DCISC), the seventy-second public meeting of the Committee, was called to order by Committee Chair Dr. Per Peterson at 1:30 P.M. at the Point San Luis Conference Facility at the Avila Lighthouse Suites in Avila Beach, California. Dr. Peterson welcomed the members of the public in attendance. Public meetings of the Committee may be viewed online in real-time over streaming video and are recorded for later broadcast on the local government access television channel (Channel 21). Dr. Peterson introduced and briefly reviewed the professional backgrounds and appointment of each of the members of the Committee.

Present:

Committee Member Robert J. Budnitz

Committee Member Peter Lam

Committee Member Per F. Peterson

Absent:

None

II Introductions

Dr. Peterson introduced and briefly reviewed the background of each of his fellow Members,

Dr. Robert J. Budnitz and Dr. Peter Lam, as well as that of the Committee's Technical Consultants Mr. R. Ferman Wardell and Mr. David C. Linnen and Assistant Legal Counsel Robert Rathie. Dr. Peterson recognized and introduced Ms. Maureen Zawalick, Pacific Gas & Electric Company (PG&E) Corporate Support Manager, who acts as the principal point of contact for the DCISC with PG&E and the Diablo Canyon Power Plant (DCPP).

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. The Chair advised time would be set aside for members of the public to comment on those matters listed on the agenda at the time the matter was considered by the Committee and 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.

Ms. Sherry Lewis was recognized. Ms. Lewis stated she was speaking as a representative of the group San Luis Obispo Mothers for Peace (MFP) and inquired concerning a reference in the draft Minutes of the June 2014 public meeting of the Committee concerning a comment by Consultant Wardell on the effectiveness of DCPP's program for addressing the Institute of Nuclear Power Operations (INPO) performance plan and what Ms. Lewis reported as a recent downgrading of DCPP by INPO in a recent evaluation. Mr. Rathie confirmed the version of the Minutes provided to Ms. Lewis was the same as included in the agenda packet for this meeting and the meeting minutes are simply a record of the discourse taking place during a public meeting. Dr. Budnitz commented that INPO is a nuclear industry organization which evaluates U.S. nuclear sites and its evaluations are not made public. The DCISC is afforded access to INPO reports concerning DCPP on a confidential basis and the Committee cannot comment on the substance of those evaluations in a public forum. Mr. Wardell confirmed Dr. Budnitz observation and stated the Nuclear Regulatory Commission (NRC) is also under certain constraints imposed by confidentiality restrictions in its use of information received from INPO.

Dr. Lam recognized the presence in the audience of Mr. Kevin Barker, Chief of Staff to California Energy Commission (CEC) Chairman Dr. Robert B. Weisenmiller, and Ms. Danielle Osborn Mills, CEC Senior Nuclear Policy Advisor. Ms. Osborn Mills addressed the Committee and stated she and Mr. Barker were happy to have the opportunity to attend this public meeting of the DCISC and she thanked the Committee Members for their service in providing a valuable benefit to members of the public and to PG&E as the operator of DCPP.

IV Consent Agenda

The only items on the Consent Agenda were approval of the Minutes of the Committee's June 11-12, 2014, public meeting held in Avila Beach, and the Minutes of the Committee's August 8, 2014, public meeting held in San Luis Obispo. Dr. Lam commented that these Minutes reflect a most robust and enthusiastic participation by members of the public at the June 2014 public meeting.

Items were discussed and reviewed for follow up or action and clarification was provided to the

Committee's Assistant Legal Counsel concerning certain references in the draft Minutes provided in the agenda packet for this meeting, and regarding necessary typographical and editorial corrections as well as concerning substantive changes to be made to the final version of the June and August 2014 Minutes which will be made in the final versions of both sets of Minutes which, for the June 2014 Minutes will become a part of the Committee's 24th Annual Report on the Safety of Diablo Canyon Power Plant Operations (Annual Report) for the period July 1, 2013 to June 30, 2014, and for the August 2014 Minutes the 25th Annual Report for the period July 1, 2014 to June 30, 2015.

On a motion by Dr. Budnitz, seconded by Dr. Lam, the Minutes of the Committee's June 2014 public meeting were approved as amended, subject to inclusion of the revisions discussed and changes provided to its Assistant Legal Counsel. On a motion by Dr. Budnitz, seconded by Dr. Lam, the Minutes of the Committee's August 2014 public meeting were approved as amended, subject to inclusion of the revisions discussed and changes provided to its Assistant Legal Counsel.

Ms. Sherry Lewis, representing MFP, was recognized. In response to Ms. Lewis question Dr. Budnitz stated that each department at DCPD is made up of many sections. Ms. Lewis also suggested and the Members agreed that the Minutes be corrected to use the correct spelling of the Japanese word "Daini".

Mr. Bill Dineen was recognized. Mr. Dineen thanked the DCISC for providing hearing assistance devices to attendees at its public meetings and he stated that DCPD would not be needed if more people had photovoltaic devices on their roofs as he does and which produces more electricity than he uses.

Ms. Rochelle Becker, the Executive Director of the Alliance for Nuclear Responsibility (A4NR) was recognized. Ms. Becker referred to comments she made at the June 2014 DCISC public meeting which were included in the Minutes of that meeting and clarified a statement that the position of the A4NR is that DCPD could continue to operate to the end of its current license only if it can do so safely and cost-effectively.

V Action Items

A. DCISC's 24th Annual Report on Safety of Diablo Canyon Operations; July 1, 2013—June 30, 2014.

The Chairman reviewed the duty and obligation of the Committee to develop and make available its Annual Report on the safety of DCPD operations. Dr. Peterson stated preparation of the Annual Report was an intensive, collaborative effort led by Committee Technical Consultant Mr. R. Ferman Wardell. Dr. Lam remarked Mr. Wardell has done an outstanding job and deserves recognition and the thanks of the members of the Committee for his efforts. At Dr. Peterson's request, Mr. Wardell reviewed the process employed by the Committee to develop its Annual Report for 2013–2014 and the single Recommendation from the Committee's 24th Annual Report. Dr. Budnitz observed the Annual Report represents a compendium of the DCISC's efforts over that twelve month period and its positions, policies, findings, conclusions and recommendation are set

forth in the fact finding reports on which presentations are made at each public meeting during the Annual Report period.

Dr. Lam requested Consultant Linnen to briefly review the basis for the single recommendation, R14-1, in the 24th Annual Report. Mr. Linnen stated Recommendation R14-1 resulted from an event at DCPD during February 2013, when a maintenance activity to replace a fuse led to the de energizing of a 4 kV bus at a time when the affected unit was shut down and had no fuel within its reactor vessel. A Licensee Event Report (LER) was submitted by PG&E to the NRC and an extensive Root Cause Evaluation (RCE) was performed. The RCE identified two root causes one of which concerned the Maintenance organization leadership not being proactive in addressing human performance standards. Mr. Linnen stated the DCISC agreed with this aspect as a root cause. Nevertheless, the DCISC noted that there were a number of instances where the Maintenance and Operations organizations interacted prior to the event. Therefore, the DCISC based its Recommendation R14-1 upon its conclusion that Operations played a role commensurate with Maintenance in this event and recommended that DCPD reexamine the role of Operations in the event.

Mr. Rathie observed that, in accordance with the Restated Charter from the California Public Utilities Commission (CPUC), upon its approval, the Annual Report is provided to PG&E for its response which becomes a part of the final Annual Report. The Annual Report is then provided to the CPUC and to each of the Committee members' appointing entities, the Governor, the California Attorney General and the Chair of the California Energy Commission as well as to the California Polytechnic University (Cal Poly) R.E. Kennedy Library and to public libraries in the local area, and on the Committee's website at www.dcisc.org. On a motion by Dr. Budnitz, seconded by Dr. Lam, the Committee unanimously approved its Twenty-Fourth Annual Report PG&E's on the Safety of Diablo Canyon Operations for the period July 1, 2013—June 30, 2014.

B. Update on Financial Matters and Committee Activities.

Mr. Rathie reported that a statement of revenue, assets, and liabilities was previously provided to the Members. He stated three payments under the grant which funds the DCISC activities have been received and, while it is difficult to budget as the Committee expends funds at different rates during a calendar year based upon its activities, it appears the DCISC will complete calendar year 2014 within the amount of the 2014 Grant. Any funds remaining unspent from 2014 will be returned to PG&E for credit to its ratepayers who provide all funds for DCISC operations. During calendar year 2013 the DCISC returned \$73,750 .00 to PG&E's ratepayers. Mr. Rathie directed the members' attention to the pages in the agenda packet which included information on the dates for public meetings and fact-findings during the remainder of 2014 and for 2015 and he reported the dates for the June 2015 public meeting have been changed to June 16–17, 2015.

C. Discussion of Issues on Open Items List.

Dr. Peterson requested Consultant Wardell lead a review of items on the Open Items List, used by the Committee to track and follow issues, concerns, and information identified for subsequent action during fact-finding or public meetings. Dr. Budnitz observed there were 25 items on which

the DCISC indicated it would take some action during the final quarter of 2014 and some of these items must necessarily be deferred. Items concerning which action was taken included the following:

Item	Re:	Action Taken
CO-12	Assess Flexible Power Operations	Defer to 1Q15 or later if new development occurs
CM-13	Maintenance Dept.	Rev Troubleshooting 1Q15 Defer balance to 2016
ET-5	Use of Social Media by ERO	Rev. Natl. Academy and NEI Reports prior to FF
RA-5	PRA Program	Move to 1Q15
RA-6	Monitor Seismic Fragility Analysis	Move to 1Q15
RP-13	PHC Rev. of Rad. Monitoring System	Schedule for Nov.2014 FF
SE-26	RPV Compliance Status	Schedule for 1Q15
SE-38	CFCU Modifications	Schedule for Nov.2014 FF
SF-1	Monitor ISFSI Operations	Coordinate with next transfer
SF-2	Relative Risk: Cask vs. Pool Storage	Add: (1) rev. potential for clad embrittlement due to hydriding;
		(2) salt deposition by saltwater cooling towers & degradation of fuel storage canisters [Also follow—Closed Cooling item]
SC-3	Long Term Seismic Program	Schedule for 1Q15
SC-4	Monitor Tsunami Risk Analysis	Schedule for 1Q15 Rev. tsunami design basis & PRA
SC-8	Sewell Report	Open new item
LD-6	Observe operator license requal. class	Schedule for 2Q15FF
CL-3	Review Bechtel Closed Cooling Study	Coordinate/update with CL-5
CL-5	Once-Through Cooling	Continue to follow

BDB-6	FLEX Status	Delete comment on use of video
6/14 PM15	Post Annual Recommendations to Website	Update website

During review of the Open Items List Dr. Budnitz provided an update on the tsunami report prepared in 2003 by Dr. Robert Sewell which was provided to the NRC and is the subject of a request made under the Freedom of Information Act by the DCISC to the NRC which is now under consideration. Dr. Budnitz reported the report by Dr. Sewell was called to the Committee's attention by Mr. David Weisman, the Outreach Coordinator for A4NR.

VI Committee Member Reports and Discussion

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

The Committee members and consultants reviewed and scheduled fact-finding visits and public meetings of the Committee as follows:

Public meetings of the Committee were scheduled and confirmed for: February 4–5, June 16–17, October 21–22, 2015 and February 3–4, 2016.

Fact-finding visits were confirmed and scheduled as follows:

[2014] November 19–20 RJB/RFW; December 2–3 PFP/DCL

[2015] January 21–22 PL/RFW; March 31–April 1 RJB/DCL; April 21–22 PL/RFW; May 19–20 PFP/DCL; July 7–8 RJB/RFW; August 5–6 PFP/DCL; September 29–30 PL/RFW; November 17–18 RJB/DCL; and December 9–10 PFP/RFW.

A short break followed

B. Documents Provided to the Committee:

Mr. Rathie directed the Committee's attention to the list of documents received since its last public meeting in June 2014. A copy of the list was included with the public agenda packet for this meeting.

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

The Chair requested Consultant Wardell to report on a fact-finding visit to DCP. Mr. Wardell reported on the August 13–14, fact-finding visit to DCP with Dr. Peterson. Mr. Wardell reviewed the items and topics reviewed with PG&E during that visit.

- MIDAS (Meteorological Information and Dose Assessment System) Mr. Wardell reported MIDAS is used at DCP in the event of a potential radioactive release to predict the path and magnitude of any radioactive plume and is used in conjunction with EPR2NET, which is used

by control room personnel, and with the Emergency Assessment Response System (EARS) which determines if a radioactive release has taken place at the plant. MIDAS and EARS are used to help DCPD provide protective action recommendations to San Luis Obispo County (County) officials who analyze the data and decide on what actions to take. Once a full response team is in place at the County Sheriff's office the County radio technicians and DCPD technicians in the Uniform Dose Assessment Center (UDAC) jointly take over responsibility for MIDAS and EARS. DCPD is now using the second MIDAS revision in conjunction with its seven meteorological tower and other weather instruments. Mr. Wardell stated MIDAS is an accurate system and its third revision is now available which will permit assessment of multi-point releases. The DCISC team reviewed the use of EPR2NET and the new MIDAS simulation. **He stated DCPD is now in the process of implementing the third revision to MIDAS which should be in place by the end of 2014. He suggested the DCISC follow up on the implementation effort during first part of 2015.**

- **Safety-Security Interface** Mr. Wardell stated DCPD has a formal process to assess security-related changes for their potential impact on the plant's safety features. These reviews are conducted by the Engineering, Maintenance and Operations Departments and are coordinated with the Security Department. The DCISC fact-finding team found the program to be satisfactorily implemented.
- **Spent Fuel Pool Instrumentation**—Mr. Wardell reported the two DCPD Spent Fuel Pools (SFP) presently use level instrumentation which is mounted on the side of each pool. Since the accident at the Fukushima Daiichi Plant in Japan (Fukushima), the NRC has required nuclear power plants to install SFP primary and backup remote access level instrumentation supported by independent electrical power to primary and secondary instrumentation. DCPD is installing two instruments provided by Westinghouse Electric Company in each SFP which will be powered by different electrical bus bars (buses) with backup power provided for 72-hours with a local display within the Fuel Handling Building with the data also being fed to the Control Rooms. Mr. Wardell stated the team inquired, in response to a comment from a member of the public at an earlier public meeting, why a video monitor could not be used and the DCISC team was informed that steam and other limitations make the use of video monitoring impractical for level monitoring purposes. He stated the new instruments will be installed by May of 2015 for DCPD Unit-1 (U-1) and by the end of June 2015 for DCPD Unit-2 (U-2).
- **Emergency Auxiliary Saltwater System (ASW) Layout Test** Mr. Wardell described the function of the ASW as to provide access to the last cooling source, also termed the ultimate heat sink, to cool plant safety-related systems. During the accident at Fukushima a loss of ASW capabilities was experienced and DCPD is creating an Emergency ASW as part of its emergency response strategies and systems, an effort termed "FLEX" which has been developed by the nuclear industry in the aftermath of Fukushima. Mr. Wardell displayed the path of the piping used by the Emergency ASW to tie-in to the existing underground auxiliary service water and water piping and the location of the pumps used to provide suction for the Emergency ASW and he reported the components for the Emergency ASW are stored on trailers and within storage containers. Mr. Wardell reported the Emergency ASW uses diesel-driven pumps and no electricity is required. He reported that while DCPD has laid out the

piping runs using quick joint connections and placed the pump in their locations, because the plant does not yet have the necessary permit water could not be pumped through the flexible piping, which ends in a kelp cage which extends into the ocean. He displayed several photos of the fact-finding team on site inspecting the system components. **Dr. Peterson commented that the environmental permitting requirements which pose an impediment to actually testing the system in the ocean seem unnecessarily burdensome in context of nuclear safety, particularly as DCPD pumps millions of gallons of ocean water through its cooling systems on a daily basis. He stated the DCISC should follow up on the Emergency ASW permitting issue.** In response to Dr. Budnitz' inquiry, Mr. Wardell stated DCPD estimates it would take approximately 128 hours to deploy the Emergency ASW and Dr. Peterson observed that as the Emergency ASW function is to provide water for long term cooling, but in the short term after an accident cooling can be provided by injecting water into the steam generators (SG) and the SFP, this period appears to be adequate. Dr. Peterson stated it is important that training be sufficiently realistic that it generate confidence that under actual accident conditions that would disable the ASW that DCPD would be capable of responding. **Mr. Wardell observed when the Emergency ASW was tested in May 2014 two pumps experienced problems and he recommended the DCISC follow up on future tests of the Emergency ASW pumps.**

- Design Quality Effectiveness Mr. Wardell reported during the seventeenth refueling outage for U-1 (1R17) some field modifications experienced problems with design and corrective actions were taken during 1R18 which proved to be effective, although problems were also experienced during 1R18. DCPD reviewed 64 major and minor projects and determined 92% were accomplished without experiencing design quality problems and the plant is reviewing further corrective actions to improve its design process and **Mr. Wardell stated the DCISC should continue to review issues of design quality released to the field which are now measured monthly by DCPD.** Design quality is presently rated as "White" which is considered to be satisfactory by the plant.
- DCPD Review of Reactor Trip Commonalities—The DCISC fact-finding team reviewed the three reactor trips which have occurred due to flashover events in the switchyard. Mr. Wardell reported a thorough root cause evaluation (RCE) was performed and corrective actions were identified. An outside consultant was engaged to review the issue for commonalities and these were found to include contaminant buildup on insulators, bushings, and lightning arresters on high voltage equipment due, in part, to salt spray and dampness, dust, and particulate deposits due to exhaust products and soot from operation of the emergency diesel generators (EDG). The plant no longer performs washing activities on the insulators or transformers while the plant is at full power but reduces power and isolates transformers during washing. Bushings in certain insulators are also being changed and replaced with bushings that can better withstand contaminants. One transformer has also been moved to a more protected area.
- Seismic Fragility PRA—the probabilistic risk assessment (PRA) of seismic fragility was undertaken to determine the capability of safety-related systems, structures and components (SSC) in the plant to withstand seismic activity. **Dr. Peterson stated that the absolute magnitude of an earthquake is not the most important factor in seismic fragility,**

rather it is the duration and acceleration at specific frequencies which is the principal factor in determining the vulnerability and sensitivity of SSCs, such as electrical equipment and nuclear fuel. There are also questions whether replacement or repair will be possible using FLEX strategies and whether personnel will survive an earthquake and retain the ability to retain access to necessary areas of the plant. **Dr. Peterson observed when a situation departs from a plant's design basis, human error and equipment damage can potentially exceed what was anticipated and training must be provided and guidelines need to remain available and this is an important area for the DCISC to follow.** Dr. Peterson observed a lack of preparation, poor or no access to instrumentation, and poor decision making processes contributed significantly to difficulties experienced during the accident at Fukushima. In response to Dr. Budnitz' inquiry, Mr. Wardell confirmed that in examining and evaluating SSCs at DCPD for unanticipated issues concerning seismic fragility there has been nothing discovered to date which would call into questions the SSC safety during an earthquake. Dr. Budnitz observed the PRA is being undertaken at the request of the NRC and is expected to be completed by mid to late 2015. The NRC is also requiring all nuclear power plants to review and evaluate the seismic capacity of their FLEX equipment and to report the results by the end of December 2014. Dr. Budnitz reported that he presently serves as an advisor to the NRC staff on that program to assist in the review of the FLEX equipment capabilities but he will recuse himself from the review of the submission by DCPD. **Dr. Peterson stated an important issue for the Committee to follow concerns the questions of what are the likely states of damage in a plant that could follow a BDB earthquake event and whether the impact of that damage on access and personnel is going to be adequately addressed in context of the FLEX review.**

- **NFPA-805 Update** Mr. Wardell reported nuclear power plant fire regulations now fall under Title 10 Code of Federal Regulations (CFR) Part 50 Appendix R which he described as employing a deterministic approach to fire safety. The National Fire Protection Association (NFPA) has now developed Standard 805 Regulation, a standard which retains some deterministic aspects but also adds risk-informed performance standards which provide what Mr. Wardell described as a more realistic look at fire protection. Using the 10 CFR App. R regulatory scheme DCPD has identified 105 separate and distinct fire areas. DCPD made the decision to transition to NFPA-805 regulations and the eight modifications required for this transition for each unit should be complete by their twentieth refueling outages.
- **Reactivity Management** Mr. Wardell reported the DCISC team reviewed this topic, which measures the fractional change in neutron population from one neutron generation cycle to the next as a measure of reactivity and he described this as a direct measure of nuclear safety. He reported the DCISC team found the DCPD procedures to be satisfactory including the role and function of the Reactivity Management Leadership Team which reviews monthly those events which impact reactivity. U-1 is currently in "White", or satisfactory status, while U-2 is in "Yellow" status which indicates improvement is needed. Mr. Wardell reported the "Yellow" status for U-2 was due to the three flashover events which resulted in reactor trips and because a 12-month rolling average is used to measure reactivity events, both units should be in "Green" status by the end of October 2014.
- **2R18 Outage Plan**—the fact-finding team reviewed the Outage Safety Plan which is

developed to allow the outage to proceed safely as plant systems and components are taken out of service or tested and to ensure defense in depth is maintained at all times so as to prevent accidents and to mitigate any that occur. The DCISC representatives found the Outage Safety Plan for 2R18 to be satisfactory.

- Meet with NRC Resident Inspectors—the DCISC representatives met with both NRC Resident Inspectors to discuss the Bechtel Assessment concerning the proposal for the elimination of once-through cooling at DCP, the seismic hazard studies, and the review of FLEX equipment. The DCISC representatives also discussed the Committee’s efforts to obtain a copy of the 2003 Tsunami Study prepared by Dr. Robert Sewell
- Chemistry Program—Mr. Wardell reported the DCISC fact-finding team reviewed the Chemistry Program which is used to manage water chemistry in primary and secondary plant systems, to minimize corrosion and biofouling, and to manage reactivity through the use of boron the Reactor Coolant System (RCS). The Chemistry effectiveness index measures various parameters of the Chemistry Program and Mr. Wardell reported U-1 is currently in “Green” status while U-2, due to iron in the SG secondary side caused by starting up the unit, is presently in “Yellow” status.
- DCISC Member Meeting with DCP Site Vice President - Dr. Peterson reviewed the items reviewed during the fact-finding meeting.

Mr. Bill Dineen, a member of the audience, was recognized. Mr. Dineen remarked that installation of rooftop solar photovoltaic units could make DCP unnecessary in the future.

Ms. Rochelle Becker of A4NR was recognized. She stated the issue of the reactor trips at DCP was presently under review by the CPUC in its Energy Resource Recovery Account (ERRA) proceedings and she reported that the Office of Ratepayer Advocates has posed some excellent questions which the DCISC should review. **Dr. Peterson stated the Committee would review the ERRA briefs cited by Ms. Becker.**

Ms. Sherry Lewis of MFP was recognized. Ms. Lewis inquired whether the flexible piping used with the Emergency ASW might be used for the entirety of the Emergency ASW piping if necessary to run piping around obstructions. She further inquired whether PRA analysis leaves out loss of coolant accidents from consideration and she observed that there may be a number of considerations which are not part of any PRA analysis which should be considered. Finally she inquired whether the reactivity management discussed by Mr. Wardell occurs inside Containment. Mr. Wardell replied that there is sufficient piping available, both solid and flexible, to cope with obstructions and flexible piping is required for the piping run which extends into the ocean and, if necessary, flexible piping could be inserted between solid piping runs. Mr. Wardell confirmed that the reactivity management he discussed during his presentation occurs entirely within Containment. Dr. Budnitz confirmed that PRA analyses include loss of coolant accident scenarios of all different magnitudes as such events are possible initiating events for an accident.

Upon a motion by Dr. Budnitz, seconded by Dr. Lam, the August 13–14, 2014 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 Linnen to report on the next fact-finding visit to DCP. Mr. Linnen reported on the June 24–25, 2014, fact-finding visit to DCP with Dr. Budnitz. Topics reviewed with PG&E during that visit included the following.

- **Trend in NRC Violations on Work Practices and Human Error**—Mr. Linnen reported this review was a status check on an issue that had previously been reviewed in January 2014 and stemmed from three station level human performance events that occurred during the 4th quarter of 2013. The fact-finding team noted during a review this past June that the station had taken action on this issue which included more observations of work activities by supervisors and managers and examining lower level events more deeply for causal factors of human performance problems. Each work activity was being assigned a level of risk to maintain a consciousness of the potential impact of the work activity. The DCISC representatives noted from review of station performance reports that improvement was being made. The station's most recent Plant Performance Improvement Report indicates that DCP has not experienced a significant station level human performance event since February of 2014. Also, lower level events are being reported and tracked, and are referred to as Department Level events. **During January through March 2014 the station experienced 16 of these lower level human performance problems, and during April through June there were 3. Mr. Linnen remarked the Committee should review this topic again during the 1st quarter of 2015 to see whether this improvement is being sustained.**
- **Nuclear Fuel Performance**—the fact-finding team reviewed this as a periodic review regarding the station's status with regard to maintaining the integrity of the nuclear fuel and preventing radioactive fission products from leaking from the fuel into the reactor coolant. In this regard Mr. Linnen observed the industry has been implementing a program aimed at achieving zero fuel leaks that was developed by the Electric Power Research Institute. The DCISC representatives noted in the review that DCP has experienced no fuel leaks since 2011.
- **Management of Online Maintenance Risk**—Mr. Linnen reported this activity is undertaken by the plant to ensure that conducting maintenance on equipment during plant operation doesn't pose an unacceptable risk to nuclear safety. To this end, nuclear organizations screen desired work activities for their potential risk to the plant. This program has become increasingly refined over the years so that the workers themselves are becoming more knowledgeable of the potential impact they might have on plant operation through their work. He stated station performance in this area was rated as "Green", or healthy, for every month in 2014.
- **Outage Planning and Execution Action Plan**—Mr. Linnen reported the fact-finding team examined DCP's performance during 1R18 compared to its goals for the outage, as well as to

previous outage performance. Key aspects were that the station experienced no station level human performance events and only 4 department level human performance events in 1R18 compared to 13 department level events in the prior refueling outage. Spent fuel cooling was interrupted for several minutes during 1R18 due to a disturbance in the electrical grid and the pump was then manually started by Operations. Department level human performance during 1R18 was the best in the station's history. With regard to industrial safety, there were no lost time injuries and no recordable injuries during the outage. There were 13 events of personnel receiving radioactive contamination compared to the goal of 16, and the outage was completed in 32 days compared to a goal of 33. Mr. Linnen reported a significant number of major work activities were conducted as planned during refueling outage 1R18, including replacement of a vital battery, polar crane modifications, containment fan cooler unit (CFCU) damper modifications, and overhauls of the motors of a circulating water pump and a Reactor Coolant Pump. One problem that arose during return to power was due to the misalignment of the pump shaft and motor shaft of Reactor Coolant Pump 1-3 by the vendor which resulted in abnormal vibration and the need to take Unit 1 offline for 10 days shortly after startup in order to realign the pump and motor shafts.

- **Management of Single Point Vulnerability**—Mr. Linnen stated this topic pertains to any component whose failure by itself could result in a reactor trip, a turbine trip, or a decrease in power of greater than two percent. He observed that this may appear to be primarily an operability issue because if such a component fails, the unit shuts down or reduces power. However, a clear objective from a safety standpoint is to avoid any unanticipated transients. Dr. Budnitz remarked on the need to examine and understand why things go wrong in order to learn more generally about maintenance and follow up procedures. Mr. Linnen agreed and stated the issue of identifying single point vulnerabilities generated industry-wide efforts in the time period 2002-2006 and involves organizations such as the Electric Power Research Institute (EPRI) and the Nuclear Energy Institute (NEI). Mr. Linnen stated one example of a single point vulnerability occurred in 2013 and stemmed from the review of the auxiliary and startup transformers, where the transformer oil was evaluated to ensure that it was in fact meeting industry standards. A similar situation involved the single phase generator transformers when one transformer was found to have high moisture and oxygen in the oil which resulted in the replacement of that transformer.
- **Critical Equipment Clock Resets**—Mr. Linnen discussed the team's review of Critical Equipment Event Clock Resets which are reflected in:
 - Reactor trips, either automatic or manual.
 - Events requiring the submission of a Licensee Event Report to the NRC.
 - A Limiting Condition of Operation (which is a situation that would require the plant to shut down or derate within 24 hours).
 - Unplanned reduction in power of more than two percent.

He remarked that since these types of events occur infrequently performance is assessed based upon the numbers that occur on a rolling 12-month basis. That is, every month, the number of

events in the prior 12 months is tabulated. At the time of the DCISC review, looking back at that time on each month of the prior 12 months, it was noted that the plant had been experiencing between 9 and 11 resets during each of the rolling 12-month periods. However, Mr. Linnen reported most of those events occurred in the early months of the most recent 12-month period, and considerable improvement was noted when moving forward through that period. During the prior nine month period at the time of the DCISC review there were only four resets (which would translate to between 5 and 6 in a 12 month period) and during the most recent six month period there were two resets (i.e. annualized 4 events per 12 month period). Mr. Linnen stated the fact-finding team believes DCPD recognizes that equipment aging can be a factor in the types of events that result in clock resets, and the station is increasing its efforts to monitor and document aging and degradation mechanisms.

- **Auxiliary Feedwater System Health**—Mr. Linnen reported the Auxiliary Feedwater System (AFW) is a safety-related system that is relied upon to prevent damage to the nuclear fuel and to prevent over pressurization of the RCS in the event of transients such as a loss of normal main feedwater or a pipe rupture on the secondary side. The station's color coding system for plant system health rated U-1's AFW System as "White" and U-2's as "Green". He remarked the reason for U-1's "White" rating pertains to the new auto/manual hand stations at the Hot Shutdown Panel as the demand button needs to be jogged in order for the controller to respond if demand is in the range of 0-10% or 90-100%. U-2 does not have this problem. The DCISC fact-finding team concluded that the few existing system health issues do not appear to be significant enough to negatively affect system reliability or plant safety. **Nevertheless, considering the significance of this safety system, the fact-finding team felt that DCISC should conduct its next review of the AFW system prior to the end of 2015.**
- **2013 Annual Radioactive Effluent Release Report and Annual Radiological Environmental Operating Report**—Mr. Linnen summarized this topic and reported for 2013, the station's releases of radioactive gases and liquids would each provide a calculated whole body radiation dose to a person who resided continually at the site boundary throughout the year that amounts to less than two one-hundredths of one percent of the Technical Specification (TS) limits, and ambient radiation levels did not change, and were within the pre operational range throughout 2013.
- **Plans to Address 230 kV System Issues**—Mr. Linnen reported this system is DCPD's primary source of power to its vital electrical busses in the event of a loss of a station turbine generator. The station's Emergency Diesel Generators (EDGs) are the backups to the 230 kV System. He reported an emerging issue is that as the electric demand in the region increases this could cause voltage variations on the 230 kV system, which could affect the system's reliability if called upon to supply the plant with vital electric power. To address this DCPD has been engaged in a number of activities. One is to install high voltage stabilizing devices in the 230 kV switchyard. Another is to transfer non-essential 4 kV loads away from the 4 kV vital busses. The station is also pursuing a license amendment which seeks NRC approval to replace the current undervoltage relays with more robust relays, and plans are also in the works to install Voltage/Amperage/Resistance (or VAR) Compensators for stabilizing voltage in the 230 kV switchyard. Mr. Linnen remarked the DCISC representatives concluded that the

station's approach to this issue and the options being examined appear reasonable, and the Committee should continue to follow this issue.

- **Component Mispositionings**—Mr. Linnen reported that over the years, the station has done a very good job of avoiding significant component mispositionings that would have had a severe or major impact on the facility. Lower level events appear to be under better control having decreased in number steadily. These improvements have been attributed to training and greater emphasis during shift briefings and pre-job briefings.
- **Operations Training and Time Critical Operator Action**— Mr. Linnen reported that the training that was observed on this topic was exemplary. The instructor was highly knowledgeable with the subject and with the training material.
- **Engineering Training**—The DCISC fact-finding team also observed this training session which was conducted by an instructor who was presenting this material for the first time. The session was primarily a lecture which the DCISC team understood took longer than was expected and did not stimulate the degree of involvement of the engineers as the team found with the Operations training.
- **Meeting with NRC Resident Inspector**—Dr. Budnitz reported he met with both the NRC resident inspectors and discussed the DCISC's efforts to obtain the release of the tsunami report prepared in 2003 by Dr. Robert Sewell.
- **DCISC Member Dr. Budnitz Discussion with PG&E Chief Nuclear Officer.**

The Chair requested Consultant Linnen continue his report with a report on the next fact-finding visit to DCP. Mr. Linnen reported on the September 17–18, 2014, fact-finding visit to DCP with Dr. Lam. Topics reviewed with PG&E during that visit were reviewed as follows:

- **Maintenance Department Performance**—Mr. Linnen stated during this most recent visit the DCISC representatives learned that managers and directors have continued observations of workers on a periodic basis and reported the results to the Plant Manager or Operations Manager. The results of these observations have led to a reduction in the number of outage maintenance rework activities from 92 in 2012, to 26 in 2013, and to 19 in 1R18.
- **Results of Recent Audits by Quality Verification (QV)**—Mr. Linnen reported this topic is routinely reviewed by the Committee to gain insights on the station's performance from QV's perspective. Mr. Linnen remarked that QV is extraordinarily familiar with the NRC requirements and QV audits are often validated by NRC audits. The Quality Assurance (QA) auditing group consists of full-time QV personnel. The QV's assessment group looks more broadly, without focusing necessarily on NRC requirements, and consists of station line personnel who are loaned temporarily to QV and who evaluate performance with respect to management standards that strive to go beyond the federal requirements. This additional approach provides a benefit to the station by providing the line organization with a better understanding of desired standards of performance. **The DCISC team suggests that the Committee follow up on an audit finding that the station's performance with respect to entries into Limiting Conditions of Operation had been "Red", or unsatisfactory for most months since June 2013.**

Mr. Linnen remarked that the remaining topics that he would discuss were selected because they had not been reviewed by the DCISC for a number of years, rather than because of any noted performance deficiency.

- Self-Assessment Program—The Self-assessment Program itself was last reviewed in November 2011, and Mr. Linnen reported its structure appears to have remained essentially intact since that time. The results of these assessments are included in the station's monthly Plant Performance Improvement Report and the DCISC fact-finding team concluded that the program appears to be in continuing good health and the program reports well designed and well structured. It was determined that the DCISC need not conduct another status check on this program as a whole for at least another two to three years, unless dictated by future performance issues.
- System Engineering Function—Mr. Linnen stated this is a very broad topic, and the team's review consisted of an overview of this function as a whole rather than as an examination of a particular system. It was last reviewed in this aggregate manner back in 2011. The fact-finding team concluded that the System Engineering Function continues to be a very useful mechanism for documenting and discussing system issues, identifying priorities, tracking progress, and helping to gauge overall plant performance.
- DC Power System Health—Mr. Linnen reported this is a battery powered system that is kept charged with dedicated battery chargers. The information recently obtained by the DCISC showed that the systems in both units were rated "Green". In addition, all of the individual performance categories for both units, such as Reliability, Material Condition, and Operations Concerns, were rated "Green" as well. There was one performance sub-category in both units that was not rated "Green". That sub-category was Aging Issues Affecting Reliability. This pertains not to battery cells, but rather to circuit breakers in the system that are undergoing replacement due to aging (grease hardening issue which can affect reliability). Station's plans are to complete the replacements by the end of refueling outages 1R19 and 2R19 and Mr. Linnen reported the system remains completely functional.
- Reactor Coolant System Health—The DCISC last reviewed this system in May 2009. Since that time U-2 suffered a seal failure of Reactor Coolant Pump 2-2 which took U-2 offline during 2R17 and when U-1 was coming out of 1R18 there was excessive seal leakage from Reactor Coolant Pump 1-3 due to misalignment of pump and motor shafts. **Mr. Linnen reported that the fact-finding team concluded that DCISC might consider conducting another fact-finding visit on this system during the next 12 months.**
- Vibration Monitoring Program—Mr. Linnen observed this topic was last reviewed in 2011, and is part of the station's Predictive Maintenance Program, which itself is part of Reliability Centered Maintenance. The plant has permanent vibration sensors with remote Control Room readouts on its Reactor Coolant Pumps, Turbine Generators, and Main Feedwater Pumps. There are also about 300 other components that are monitored with portable vibration detecting equipment, mostly on a monthly frequency. The DCISC representatives were provided a copy of the station's Predictive Maintenance Watch List, which listed components with elevated vibration, components with elevated temperatures, and abnormal

oil samples, and the timetables for acting on the few vibration issues appeared to be reasonable. Mr. Linnen reported the total list had several dozen entries, and about one third of them pertained to vibration.

- **Compressed Air System Health**—Mr. Linnen remarked the next topic covered during the fact-finding concerned the Compressed Air System which was last reviewed in 2011. The system serves both units and is divided into two subsystems: Instrument Air and Service Air. Three Plant Air Compressors (PACs 5, 6, & 7) serve as the source of air for Instrument Air. These compressors are rotated one at a time, each for a week, to serve the plant. Because the Compressed Air System is not fully safety-related the valves required for safe shutdown are supplied with an additional source of air from the Backup Air/Nitrogen System. This is a passive pressure system of a Class 1 design with air or nitrogen accumulators located with and dedicated to each safe-shutdown valve. These are seismically designed to resist earthquakes and require no electrical power. Each is designed with capacity adequate for valve operation to assure safe shutdown. Four additional full-capacity compressors (PACs 0-1 through 0-4) are maintained on site and are intended to serve the system at any time when called upon, and are also to serve in a secondary role during refueling outages. However, as the fact-finding team understands, the compressors have not operated during the past 15 to 20 years. During outages, two additional diesel driven air compressors are brought onsite and are the primary source of compressed air during the outages. The System Health Report rates the system as “Yellow” or deficient. According to the grading system a grade of “White” could have been justified but the rating was purposefully downgraded to call attention to recent reliability problems of the three primary compressors. Mr. Linnen reported PAC 0-5 failed due to various components reaching the end of their useful lives and producing abnormal noise while operating. For part of the time when PAC-05 was unavailable, PAC-07 was also unavailable due to an oil leak from a degraded hose. This caused both operating nuclear units to rely on only one compressor, PAC-06. In addition, the Health Report noted that PAC-07 and its instrument panel are located outside the Turbine Building. In particular, Mr. Linnen stated the instrument and control unit is facing in a direction that exposes the panel directly to the sun and also to rain and saltwater impingement. Consequently, the instrumentation, controls, indicating lights, and temperature trip switches are unnecessarily degrading due to the harsh environment and the controls require frequent replacement. On another occasion PAC-06 would not shut down automatically on compressor high discharge pressure, which would lift the system relief valves. **The DCISC fact-finding team concluded that although the Compressed Air System has remained operational and is served by a Back-up Air Nitrogen System for the pneumatically operated safe-shutdown valves, it has experienced a number of challenges to operability, including equipment aging, deterioration, and failure. Also, installed equipment that could serve as backups to the three primary air compressors has apparently not operated for some time. The station has recognized and documented these issues and has plans to address them. Based on the information that was provided, the fact-finding team concluded the Committee should take time to reexamine this system more closely, including a system walkdown, in the near future.**
- **Margin Management Program**—The DCISC last reviewed this system in 2011. Margin is a concept and a principle defined as conservatism, that is, a safety factor, design factor, buffer,

or cushion included in the design and analysis of every plant structure, system or component (SSC) from a procedural, design, operations and maintenance standpoint in order to accommodate a variety of factors. Putting all of this into practice requires the involvement of SSC engineers, the Margin Management Subcommittee, and DCP's senior station managers comprising the Plant Health Committee. Overall Mr. Linnen stated the program and its infrastructure (procedures and processes) and implementation were rated as "green," or healthy at the time of the review. However, the Equipment Cornerstone was rated as "Red," or unhealthy, due to multiple open margin issues during the last 12 months. Examples included a corroded firewater header between the units, the debris loading margin for the Residual Heat Removal System, and the loading margin for EDGs for both units. **Mr. Linnen stated the fact-finding team concluded the DCISC should focus on the Margin Management Program during a future review.**

- Meeting with NRC Senior Resident Inspector.
- DCISC Member's Discussion with DCP Site Vice President.

Following Mr. Linnen's presentation, Mr. David Weisman of the A4NR was recognized. Mr. Weisman asked for confirmation from the DCISC that a formal request under the Freedom of Information Act has been made by the DCISC of the NRC for release of or access to the tsunami report prepared in 2003 by Dr. Robert Sewell. Dr. Budnitz confirmed that such a request had been made and that a copy, along with a copy of an earlier letter to the NRC Resident Inspector for DCP, was included in the correspondence with the agenda packet for this meeting. Mr. Weisman then inquired whether, if the report were released in a form restricted to review by the DCISC, whether the DCISC would be allowed to share the report with PG&E. Dr. Budnitz responded that the Committee would review the conditions under which review might be granted with its Legal Counsel's office prior to accepting the report with restrictive conditions. Dr. Lam stated that he appreciated Mr. Weisman bringing the report to the attention of the DCISC as it was his belief that the matter advances the Committee's safety agenda.

Upon a motion by Dr. Budnitz, seconded by Dr. Lam, the June 24-25 and September 17-18, 2014 Fact Finding Reports were approved and their transmittal to PG&E authorized.

The Chair requested Assistant Legal Counsel Rathie to report on administrative, regulatory and legal matters. Mr. Rathie reported that the office of legal counsel has been involved with a number of administrative matters stemming from the Committee's public meeting on August 8, 2014, including responding to inquiries from members of the public and making the draft of the Evaluation of the Bechtel Addendum to the Final Assessment available on the DCISC website, in draft form and in a form which shows changes from the earlier draft of August 11, 2014, which was posted to the DCISC website after the public meeting on August 8, 2014. Mr. Rathie reported information has been received concerning a meeting of the CPUC's Independent Peer Review Panel (IPRP) on October 23, 2014, in San Francisco, California. He reported that he accompanied Dr. Lam to a meeting with the CEC Chair, the Chair's Chief of Staff, CEC Senior Nuclear Policy Advisor, and the CEC's Executive Director on October 1, 2014, in Sacramento, California. He remarked that the Governor's office announced the reappointment of Dr. Peterson on September 10, 2014, to a three-

year term on the DCISC from 2014 to 2017. The CPUC is now advertising for candidates for the CEC appointment to the DCISC for the 2015-2018 term. Mr. Rathie concluded his remarks by reporting that visits to the DCISC website (www.dcisc.org) averaged 39 visitors during the Committee's public meetings in the period of the 24th Annual Report (July 1, 2013—June 30, 2014) and during that period the website has averaged 620 unique visitors to the site every month with most visitors coming from (in order): the United States, Ukraine, Finland, France, the Russian Federation, and China.

VIII Correspondence

Copies of correspondence sent and received at the office of the Committee's Legal Counsel since the last public meeting of the Committee in June 2014 were included with the public agenda packet for this meeting.

IX Adjourn Morning Meeting

The Chair adjourned the morning meeting of the DCISC at 12:05 P.M.

X Reconvene For Afternoon Meeting

Dr. Peterson convened the afternoon meeting of the DCISC at 1:30 P.M.

XI Committee Member Comments

There were no comments at this time from the Committee members.

XII Public Comments and Communications

Dr. Peterson invited any member of the public present to address comments to the Committee on topics not on the agenda.

Mr. Bill Dineen, a resident of Nipomo, California was recognized. Mr. Dineen stated he was previously a biology professor at a college and became concerned about what was to be done with nuclear waste in 1977. He was arrested during that year along with others at the entrance to the Diablo Canyon site. He again posed the question of what was to be done with nuclear waste which he described as terrible legacy for future generations. He stated he has inquired of PG&E on how long nuclear waste lasts but has not received a satisfactory answer.

Dr. Gene Nelson, a resident of San Luis Obispo, California, was recognized. Dr. Nelson stated he holds a degree in radiation biophysics and serves on the Physical Sciences Division at Cuesta College and recently served in the engineering faculty at Cal Poly. He stated he is concerned about what he sees as a profit motive by organizations which assert an interest in public safety and he commented that his inquiries have demonstrated fear mongering can be very profitable. He stated he takes particular exception to organizations taking funds provided by electric ratepayers such as the Alliance for Nuclear Responsibility and the San Luis Obispo Mothers for Peace. Dr. Nelson stated the CPUC provides information on compensation provided on its web page as intervener compensation

which is paid by public utilities from funds collected from their ratepayers and he provided information on hourly rates and total compensation for certain individuals.

Mr. Joey Racano, the Director of the California Ocean Outfall Group, was recognized. Mr. Racano stated his group deals with ocean outfall issues and he was speaking on behalf of what he characterized as a priesthood charged with guarding nuclear waste from the present day to the year 1,002,014. He commented the southern sea otter is a species listed as endangered and PG&E in performing seismic testing implanted sea otters with listening devices which have not been removed. He reported a new program is being implemented to measure levels of Strontium 90 in baby's teeth which he remarked can only come from nuclear activities.

Mr. Steve Cleaver, a physics educator, engineer and ocean surveyor and local resident was recognized. Mr. Cleaver stated his belief that there is no real need for the elimination of once-through cooling by DCPD as there is little or no measurable effect on the fisheries as opposed to the huge impact proposed for the terrestrial environment and it appears to him the solution is worse than the problem. Mr. Cleaver stated that the alternatives being proposed for replacing once-through cooling at DCPD would, in his opinion, have a huge impact on plant safety.

Mr. William Gloege, a resident of Orcutt, California was recognized. Mr. Gloege stated he was thankful for DCPD providing clean air and less soot, smoke and ozone than would be produced by electricity generated from fossil fuel. He commented his wish would be that all industries in the U.S. operated with safety records comparable to DCPD. Mr. Gloege stated the opponents of nuclear power he has met are nice people and he directed his comments to those persons asking that they take another look at alternatives to nuclear power because closing a nuclear plant results in many tons of carbon being added to the atmosphere and he remarked this has been the case with South California Edison Company's closure of its San Onofre Nuclear Generating Stations (SONGS). He remarked carbon in the atmosphere is partly responsible for the current drought in California and for global warming effects. He stated there are links between leadership of antinuclear groups and the fossil fuel industry.

Ms. Katherine Perepsky, a resident of Nevada City, California and owner of a timeshare in San Luis Bay was recognized. Ms. Perepsky stated she was a realtor and the presence of DCPD in the local area requires property owners to sign an acknowledgment of the plant presence in the area. She remarked DCPD is situated on seismic faults and after Fukushima it is known that worst case scenarios may occur. Mr. Perepsky stated that she is aware of the emergency siren exercises but is unaware of any plans in place to address evacuation routing. She remarked that since she has been visiting the local area for ten years she has noted a lack of sea life in the area and wonders if that is associated with the presence of DCPD.

Ms. Sherry Lewis, a representative of MFP, was recognized. Ms. Lewis stated that radiation was the worst pollution in the world and much worse than that caused by fossil fuel. She stated that the medical aspects of radiation have not been properly tested and that if a radiological accident were to occur not only the present but future generations would be affected.

Ms. Elizabeth Brousse, a representative of MFP, was recognized. Ms. Brousse stated that the DCISC failed to follow the criteria the authors set forth in the Evaluation of the Addendum by the Bechtel Corporation to its Final Assessment concerning the elimination of once-through cooling at DCP. She stated the Evaluation fails to assess dangers to public and environmental safety of the plant's current use of its once-through cooling system or to address the environmental dangers associated with an earlier proposal by Bechtel which the DCISC has affirmed as safe. She stated information obtained from PG&E concerning levels of salt deposition on sample coupons demonstrated that U-2 main transformer area experiences higher levels of salt deposition than for U-1 which accounts for the major problems U-2 has experienced with flashover events, yet the Evaluation fails to acknowledge that this was caused by the antiquated once-through cooling system which is required by law to be retired. Ms. Brousse stated the Evaluation proves the once-through cooling system is the cause of problems but the Evaluation fails to state this. She inquired whether the flashover problems were a safety problem. She requested that the DCISC provide her with information on how often spray from the once-through cooling system caused flashover events in the last ten years and whether the DCISC sees this as a safety problem. If so, Ms. Brousse demanded that this observation be included in the Evaluation.

Mr. Joe Oliveira, a resident of Orcutt, California was recognized, Mr. Oliveira stated nuclear energy is the safest form of electric energy in the world according to scientific fact.

Ms. Linda Seeley, a representative of MFP, was recognized. Ms. Seeley inquired whether Ms. Brousse's comments should have been made at the time the DCISC considered the Evaluation. **Dr. Peterson stated that would have been in accordance with Committee protocol but that Ms. Brousse's comments would be considered by the Members nevertheless.**

Dr. Peterson thanked the members of the public for their comments and stated the Committee would address answers to some of the questions later in the day.

XIII Action Items (Cont'd.)

Dr. Peterson stated the next item on the agenda was to review potential safety issues associated with various options to address once-through cooling at DCP.

D. Evaluation of Safety Issues ("Evaluation") for Bechtel Power Corporation's "Addendum to the Independent Third Party Final Technologies Assessment of Alternate Cooling Technologies or Modifications to the Existing Once-Through Cooling System for Diablo Canyon Power Plant Addressing the Installation of Saltwater Cooling Towers in the South Parking Lot." (Bechtel Addendum)

Dr. Peterson reported that at the public meeting on August 8, 2014, the public had not been accorded sufficient time to review the Evaluation of the Bechtel Addendum and it was therefore determined by the Committee to defer consideration of the Evaluation to this public meeting. He stated the Bechtel Addendum was in draft form as of August 8, 2014, and it was determined to leave the Evaluation in draft form to allow more time for review but that the draft version of the August 8, 2014 Evaluation had been provided to the State Water Resources Control Board (SWRCB).

Dr. Peterson noted that the effect of having the DCISC review a draft of the Bechtel Addendum resulted, with the permission of the SWRCB, in the Bechtel Addendum being made available to the public earlier than would have otherwise been the case.

Dr. Peterson stated that together with Consultant Wardell as the authors of the Evaluation changes were made to the draft Evaluation for the August 8, 2014 meeting after the meeting. Subsequent drafts were provided on August 11 and October 7. Dr. Peterson briefly described the process used by the Committee to prepare the Evaluation for consideration at the public meetings of August 8 and October 14, 2014, and he stated the original technologies assessment study by Bechtel ("Bechtel Assessment" on which the DCISC provided its review on September 4, 2013, addressed seven different options for changing DCP's once-through cooling system which would essentially attempt to filter or reduce impingement while maintaining the use of seawater for plant cooling and a variety of options that could potentially be implemented in order to use cooling towers in a closed cooling system. Dr. Peterson stated the DCISC concluded in September 2013 that all of the options presented by the Bechtel Assessment could likely be implemented without major impacts on plant safety but there remained key areas of uncertainty regarding their effect on plant reliability.

Subsequent to the release and review of the Bechtel Assessment comments were received including from the group Friends of the Earth (FOE) and Bechtel was directed by the SWRCB Review Committee for Nuclear Fueled Power Plants (RCNFPP) to perform a study of certain additional options which might reduce the cost of construction including moving the location of the proposed cooling towers from north of the plant site to the south, implementing the use of seawater as the coolant makeup rather than using desalinated and reclaimed water, and to change the cooling water temperature to permit the use of smaller cooling towers. Dr. Peterson observed there is a limit where if it were reached the water from the cooling towers would be too warm to be able to be used in the plant's existing Service Cooling Water System (SCW) used to provide heat removal from a wide variety of non safety-related equipment. Therefore, if the cooling towers were made large enough it becomes possible to keep the existing SCW. With smaller cooling towers it would be necessary to build a small once-through cooling system for the SCW which would not require a complete change out of the SCW as the quantity of water needed for the SCW is quite small. Dr. Peterson stated none of the plans proposed for cooling towers at DCP call for changing the use of seawater for the Auxiliary Saltwater System (ASW) which is a safety-related cooling load. Dr. Peterson remarked the principal purpose of the proposals to eliminate once-through cooling at DCP is to reduce the total amount of water used to cool the plant by eliminating the use of seawater to cool the condensers which he described as having a very large thermal load.

Dr. Peterson observed that with reference to the Bechtel Addendum and the Bechtel Assessment there are various permutations of all the proposals which might be employed in various combinations. He stated Mr. Bill Powers, an engineering expert engaged by FOE, has also proposed locating the cooling towers at a higher elevation thereby reducing the amount of excavation required. Dr. Peterson stated the Evaluation included consideration of whether the proposed changes would require DCP to obtain a license amendment from the NRC and in this respect the Evaluation disagrees with Bechtel's position that the 10 CFR 50.59 process would be adequate to

allow plant modifications but Dr. Peterson observed that only the NRC could make such a determination. Dr. Peterson stated that the implications of modifying the plant include assessment of the impact on a number of safety-related systems including the flooding analysis for the Turbine Building, analyzing the impact on the ASW and he stated that in DCISC's judgment it is likely that the NRC would require a license amendment.

Dr. Peterson stated the potential impact of placing cooling towers to the south of the plant site involves the impact upon normal access and upon a number of plant support facilities that are now located in that area. He stated the southern option would have a larger impact upon plant operations than if the cooling towers were located to the north of the plant site. The Bechtel Addendum proposes that the majority of construction would occur during a 6.3—6.5 year period during which both units would remain in operation. The final connection of the cooling towers would require excavation within the protected area and temporarily disabling and rerouting the ASW and replacing the fuel storage tanks for the EDGs during a dual unit outage which would extend for 2.3 years.

Dr. Peterson observed the Evaluation did not address the cost estimates or the schedule but focused upon safety impacts on operations, emergency response, and security. He stated the closest analogy to what is proposed is offered by the security-related modifications to the plant which were undertaken after September 11, 2001, which the DCISC has closely followed. Dr. Peterson observed security and safety aspects can sometimes be in conflict as security involves limiting access while safety involves assuring access and egress. He stated DCPD has a process for reviewing the implications of such changes which includes creating temporary barriers to assess whether the restrictions proposed would cause problems related to operability or safety.

Dr. Peterson observed such a review for the modifications proposed in the Bechtel Addendum and Bechtel Assessment would be substantially more challenging but would be lessened if the cooling towers were located to the north of the plant site. The needs created by a southern siting for the cooling towers would also require changes to safety-related systems including installation of new cooling water ducts which enter the protected area from the south and create impacts on the design of the ASW, which is the primary safety-related heat sink, as well as on operability of the EDGs because of impacts on underground piping and the need to replace the underground diesel fuel storage tanks. Bechtel has also proposed replacement of the EDGs by temporary emergency diesel generators which would be challenging due to the fact the EDGs must be protected from external missiles and other threats. Dr. Peterson stated the Evaluation recommends a probabilistic risk assessment be done to quantify these potential impacts. He commented that there could be some positive impacts on plant safety and reliability through the installation of cooling towers including reducing or eliminating periodic problems which have occurred with circulating water pumps due to impingement on the Traveling Screen System which have now been addressed at DCPD by implementation of winter storm watches and the reduction of power during winter storms, thereby making the consequences of a plant trip less severe, as well as the installation of a bubble curtain to protect the Circulating Water System from intrusion by fish and sea life.

Dr. Peterson reported the Evaluation considered the potential safety impact of using seawater for

evaporative cooling in place of fresh water. He reported a study by the CEC reviewed the use and effect of high salinity water used in cooling towers on accelerated corrosion on unprotected metal surfaces on buildings and equipment. This report concluded that nearly all plants with high salinity cooling towers, both natural and forced draft, have encountered accelerated corrosion. Dr. Peterson reported that use of saltwater cooling towers with drift elimination at DCPD is expected to release approximately 830 metric tons of salt each year in aerosol form and a key question involves where that salt will be deposited on the plant site. Dr. Peterson reported data shows that the majority of the time the wind would carry a plume from southern-sited cooling towers to the south and away from the plant but 11% of the time the wind would carry the plume to the north and over the plant, while 23% of the time the plume would be expected to rise in light to no wind conditions.

DCPD is once again collecting data on current salt deposition rates at various locations and it appears the current rate of deposition is approximately 1.5 or 2 metric tons per year. Dr. Peterson stated modeling tools could be used to develop more accurate projection for salt deposition which would be important tools in reviewing the impact on systems and equipment which use large volumes of air such as the EDGs, the ventilation systems, and the dry cask spent fuel storage systems as well as upon the reliability of high voltage equipment including the switchgear in the 230 kV and 500 kV Switchyards where a simultaneous failure would lead to a loss of offsite power. Dr. Peterson observed that most of the flashover problems experienced by U-2 appear to be associated with drift from the Outfall which is pulled by the wind between the Administration Building and the Turbine Building and the use of freshwater could reduce or eliminate that issue. Use of saltwater cooling towers could increase deposition rates substantially from the present and periods of adverse weather with higher deposition rates could increase flashover events and this is subject to analysis through modeling. Dr. Peterson stated the Evaluation reviewed the use of high salinity cooling towers by the Palo Verde Nuclear Generating Station (Palo Verde) in Arizona which uses reclaimed water from the City of Phoenix in a desert environment with different wind and humidity than at DCPD and Palo Verde produces a lower salinity release, containing approximately one-half the amount of salt that is forecast for DCPD if saltwater cooling towers were built. Dr. Peterson stated the Evaluation concludes that more study concerning the implications of using saltwater cooling towers is required.

Dr. Peterson reported the Evaluation reviewed the use of smaller cooling towers to reduce cost and address siting issues and determined their principal impact would be an additional derating of the plant's power output and for the southern siting option the inability to modify the SCW and therefore a separate once-through system to provide water to the SCW would be required operating essentially as it does now, while circulating water that would go to the turbine condensers, the dominate use of cooling water, would be shifted to water from the cooling towers. He reported the Evaluation did not identify substantive negative impacts on safety from the various different impacts on condenser back pressure.

With reference to placing the cooling towers at a higher elevation, Dr. Peterson reported the principal impact would be on the pressures at which the condenser cooling water piping would operate together with an increased risk from leaks and flooding which should be studied and he

remarked the DCISC has added entries to its Open Items List to review several of the items identified in the Evaluation including the current flooding design basis and how that might change and impact the Turbine Building and the EDGs.

Dr. Peterson summarized the recommendations from the Evaluation which include:

- Evaluating the impact of southern siting for cooling towers on plant security, emergency response and safety capabilities.
- Analyzing how extensive an NRC review might be necessary, specifically regarding the replacement of the ASW underground piping.
- Performing a probabilistic risk assessment to quantify the impact of cooling towers on the risk of transients and any reduction in safety margins.
- Evaluating the impact of salt deposition on various equipment including periods of adverse weather conditions.

Dr. Lam commented that Dr. Peterson and Consultant Wardell had performed a tremendous piece of work on an exceptionally tight schedule and this was accomplished within the requirements of California's Bagley-Keene open meeting laws. Dr. Lam remarked that much more work needs to be done by Bechtel and he suggested that the title of the draft Evaluation be revised to indicate that the Evaluation was preliminary as the DCISC does not yet have enough information to reach a final determination and more observation and study is required.

Dr. Budnitz remarked the DCISC review of the Bechtel Assessment approved by the Committee at its meeting on September 4, 2013, concluded that more information was required to evaluate the seven options in the Bechtel Assessment but the DCISC review concluded that with more information if the design and safety analysis were done properly it was likely any one of those seven options would meet the NRC's safety review criteria. Dr. Budnitz stated that the Evaluation of the Bechtel Addendum reviewed the use of cooling towers located on the south side of the plant and use of saltwater rather than fresh water for cooling and stated that it was his belief that if done properly either or a mix of those proposals could likely be licensed by the NRC. Dr. Budnitz observed that in its September 4, 2013 review of the Bechtel Assessment and in the current Evaluation of the Bechtel Addendum the criterion used by the DCISC was that any alternative proposal should provide at least approximately the same level of overall nuclear safety and any degradation of safety, even if the proposal met the NRC safety criterion, was unacceptable. Dr. Budnitz stated that some features of the newly proposed designs would likely improve safety by addressing problems with the existing once-through cooling system which, like all systems, has failure modes which produce the potential for accidents. If the replacement technology does not suffer from worse problems safety could be improved. Dr. Budnitz stated making such a determination requires analysis of a complex mix of frequencies and consequences of accidents and it is on that basis that the DCISC offers its recommendation that not enough design and analysis has been done to answer questions about the level of safety that would be achieved by the proposals provided in the Bechtel Assessment and Bechtel Addendum. Dr. Budnitz stated the DCISC in its reviews and evaluations did not address issues of cost or schedule except as insofar as

scheduling issues could impact safety. He stated it is important to understand how nuclear safety analysts analyze the safety of a plant which is a different process than that used by the NRC to determine if a plant meets the minimum levels of safety necessary to obtain a license to operate. Dr. Budnitz observed all U.S. nuclear plants need to be better than the NRC licensing criteria and all the plants currently running exceed the NRC criteria. Dr. Budnitz remarked that when issues occur at DCPD such as the flashover events the report of those events is reviewed by nuclear operators around the world. Three events at DCPD involved flashovers in the last approximately two years and the DCISC believes that any new design must result in much fewer of these flashover events in order to be safer than at present. Before this can be determined more analysis is required to obtain an NRC license for a new design and even more analysis is required to determine if the new design would meet the DCISC's safety criterion that the plant must remain at least as safe as it is now. Dr. Budnitz remarked there is a community of safety experts who would be involved in scrutinizing any proposed new design and this is a positive benefit for the analysis and ultimate determination concerning safety of the design proposals.

Dr. Peterson requested comments from members of the public.

Mr. Joey Racano representing the California Ocean Outfall Group was recognized. Mr. Racano stated the safety issues identified by the State of California are issues which the state wants to see DCPD follow through concerning and it is time to upgrade to the best available technology. He stated that the plant has intruded on the ocean environment and that if salt is a problem the plant should be removed from the coast where it would not need to use ocean water for cooling purposes. He observed DCPD is constructed upon faults and there is no reason for the plant to be so located, as doing so is dangerous as is anything which is proposed to extend the operational life of DCPD. He requested a few moments of silence in recognition of the 25th anniversary of the Loma Prieta earthquake. Mr. Racano directed attention to the issue of what he described as en echelon faults which he stated are parallel faults which can interact to give vertical acceleration to seismic energy sufficient to overwhelm DCPD's safety features despite any retrofitting. He stated his group believes DCPD should be upgraded to the best technology and this should be done without the ocean intruding on the nuclear plant as it is only a matter of time until another earthquake similar to Loma Prieta occurs and such an event would be a calamity as there is an overabundance of nuclear waste stored at DCPD on earthquake faults.

Mr. Bill Powers, an engineer speaking on behalf of Friends of the Earth, was recognized. Mr. Powers stated that a comment letter he submitted to the Committee was in draft form and would be revised. He also remarked he misunderstood the concern expressed in the Evaluation concerning flooding. Mr. Powers stated his belief that the conclusion in the Evaluation that use of saltwater evaporative cooling by cooling towers located to the south of the plant would have a sufficiently negative impact so as they might not meet the DCISC safety criterion should be modified to recognize and reflect several other statements in the Evaluation that certain questions could not be answered due to lack of information, study and analysis and a reference to that additional study should be included in the Evaluation's conclusion.

Mr. Powers reported he provided information to the RCNFPD regarding a Bechtel paper on

seawater cooling which listed more than 30 operational reactors worldwide which use seawater cooling tower. Dr. Peterson observed that the issue involved the use of high salinity cooling water not necessarily seawater and that the issue of salinity in the Bechtel report was not well defined. Mr. Powers reported that the Hope Creek Nuclear Plant (Hope Creek) in New Jersey is slightly larger than the individual units at DCPD and uses a saltwater cooling tower located in the vicinity of the Hope Creek plant's high voltage switchyard. He reported that since Hope Creek began operations in 1986 it has maintained a comparable overall operational capacity factor (98% for Hope Creek) to that of DCPD U-1 (92%) and U-2 (88%) and over the period 2010-2013 all three units are at 92%. Mr. Powers stated this represents a 28-year operational case study of a similar reactor to those at DCPD using a saltwater cooling tower located adjacent to the high voltage switchyard. Mr. Powers reported Florida Power & Light Company has applied to the NRC to build Turkey Point Units 6 and 7, which will be approximately the same size as DCPD and will use either reclaimed water or seawater with a slightly higher salinity than is proposed by Bechtel for DCPD. He remarked that in his opinion this demonstrates that there is no insurmountable safety issue related to seawater cooling.

Mr. Powers observed the Evaluation was somewhat selective in its use of conclusions from the 2010 CEC report and that this report includes other conclusions that utility size cooling towers have been designed, built and operated successfully using seawater and recent installations of mechanical draft cooling towers operating with high salinity using corrosion resistant material have operated successfully. He stated the cooling towers proposed by Bechtel for use at DCPD would be made of fiberglass and would not be expected to experience the degree of degradation experienced by cooling towers and basins constructed of concrete. He reported all studies reach the conclusion that there was no significant increase observed in salt concentrations in soils or vegetation in the vicinity of plants using high salinity towers and no symptom of environmental injury. He stated the 2010 CEC report was generally favorable to the use of seawater cooling towers.

Mr. Powers stated the arcing issues experienced by the DCPD transformers were caused by the impact of the higher salt deposition rate on U-2 due to prevailing winds taking spray from the once-through cooling Outfall between the Turbine Building and the Administration Building to the U-2 transformer area. He remarked that with the use of cooling towers the impact of salt deposition from the Outfall would be eliminated. Dr. Peterson stated there is a concern with the substantively greater amount of salt produced by the cooling towers and the current release from the Outfall is a more focused release. Dr. Peterson reported wind data shows that approximately 20% of the time the wind would carry the salt deposition from the cooling towers over the plant site and study using modeling is needed to determine how much of the salt would be deposited close to the cooling towers as opposed to elsewhere on the plant site. Mr. Powers agreed that more study is needed and commented the Evaluation did a superb job in demonstrating deposition tendencies at the plant. He stated that the U-1 transformers were not further away from the Outfall than the U-2 transformers and it was only the salt deposition rate due to wind patterns which was the cause of U-2 experiencing more events challenging its reliability. Mr. Powers stated in his opinion it was premature to conclude that salt deposition from cooling towers would be worse than that salt deposition currently experienced at DCPD originating from the Outfall and he asked that the Committee acknowledge this in the Evaluation. Dr. Peterson replied that the Outfall source is relatively small and focused on a limited area of the plant and it is necessary to consider other

systems that do not now experience much salt deposition but might see significantly more if the use of cooling towers replaced the volume of seawater at the Outfall.

Dr. Peterson stated in anecdotal discussion it was mentioned that employees prefer not to park their cars near a cooling tower and Mr. Powers agreed that much of the drift which comes off a cooling tower is deposited in the vicinity of the tower. Mr. Powers stated it was estimated approximately 237 tons of salt would become airborne away from the immediate vicinity of the cooling towers. Mr. Powers stated he was in agreement with the DCISC that more modeling exercises are necessary but he differs from the Evaluation in that he does not believe that a safety determination can be made at present that salt deposition represents a definite negative impact from saltwater cooling towers. Mr. Powers stated the Evaluation has set the DCISC against Bechtel's conclusion that the salt deposition issue is an operational and maintenance issue and he opined this is based on a wealth of information from Bechtel's experience and he questioned how the DCISC could be in a position to question Bechtel given Bechtel's experience in designing, building, and operating facilities which use saltwater cooling towers. Dr. Peterson observed it is difficult to make direct analogies between DCP and other plants due to more complex wind patterns at DCP as compared to other plants located in simple topography without proximity to mountains and the ocean. Mr. Powers stated he gives credit to the Evaluation for acknowledging that installation of seawater cooling towers could improve DCP reliability by reducing trips associated with kelp if the Outfall were eliminated, which would also eliminate a prime source of problems for U-2.

Mr. Powers stated that the Evaluation conflicts with Bechtel's assessment of whether a license amendment would be required and he remarked that in 2007 the CEC Independent Energy Policy Report included a nuclear workshop during which the then Acting Deputy Director for the NRC Division of License Renewal made the statement that use of cooling towers at DCP represented a state issue under the auspices of the SWRCB and that the NRC would not be involved in making a determination of whether NRC regulations would preclude the use of cooling towers at nuclear plants. Dr. Peterson stated that there is likely more to the NRC role in that the NRC would be involved in the decision as to whether a licensee would be allowed to make the modification to use cooling towers and the NRC Acting Deputy Director may have been commenting in policy terms on a decision of once-through versus closed cooling. Dr. Budnitz stated he interpreted the then Acting Deputy Director's comments as meaning the NRC would not intervene to tell the licensee or the licensee's state regulator whether or not the NRC would insist on the change to cooling towers. Dr. Budnitz observed there are 40-50 nuclear plants in the U.S. which use cooling towers and it is clear that the NRC has a process to license the use of cooling towers but would not intervene in a decision to require their use but would review the change and the plans as the NRC would for any plant and if the NRC safety criterion was met a license could be issued which, Dr. Budnitz stated, is essentially consistent with the conclusion reached in the Evaluation. Dr. Lam remarked that before his retirement in 2007 he sat as a Federal Administrative Judge on the NRC's Atomic Safety Licensing Boards and if this issue were before him in that judicial role, without commenting on the merits of an intervention petition, procedurally a back fit of the magnitude being proposed for DCP would certainly require a public hearing. Dr. Lam stated he appreciated the comments offered by Mr. Powers and would consider and agreed to make changes in the preliminary Evaluation in

response to Mr. Powers' comments.

Mr. Powers again stated he misunderstood the concern expressed in the Evaluation about flooding but stated that flooding might not be an issue dependent upon the proximity of the cooling towers to the Turbine Building and he stated the cooling tower for U-1 is expected to be located 2,000 feet from the Turbine Building on a cliff over the Pacific Ocean, with the cooling tower for U-2 projected to be located somewhat closer to the Turbine Building, but any water with the potential to flood the Turbine Building should be precluded by engineering design. Mr. Powers remarked that concerns about the EDGs and the ASW would not be expected to affect plant reliability as those modifications would take place during the time both units would be off line and not operating.

In concluding his remarks, Mr. Powers again stated his belief that the Evaluation should include in its conclusion the statement that more study is required to determine if there are overall safety impacts which might not meet the DCISC safety criterion. Mr. Powers remarked that he saw no reason the cooling towers should be located at an elevation of 115 feet as both the existing duct work and condenser upgrade to 50 psig would provide adequate headroom to locate the cooling towers in the south parking lot without the need for significant excavation other than for the pipes going to and from the towers.

Dr. Budnitz remarked that SONGS is no longer running due to issues with the replacement of its SGs although there have been many other individual SG replacement projects and it might have been assumed that the engineering would be performed correctly but this turned out not to have been true and therefore attention needs to be paid and issues need careful further analysis.

In response to Consultant Wardell's question Mr. Powers stated the Hope Creek plant was designed to use cooling towers and he was unaware of whether protective devices were designed for the high voltage switchyards at Hope Creek but he remarked the CEC has suggested a remedy for salt deposition by installing salt resistant insulators. Mr. Powers reported Hope Creek uses a hyperbolic tower which he presumed included use of a mist eliminator. Dr. Budnitz remarked the Hope Creek plant has protection for hurricanes. Mr. Powers stated he did not evaluate a wind rose diagram for Hope Creek. In response to Consultant Wardell's inquiry, Mr. Powers stated he did not see security as a major issue with the transition to the use of cooling towers by DCPD but he agreed that a PRA analysis would provide more confidence in making a recommendation.

The Chair opened the floor to public comments.

Dr. Gene Nelson was recognized. Dr. Nelson stated that as DCPD was not broken and there was no need to fix it and the SWRCB actions were simply a disguised method to shut down nuclear power plants in California as nuclear plants have the greatest amount of waste heat to release to the environment and accordingly would require the most complex cooling systems. He observed that cooling towers which would increase salt deposition and their construction of fiberglass could result in a fire if the towers were targeted by terrorists. He remarked DCPD is 85 feet above sea level and unlike at Fukushima gravity would keep saltwater out of the plant's safety-related systems but the SWRCB's actions could result in a large amount of saltwater and brackish water becoming

located above the 85 foot level. In summary, Mr. Nelson stated his belief that the SWRCB plan would create a potential for a man made tsunami at DCP.

Ms. Rochelle Becker, representing the A4NR was recognized. Ms. Becker stated she sits on the RCNFP and as a member of that Committee she requested that a satellite webcast location be established in San Luis Obispo for presentation of the Bechtel Addendum to the RCNFP on November 18, 2014. Ms. Becker stated the CEC supports that request and she stated that it was important that the DCISC send representatives to the meeting as well as provide support for the request to establish a satellite location for a webcast of the meeting in the local area.

Dr. Henriette Groote was recognized. Dr. Groote remarked she was a supporter of MFP and A4NR and she complimented Dr. Peterson for a clear and lucid report on the Evaluation of the Bechtel Addendum. She stated she was unclear whether the Evaluation favored the northern or the southern location for the cooling towers and she inquired if the Evaluation considered that at some point there could be simultaneous interaction between the flooding and salt deposition problems. Dr. Budnitz responded that the Evaluation neither favors nor disfavors either site but merely evaluated the options and issues in connection with each location in accordance with the DCISC's safety criterion but until more analysis is done the relative factors associated with each proposed site cannot be adequately evaluated. Dr. Peterson remarked that the use of freshwater would result in less salt deposition and the northern location in less disruption during the construction phase but whether those impacts are sufficient to affect a final decision is something that requires additional analysis. Dr. Budnitz observed the freshwater option would require construction of a very large and very expensive desalination plant but that matter was not one that involved nuclear safety.

Mr. William Gloege of Orcutt, California was recognized. Mr. Gloege remarked that a number of attacks have been made on DCP's operations including false reports that the plant was leaking radiation. Reports on the seismic faults in the vicinity of the plant have established that those faults are minor and do not have the capacity to create sufficient earth movement to damage the plant. He stated his opinion that the issue of cooling towers is part of a game to shut DCP and that these actions have the potential to harm the environment because were DCP to close more smoke, soot and ozone would be released into the air. Mr. Gloege remarked the DCISC deals with safety and should therefore consider the negative safety impact on human beings if the plant were to close as well as the impact of its closure on global warming issues. Dr. Peterson responded that the charter of the DCISC directs it to review and focus its attention on operational safety and the issues raised by Mr. Gloege fall outside its remit.

Mr. Damon Moglen, representing FOE and overseeing its program on DCP, was recognized and was connected to the meeting by telephone. Mr. Moglen thanked the Committee for the opportunity to address the meeting. He commented he believed the concern expressed in the Evaluation with salt deposits on the spent fuel canisters was an oversight as there was no basis or references to documentation in support of that concern in the Evaluation and in his opinion the references to an impact on the spent fuel canisters should be removed from the Evaluation. Mr. Moglen observed that the Evaluation contained very little analysis of the problems which currently

exist as a result of DCP's use of once-through cooling including the Outfall producing sediment which causes tripping problems. Mr. Moglen stated the Evaluation should clearly document that there are problems with the current cooling system, aside from the issues of entrainment and entrapment of sea life, which have an adverse effect on plant safety. Mr. Moglen commented that during the period when both reactors would be shut down there would be no issues of plant operational safety aside from maintaining water to the SFPs and he commented there is experience with large scale projects concerning replacement of the SGs and the reactor vessel heads which might be more relevant than the efforts to address post 9-11 security issues. Mr. Moglen observed in its earlier Evaluation of the seven technologies addressed in the Bechtel Assessment the DCISC did not identify issues in accordance with its safety criterion in connection with the wedge-wire screen proposal which he stated would create entrapment problems but the Evaluation of the Bechtel Addendum now raised potential safety problems with the southern siting proposal without using the same criterion and he encouraged the DCISC to take an even-handed approach concerning its assessment.

Ms. Sherry Lewis representing MFP was recognized. Ms. Lewis stated dry cask storage should not be an issue as its duration extends beyond the operational life of the plant and she observed that over time salt deposition would be expected to occur on the canisters without cooling towers and she stated her opinion that this factor needs to be taken into account. Dr. Peterson noted the Committee has added an item to its Open Items List to address salt transport and its potential effect.

Dr. Budnitz, in response to Mr. Moglen's comments, remarked that installation of the cooling towers was projected to take more than six years during which both units would remain in operation followed by two years of a dual unit outage. Dr. Budnitz stated that in his opinion it was likely the NRC would require a full core offload to the SFPs for the two-year dual outage rather than leaving the cores in the reactor vessels and, if that were the case, there would be little risk of problems with the reactors while no fuel was present in the core and accordingly no nuclear safety issues with the reactors and the vessels would be available for extensive inspection. In the alternative, the cores might remain within the vessels and the SFP inventories would consist of older assemblies while cooling would have to continue to the reactor vessels as well as to the SFPs.

Ms. Carole Hisasue, a resident of Los Osos and member of MFP was recognized. Ms. Hisasue read a statement by Ms. Jane Swanson, spokesperson for MFP. In the statement Ms. Swanson stated her belief that the Evaluation inadvertently left in place two references to potential salt damage to the spent fuel casks from salt deposition without including evidence on this issue and those references should be deleted from the Evaluation. Dr. Peterson replied the statements referred to by Ms. Swanson would remain part of the Evaluation based upon an understanding that use of saltwater cooling towers would very likely significantly increase the rate of salt deposition at the Independent Spent Fuel Storage Installation (ISFSI) but would consider modifying the recommendation to make it clear the Evaluation was not reaching a premature conclusion on the potential safety effect of salt deposition and that modeling analysis on this issue should be done. Dr. Peterson commented new issues have also arisen with regard to the potential for hydriding and embrittlement of fuel cladding as a consequence of the manner in which the spent fuel canisters are dried and packed which the

DCISC will review. Ms. Hisasue commented the SWRCB has determined that the cooling towers are needed by 2015 as once-through cooling is harming the marine environment and the only responsible thing to do is to shut down DCPD until the towers are built both during construction and connection of the towers. She stated that after listening to the presentation she understands that determining the type of tower to be used will take time as there are safety issues involved and this assessment will be very expensive and the cheapest option for both PG&E and its ratepayers would be to shut down the plant and replace it with a clean energy power plant as nuclear power is not green power and radiation can be lethal.

Mr. Joe Oliveira, a resident of Orcutt, California was recognized. Mr. Oliveira observed the state is very short of fresh water and PG&E has been studying the effects of once-through cooling at DCPD for many years and he commented it was important in this matter to be logical and focused upon science and engineering. Dr. Peterson stated the DCISC Charter would not permit the Committee to judge whether the environmental impact of once-through cooling or that of the cooling towers was necessary.

Ms. Simone Malbouef was recognized and stated she was speaking in support of requiring PG&E to comply with the State Marine Environmental Protection Policy of 2010. She reported on September 25, 2014, the local newspaper ran an article by former NRC Senior Resident Inspector Dr. Michael Peck and she read from that article Dr. Peck's description of the process used to evaluate his differing professional opinion concerning nuclear safety issues with reference to the NRC standards used to evaluate DCPD's safety based upon Dr. Peck's perception that its regulatory seismic design basis margins had eroded but which resulted in no change in the NRC's conclusion that DCPD could continue to operate in accordance with its operating license. Ms. Malbouef stated the duration of the process outlined for the installation of cooling tower, which she stated would take 21 years, would extend beyond the plant's currently licensed operational lifetime. She further stated that the controversy over the seismic faulting at the plant site would also need to be assessed as to its effect on undermining safe operation of DCPD. Ms. Malbouef stated an engineer at the Fukushima nuclear plant attempted to report defects and cover ups at that plant to the Japanese government and the engineer has reported nuclear power is unstable and therefore unsafe and nuclear accidents are bound to occur and have occurred three times in our lifetime. She stated she joins in opposing the continued proliferation of nuclear power and supports the shut down and closure of DCPD.

Ms. Linda Seeley was recognized. Ms. Seeley stated she was representing MFP and stated PG&E should be viewed in a cautionary light. She stated PG&E employees were extremely conscientious but the corporate culture was suspect. She stated her opinion that PG&E commissioned Bechtel to perform an assessment of alternatives to once-through cooling so that the report would indicate an excessive cost and it was FOE that reviewed the report and identified less costly alternatives. Ms. Seeley reported PG&E has been fined for its role in causing the gas transmission explosion in San Bruno, California which resulted in eight deaths and the destruction of 38 homes and PG&E has recently been found to be complicit by having an improper relationship with the staff of the CPUC which resulted in the resignation of the CPUC President and PG&E is under investigation for improper communication with NRC staff based upon its release of the report on the Shoreline Fault at the same time as the NRC release of its final determination of Dr. Peck's concern. Ms. Seeley

advised the DCISC that PG&E might be using the DCISC for its own purposes and the DCISC could be an unwitting victim of another allegation of PG&E engaging in collusion. She closed her comments by stating it was her hope that the Evaluation would be modified in response to the comments made by Mr. Powers. In response to Dr. Budnitz response for clarification of her comments, Ms. Seeley stated she believed the DCISC could be duped by PG&E to advance PG&E's profit motives and the DCISC is advancing PG&E's interests by raising safety concerns with the cooling tower proposal which are not based upon good science and she stated it was her impression the Evaluation included conclusions based upon allusions. Dr. Lam commented that he found some of Mr. Power's comments persuasive and could support some but not all of Mr. Power's comments. Dr. Budnitz commented the DCISC is not concerned about how the proposal to install cooling towers would be paid for, whether by PG&E or by its ratepayers, as that was not within the DCISC's remit. Dr. Peterson observed some of the FOE recommendations involve design changes to the plant which the Evaluation concluded would likely not have safety implications for the plant but the use of saltwater and the issue of operating the plant during a protracted construction period does raise important questions which could involve substantive impacts on plant safety.

Mr. Steve Cleaver was recognized. Mr. Cleaver stated he is a local physics educator. He stated he believes that the issues reviewed by the Committee go beyond operational safety concerns but he recommended the Evaluation be clarified to include the clear recognition that there is a huge amount of uncertainty concerning the safety impact of the proposals discussed. The Committee responded that the Evaluation includes the statement that absent additional experiments, analysis and measurement not as much is known as needs to be and even when that analysis has been completed there will remain a certain amount of uncertainty regarding the safety implications of the changes proposed. Mr. Cleaver observed that when the Evaluation is approved, it will be used by a number of persons whose only purpose is to advocate shutting down DCP.

Mr. Hector Garcia was recognized. Mr. Garcia stated he and his family are local residents and he is employed by PG&E as an engineer. Mr. Garcia stated the plant is very safe and has been so since the 1980's and that he would not want his family to live in the local area were that not the case. He stated his opposition to the installation of cooling towers is based upon proven evidence of the plant's reliability.

Dr. Peterson expressed the Committee's appreciation for the comments by members of the public and he apologized to the PG&E personnel who were in attendance expecting to present reports to the DCISC as the Committee had required more time than expected to entertain public comment. Dr. Peterson stated there was a consensus of the membership that the Evaluation should be modified and labeled as preliminary due to insufficient information in certain respects to reach conclusions about the safety impacts of closed cooling and accordingly the need for more study. Dr. Peterson stated the recommendations in the Evaluation should be modified to make clear that more study is required on the use of saltwater and that more study and modeling is required concerning the matter of salt deposition that would be expected on different areas of the plant including a comparison of the use of saltwater compared to freshwater for closed cooling with the continued use of the Outfall for once-through cooling. Dr. Peterson observed the Evaluation should be revised to also address the possibility that a probabilistic risk assessment (PRA) might determine

that the overall reliability of the plant would increase or decrease as a consequence of the changes proposed and further study in this regard is needed. Dr. Lam stated that the first five pages of Mr. Powers' comment letter appeared to be consistent with Dr. Peterson's observations. Dr. Budnitz remarked the recommendation concerning the PRA analysis need only be revised to indicate that the analysis should quantify any change in the margins of safety and the reference to the higher salt deposition rates producing a negative impact on the ISFSI and spent fuel casks modified to indicate these impacts are likely to be less than the impact on the reactors. Dr. Budnitz stated the references to the consideration of the requirement for a license amendment should remain a part of the Evaluation as this matter would only be determined by the NRC following an extensive and involved public hearing process. The Members discussed the process to make changes to the Evaluation before its adoption and directed Consultant Wardell to revise the Evaluation in view of the public comments and the Committee's discussion and direction and provide a revised Evaluation, including a version which shows the proposed revisions, for the Committee's consideration later during this public meeting. The Chair also directed that a letter be sent to the SWRCB in support of the establishment of a satellite location in San Luis Obispo to permit members of the local community to observe and possibly take part in the deliberations of the SWRCB on November 18, 2014. The discussion of this matter closed with the observation that when approved the DCISC Evaluation of the Bechtel Addendum is due to be submitted to the SWRCB on or before November 4, 2014.

A short break followed.

XIV Information Items Before the Committee

The Chair requested Mr. Cary Harbor, DCPD Director of Compliance, Alliance and Risk to introduce the first of the informational presentations requested by the Committee for this public meeting. Mr. Harbor remarked that PG&E welcomed the previous dialogue between the DCISC and the members of the public concerning safety and he stated from PG&E's perspective nothing is more important than the safety of the general public. Mr. Rathie reported that Mr. Wardell would be providing individual emails to each member later this evening with the revised draft Evaluation of the Bechtel Addendum and in accordance with the process for completing the evaluation all comments on the revised draft should be provided by Members individually to Mr. Wardell.

Mr. Harbor introduced Mr. Kevin Braico, Mechanical Design Engineer at DCPD and stated Mr. Braico has a degree in Mechanical Engineering and five years of nuclear experience.

Buried Pipes and Tanks Program.

Mr. Braico stated the core purpose of the Buried Piping and Tanks Program is to provide increased assurance of structural and leakage integrity of buried piping and tanks. Special emphasis is placed on safety-related systems and those tanks and piping containing licensed material or environmentally hazardous material. He reported DCPD has a relatively limited amount of buried piping on site compared to others in the industry and this provides DCPD with the ability to place special emphasis on opportunities to inspect its piping and tanks. Opportunistic inspections are utilized in addition to the required inspections to enhance reliability. Mr. Braico stated DCPD's

Buried Piping and Tanks Program has been reviewed and inspected by the NRC using the NRC's Temporary Instruction Inspection 2515/182 protocol entitled "Review of the Implementation of the Industry Initiative to Control Degradation of Underground Piping and Tanks." The last inspection was conducted in July of 2013 and no findings were identified.

Mr. Braico explained buried piping and tanks are below grade and in direct contact with the soil or concrete while underground piping, while it may be encompassed by buried piping, consists of piping and tanks that are below grade but are contained within a tunnel or vault such that they are in contact with air and are located where access for inspection is restricted. He stated he would cover both types in his presentation.

Mr. Braico reported in 2009 the US nuclear industry committed to implement an industry initiative to manage buried piping integrity designated as NEI 09-14, "guideline for the Management of Underground Piping and Tank Integrity." He stated the Electric Power Research Institute (EPRI) hosts Buried Piping Integrity Group (BPIG) meetings twice a year to discuss: industry operating experience; monitoring equipment; inspection technologies; repair options; new materials; and research results. Representatives of INPO and the NRC, as well as the vendors who provide services for maintaining reliability, attend these meetings.

Mr. Braico displayed a map of DCPD indicating locations of its 21 miles of buried piping and 1 mile of underground piping and 2 buried tanks (there are no underground tanks) including the Auxiliary Saltwater System (ASW), emergency diesel fuel oil, firewater. In response to Mr. Linnen's inquiry, Mr. Braico replied other nuclear plants may have three to four times the amount of buried piping as is installed at DCPD. He displayed graphic schematics of the individual systems and discussed and described the scheduled inspections completed including:

- Auxiliary Saltwater—from the Intake Structure to the Turbine Building consisting of 3,000 feet of buried piping per unit which uses cathodic protection and is constructed of carbon steel with PVC internal line and an epoxy outer coating. He reported the southern portion of the ASW piping was replaced in 1997-1998 to remove all piping from the tidal zone elevation. The piping is also inspected by video crawler during every fourth refueling outage and was last so inspected during 2010 and 2011. In response to Dr. Peterson's request Mr. Braico stated the replacement of the southern portion of the piping was motivated by its location being too close to the tidal zone resulting in its submergence in saltwater and corresponding increases in corrosion rates. The piping was abandoned in place and new piping constructed at a higher elevation. In response to Dr. Peterson's inquiry, PG&E's Mr. Jearl Strickland replied he was responsible for the ASW bypass project and the replacement was initially conducted under the 10 CFR 50.59 process but, because the types of thrust blocks which were used required analysis techniques which differed from the analysis previously used by the NRC, a license amendment was required for the replacement of the ASW piping. Dr. Peterson observed that experience essentially resolves the issue of whether the installation of cooling towers would require DCPD to obtain a license amendment from the NRC and validates the DCISC's position concerning the matter. In response to Dr. Lam's question, Mr. Braico stated the NEI and EPRI industry initiatives function essentially as regulatory guidance for license renewal and were

created so that plants would have a common goal and common path to managing buried piping and the NRC was consulted to ensure it was agreeable to the industry initiative.

- Diesel Fuel Oil—including the underground transfer piping running along the Turbine Building which runs within a trench and is covered with a steel or concrete plate, covering and the diesel fuel pump vaults located within buildings, and the piping that transfers fuel oil to the buried diesel fuel oil tanks. This system consists of approximately 1,500 feet of underground piping and Mr. Braico reported both diesel fuel oil tanks were upgraded and replaced in 1996 and 1997 with triple-walled tanks. Monthly inspections are made of the tank vaults and there is an active link as well which monitors inside the tank vaults, transfer piping, and the pump vaults. In response to Dr. Peterson, Mr. Braico confirmed DCPD has the capability to inspect all of its diesel fuel supply piping. He reported every 10 years an advanced inspection is performed which includes removing the tank, transfer pump and pump vault covers and doing a thorough inspection for corrosion or leaks. Personnel also physically inspect the inside of the diesel fuel oil tanks.
- Firewater—Mr. Braico stated the Firewater System is separated into two sections with the primary system consisting of approximately 7,300 feet of buried piping constructed of cement or PVC pipe to support the plant and connects to the Turbine Building, the Auxiliary Building, and other facilities in the area. Metallic components of the Firewater System consist of risers and valves which are generally encased in concrete which he stated results in a very low corrosion type of piping system. The Firewater System is inspected on an opportunistic basis and Mr. Braico stated the main source of degradation is from heavy loads resulting in collapsing the concrete piping. Dr. Peterson observed that following the Kashiwazaki-Kariwa earthquake in Japan in 2007 buried piping mounted to the foundations of buildings survived but underground or buried piping in the soil was broken due to soil movement but he remarked it was his understanding that none of the firewater piping outside of buildings at DCPD is nuclear safety-related. Mr. Braico stated that the system is designed so that failure in one section can be addressed by rerouting piping in other directions. Dr. Budnitz confirmed that firewater systems were not classified as safety-related but do support an important aspect of safety at nuclear plants.

Mr. Braico reported scheduled inspections are made of the ASW piping system, the diesel fuel oil piping system, hydrogen and nitrogen piping systems, as well as the laundry drain, and these are in addition to opportunistic inspections of the firewater, domestic water, and sewer piping. He stated the Buried Piping and Tanks Program is a priority-based program, developed and implemented throughout the industry. A database was compiled of all buried piping and tanks parameters (i.e. material, coatings, external environment, internal fluid, consequence of failure, and inspection results). This information is used to determine the likelihood of degradation and the consequences of its failure. The combination of the likelihood and consequences combine to form the priority ranking of the piping and allow focused efforts on the most significant piping. Mr. Braico stated that, in general, DCPD has a limited and well designed, Buried Piping and Tanks Program which has resulted in primarily low to medium priority results. Only one system is considered high priority and that is the ASW discharge piping and there the focus has been on the discharge piping as it leaves the Turbine Building and extends to the ocean, which portion is located within the soil and there

will be a new system designed and installed as a result of inspection, while the remainder of the ASW discharge piping is protected by being encased in concrete.

In response to Dr. Budnitz' request Mr. Braico stated he meets at least twice each year with his peers at other nuclear power plants to discuss piping inspections and results and the STARS Alliance (STARS), a joint nuclear utility initiative, facilitates a monthly teleconference concerning coordinating efforts and providing information on buried piping issues for its members. In response to Dr. Lam's question, Mr. Braico stated opportunistic inspections can occur when a design change is being implemented or other work is in progress in the field which may involve excavation and provide an opportunity to observe piping.

Ms. Sherry Lewis was recognized. In response to Ms. Lewis inquiry Drs. Budnitz and Peterson replied firewater is used to extinguish fires and that some, but not all, of the underground below-grade piping can be accessed while buried piping inspection opportunities are much more limited. Mr. Braico replied underground piping is located in a vault or a trench, generally has a leak detection system installed, and is covered with steel or concrete plating which requires a crane to lift. Piping that is part of a daily walkdown inspection is not considered to be underground or buried piping.

Mr. Harbor introduced DCPD Manager of Regulatory Services Thomas Baldwin and reported Mr. Baldwin has more than 30 years' experience in the nuclear industry and holds a Bachelor of Science Degree in Mechanical Engineering and has worked in leadership roles at DCPD in Engineering and Regulatory Services and also holds a Senior Reactor Operator License.

Review of NRC Performance Indicators, Licensee Event Reports & NRC Notices of Violations

Mr. Baldwin reported his presentation would cover the time between June 2014 and September 2014, particularly in the area of NRC oversight. He stated in summary all NRC performance indicators meet NRC green performance expectations. Two violations of very low safety significance were reported since the last DCISC meeting. He stated his presentation would cover more than four months of NRC inspections involving 2000 hours by both on site and specialized inspectors.

Mr. Baldwin reviewed two slides with a chart which summarized the NRC Performance Indicators that all nuclear stations report about every quarter. Mr. Baldwin stated that DCPD continues to meet all NRC performance indicator thresholds and sets more rigorous thresholds for the Performance Indicators than the thresholds set by the NRC and monitors those on a continuous basis in order to enter areas of declining performance into the Corrective Action Program before they can impact the performance on the NRC indicators. 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. Baldwin reported on the single Licensee Event Report (LER) initiated and issued by DCPD over the last several months as follows:

- LER 2-2014-001, issued July 2, 2014, Lightning Arrester Failure Resulting in Reactor Trip. Mr. Baldwin reported this event occurred in February 2014 and was reported as an LER in July 2014 for failure of a U-2 lightning arrester which caused the output of the station to be redirected through the failed arrester to ground. Plant protection systems detected the event and automatically actuated and separated U-2 from the grid and tripped the turbine which, with U-2 at 100% power, caused an automatic trip of the reactor. Mr. Baldwin stated all systems worked as designed. The failed lightning arrester was removed but because of the extensive damage it was not possible to definitively identify the cause of its failure and corrective actions are being taken to address possible causes. These corrective actions include shutting down each unit approximate every 90 days to wash salt and dust buildup on the insulators. Mr. Baldwin commented washing normally occurs during regular rainfall but the area is currently in a drought. In response to Mr. Linnen's inquiry, Mr. Baldwin confirmed that DCPD is reducing power for both units as salt and contaminants build up on insulators for the units although the flashover events have occurred only on U-2. He responded to Mr. Linnen's question by stating that compared to other nuclear plants DCPD experiences extremely heavy buildup of contaminants. He reported DCPD is procuring larger insulators which will provide the lightning arresting function but will not be as vulnerable to conductive buildup of contaminant. Mr. Baldwin reported additional quality controls are being employed in connection with this procurement.

Mr. Baldwin reported on two violations received from the NRC³ as follows:

- NCV (“Green”)—Failure to follow Procedure Associated with Seismically Induced System Interactions (C-C Aspect P.1 Identification). This violation was identified by the NRC during a walkdown when temporary or portable material and equipment, including a steel cart, a loose valve cap, and a guardrail that could potentially interact with permanent equipment were identified as unsecured or improperly positioned. Mr. Baldwin reported the Seismically Induced Systems Interaction Program is designed to address these types of issues and provides instructions and controls to protect plant equipment and deviations from procedural requirements were identified in connection with this violation.
- NCV (“Green”)—Inadequate Design Control with Respect to Seismic Induced System Interaction of Safety Related Components (No CC Aspect). Mr. Baldwin described this violation as similar to that discussed above. It was identified by the NRC from an observation atop a heat exchanger when a small gap was identified between a vent on the heat exchanger and structural steel in too close proximity to the heat exchanger which was not in accordance with DCPD design requirements for maintaining minimum distances between equipment to prevent the items coming into contact with each other. A portion of the structural steel was cut away to avoid the interaction and it was determined that had contact occurred the heat exchanger would have met all design requirements and remained capable of performing its function. In response to Consultant Linnen’s query, Mr. Baldwin replied the NRC inspectors typically are observant when in the plant for loose materials or improperly secured temporary equipment but climbing on to a heat exchanger is unusual and he characterized the discovery as a happenstance observation.

Mr. Baldwin summarized and reviewed the NRC inspection reports issued during the period of his report:

- Emergency Preparedness Annual Inspection Report (2013-502, 7/17/14) which found the Emergency Preparedness Program to be effective.
- Mid-Cycle Assessment Letter for DCPD (2014-006, 9/2/14) which found DCPD’s performance remains acceptable.
- Integrated Inspection Report (2014-003, 8/8/14)

In summary, Mr. Baldwin reported all NRC performance indicators continue to meet NRC green expectations. Cross-cutting performance is strong, with no cross-cutting themes or developing trends identified.

In response to Dr. Budnitz inquiry regarding a report on an unanalyzed condition with reference to humidity which could be caused around the 4 kV electrical busses due to a high energy line break, Mr. Baldwin stated the situation involved a discovery that equipment in the room had not been qualified or documented to be able to perform its function in high humidity conditions. The ventilation dampers from the area on top of the turbine deck were closed to prevent steam from entering the room and the equipment was sent to a test lab for evaluation and the equipment subsequently qualified to perform its function in the high humid condition and this event report was subsequently retracted.

Ms. Rochelle Becker of the A4NR was recognized. Ms. Becker stated that the Office of the Inspector General for the NRC issued a report concerning the SONGS steam generators which found the replacement of the steam generators at that plant should have been done pursuant to a license amendment request (LAR). She posed the question to the DCISC and to PG&E concerning the problems with the NRC's process, which it had not admitted to, resulting in the SONGS ratepayers investing \$670,000,000 into the steam generators. She inquired if there were any changes contemplated by PG&E to be made under the 10 CFR 50.59 process which would permit the public to have more faith that the NRC would actually follow its own criteria so that Californians may judge whether these are good investments. Dr. Budnitz stated that he received the report of the NRC Inspector General and would review it.

XV Adjourn Afternoon Meeting

The Chair adjourned the afternoon meeting of the Committee at 5:25 P.M.

XVI Reconvene For Evening Meeting

Dr. Peterson convened the evening meeting of the DCISC at 5:40 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

XVII Committee Member Comments

There were no comments by Committee members at this time.

XVIII Public Comments and Communications

Dr. Peterson inquired whether any member of the public wished to comment or address the Committee on matters not appearing on its agenda for this meeting.

Dr. Gene Nelson was recognized. Dr. Nelson stated he wished to repeat his earlier statement concerning the proposal to eliminate once-through cooling with closed cooling at DCP. Dr. Nelson stated he is a resident of San Luis Obispo, California, and serves on the Physical Sciences Department at Cuesta College and has taught at Cal Poly. He stated the matter before the SWRCB is a disguised means to shut down nuclear power in California. As nuclear plants produce the greatest amount of waste heat they require the largest and most complex cooling systems. Unlike Hope Creek, the closed cooling system for DCP would have to be applied as a retrofit and would compromise the long term safety of the plant due to the increase in the amount of salt produced. Dr. Nelson stated PG&E located the plant 85 feet above sea level and the proposal before the SWRCB would result in large amounts of dangerous salt and brackish water being placed above the 85 foot level with potentially disastrous consequence. He stated the proposal would create a potential man-made tsunami and cooling towers constructed of fiber reinforced plastic towers and although they offer greater resistance to salt they would be far more flammable than reinforced concrete towers which suffer degradation from exposure to salt. He closed his remarks by stating his opinion that the proposal before the SWRCB to convert DCP to the use of closed cooling is a

disaster waiting to happen.

Mr. William Gloege, a resident of Orcutt, California was recognized. Mr. Gloege stated the DCISC has a responsibility for the safety of human beings and it is legitimate to look at the impact on the safety of the population if DCPD were to shut down. He stated his opinion that the DCISC is defining its safety role too narrowly and DCPD was producing and protecting the safety of the air. He urged the DCISC to reconsider and widen its mandate to review the safety of human beings in relation to DCPD and to the potential effects of shutting down the plant. Dr. Peterson responded that in order for the DCISC to remain effective it is important that it focus exclusively on the operational safety of DCPD. Dr. Peterson stated the DCISC takes no position on whether the plant should operate or whether the license from the NRC should be extended as those issues represent policy decisions. The role and function of the DCISC should be to ensure that the plant is operated in the best manner and remains among the top rated nuclear power plants in terms of its operation.

XIX Information Items Before the Committee (Cont'd.)

The Chair requested Mr. Cary Harbor, Director of Compliance, Alliance and Risk at DCPD, to continue with the informational presentations by PG&E. Mr. Harbor introduced Mr. John MacIntyre, Director of Maintenance Services at DCPD and stated Mr. MacIntyre would be presenting tonight in place of DCPD Operations Services Director Jan Nimick. Mr. Harbor stated Mr. MacIntyre has more than thirty years of experience in the nuclear industry and holds a Bachelor of Science Degree in Nuclear Technology, a Senior Reactor Operator License, and has served in leadership roles in the Quality, Operations and Maintenance organizations.

Presentation on the State of the Plant Including Key Events, Highlights and Station Activities.

Mr. MacIntyre reported the NRC licensed operator examinations conducted on August 27, 2014, for 12 Operations license candidates resulted in 7 reactor operators and 5 senior reactor operators successfully completing their initial NRC examinations. This evaluation consisted of a written exam, a series of dynamic simulator exams, and a series of Control Room in-plant and administrative job performance measures.

Mr. MacIntyre stated PG&E released its Advanced Seismic Study on September 10, 2014. He stated this research confirms earthquake safety at Diablo Canyon. Dr. Budnitz confirmed that the Committee would be receiving a presentation on the Advanced Seismic Studies following Mr. MacIntyre's presentation.

Mr. MacIntyre reported the NRC Problem Identification and Resolution (PI&R) inspection was conducted on September 11, 2014, to review the effectiveness of the plant's Corrective Action Program and he summarized the results and findings from that inspection as follows:

- 3 Proposed "green" Non-Cited Violations (NCVs)
- DCPD has a strong Corrective Action Program
- No challenges to Safety Conscious Work Environment

- Use of operating experience is very good overall
- Good inspection with commendable results

In response to Mr. Linnen's question, Mr. MacIntyre stated the PI&R inspection uses a series of interviews with individuals and teams to assess, both vertically and horizontally within the organization, and to reach an overall conclusion concerning safety conscious work environment attributes and he described it as a very thorough process.

Mr. MacIntyre provided a report and update on the current status of both units as follows:

- Station Update—Unit 1
 - 500 kV Lightning Arresters Cleaning—reduced power and separated from transmission grid. Completed on September 6, 2014. Targeting replacement with new design in December 2014. Mr. MacIntyre stated both units have been off line approximately every 90 days for cleaning as a result of flashover events on U-2 which resulted in unit trips. A root cause evaluation has determined the design requires upgrading to prevent failure and improve overall station safety. Previously installed lightning arresters used ceramic bushings which produced shrapnel upon their failure and those bushings have now been replaced with polymer bushings and, subsequent to another failure, the polymer bushings were upgraded to a design adapted for a greater incidence of contamination which at DCPD is produced by its marine environment, diesel generator exhaust, and dust from construction activities. Since this upgrade a subsequent failure has occurred and the plant instituted the current cleaning regime to address the problem until yet another design is installed. U-2 will receive the newly design bushings during its current refueling outage and U-1 will receive them during the next scheduled cleaning. Mr. MacIntyre reported that by December 2014 both units will have been upgraded with what he described as new old-style ceramic lightning arresters. He confirmed Dr. Peterson's observation that the problem of excessive buildup of contaminants is partially due to the current drought conditions.
- Station Update– Unit 2
 - 500 kV Lightning Arresters Cleaning. Reduced power and separated from transmission grid Completed on July 19, 2014.
 - Forced Outage—on August 14, 2014. U-2 experienced a forced outage as a result of maintenance work scheduled on its EDGs EDG 2-2 was out of service for a planned Maintenance Outage Window (MOW). Work was complete on EDG 2-1 and was in the process of being completed on EDG 2-2 when a failure mechanism was identified on EDG 2-3 due to a cap screw holding an injector to a fuel rack on the generator. U-2 was shut down to repair EDGs 2-2 and 2-3. A full Extent of Condition review using ultrasonic testing to inspect the cap screws was performed on all the other EDGs. All were found to be satisfactory and this issue was confined to EDG 2-3. However, as EDG 2-2 and 2-3 were both inoperable U-2 was placed in a very short shut down action situation. As repairs

were being completed to EDG 2-3 and refueling was underway a leak occurred on the fuel pump which required the fuel tank to be drained again and this extended the time to complete the maintenance on EDG 2-3. With two inoperable EDGs U-2 was required to shut down to complete maintenance on EDGs 2-2 and 2-3.

Mr. MacIntyre reported U-2 entered a refueling outage on October 5, 2014. He described and discussed the major scope and performance goals for the work to be performed during the outage as follows:

- Primary Scope:
 - Steam Generator sludge lance / eddy current testing (4 S/G's)
 - Reactor Coolant Pump (RCP) 2-2 motor overhaul
 - RCP 2-3 seal package
 - Containment Fan Cooler Unit (CFCU) inlet damper modification

In response to Dr. Peterson's inquiry, Mr. MacIntyre reported approximately three pounds of sludge was removed from each steam generator which he described as a very positive indication of plant chemistry.

- Secondary Scope:
 - Circulating Water Pump 2-2 Motor overhaul
 - Turbine extraction steam bellows replacement—Phases A, B & C
 - Electrical
- 480 V bus G breaker replacement—56 breakers
- 500 kV switchyard relay and breaker upgrades
- Battery and DC panel 2-2 replacement
- Lightning Arrester replacement
- Performance Goals:
 - Recordable & Disabling Injuries 0
 - Nuclear Safety Events 0
 - Human Event Site Clock Resets 0
 - Outage duration (days) ≤ 33

Mr. MacIntyre reviewed and briefly discussed upcoming activities for U-1 as follows:

- 21G1 Generator Backup Alarm Relay Replacement
- Repair North East Condenser Salt Leak

- 500 kV Lighting Arresters Replacement

Following the conclusion of his presentation, in response to Dr. Lam's question, Mr. MacIntyre replied that in his position at DCPD he is focused upon equipment reliability and performance concerns and it is his expectation that maintenance on equipment and design modifications will result in excellent operational reliability. He remarked the PI&R process which he discussed in his presentation is used to evaluate failures and put processes in place to improve performance and has been successfully implemented to address a number of issues around equipment reliability. He stated that as a nuclear engineer he has a responsibility to the members of the public to ensure the safe, reliable, and affordable operation of DCPD and he takes this responsibility very seriously. Mr. Harbor remarked that PG&E places paramount importance upon the safety of its personnel and therefore it is important that they have the tools, coaching, and standards to ensure they can perform their jobs safely. Mr. MacIntyre observed that the plant completed 18 million man-hours of work without a lost time injury which is within the top decile of performance within the nuclear industry but he stated continued attention needs to be paid to industrial safety and human performance.

Following Mr. MacIntyre's presentation, Dr. Gene Nelson was recognized. Dr. Nelson commented that he has toured the plant several times and been impressed with the stress placed upon three point contact when ascending or descending a stairway.

Mr. Harbor stated the next information topic would be presented by Dr. Norman Abrahamson, PG&E's Chief Seismologist with more than 29 years' experience who holds a Ph.D. in seismology from U.C. Berkeley and who also serves as adjunct professor at U.C. Berkeley and U.C. Davis. Dr. Abrahamson stated he would be assisted in the introductory portion of the presentation concerning source characterization by Dr. Stuart Nishenko who served as the technical manager for the field operations portion of the Central Coastal California Seismic Imaging Project (CCCSIP).

Advanced Seismic Safety Studies.

Dr. Nishenko stated he would be reviewing the results of the CCCSIP report which is a project of PG&E conducted in response to the recommendation of the CEC and per the direction of California Assembly Bill 1632 (AB 1632). He reported the purpose behind the CEC's recommendation was based upon a recognition that in the twenty years since the original Long Term Seismic Project (LTSP) there have been significant improvements in geophysical data acquisition including geophysical instrumentation, geophysical data processing, differential global positioning system navigation, geographic information systems, and in the use of computerized axial tomography (CT) versus x-ray scans. Dr. Nishenko reported the project identified ten specific parameters, with the assistance of the CPUC's Independent Peer Review Panel (IPRP) which were key to seismic hazard assessment and he provided a comparison of the range of values, using a tornado diagram, which showed the ratio of hazard values at a fixed point for these significant parameters based upon data collected in 2014 compared to that from 2011 when the report on the Shoreline Fault was completed. Dr. Nishenko stated the diagram shows that the CCCSIP has been able to significantly reduce the range in values. In response to Dr. Peterson's question, Dr. Nishenko stated that in order

to do a seismic hazard assessment you must know something about the frequency of occurrence of earthquakes and the geometry of the faults on which they are occurring as these have implications on how close the fault plane is to DCPD and he commented, as an example, the 2014 data collection was able to constrain the dip values and the geometry of the Los Osos Fault which now is thought to be much steeper dipping than was believed in 2011. He described this as a narrowing of the uncertainty of the selected parameters. Dr. Peterson remarked and Dr. Nishenko agreed that the original estimates had conservatisms which have now been reduced. Dr. Budnitz commented the concept of conservatism does not apply in this context as the process involves making a best estimate to capture uncertainties to provide more confidence in the ultimate hazard assessment for the site and the point is to better understand the data in order to use it in the hazard calculation. Dr. Nishenko remarked regarding the issue of linkage between the Shoreline and the Hosgri Faults it is highly unlikely that a rupture would propagate from one fault to the other but that possibility cannot be excluded and so for purposes of conservatism that consequence was examined. Dr. Lam remarked and Dr. Nishenko agreed that uncertainty analyses generate probability distributions and the uncertainties are generally dealt with by introducing a conservative bias, so as more and better data is acquired a convergency toward a lesser hazard is observed. In response to Dr. Peterson's comment, Dr. Nishenko pointed out that the data on specific parameters was presented as ratios without a mean value and he agreed with Dr. Peterson's observation that the main improvement indicated by the data was a better understanding of the geometry of the faults as well as their respective slip rates.

Dr. Nishenko displayed photos showing how the low energy seismic survey work was conducted offshore including the use of multi beam echo sounding for high resolution mapping of the sea floor and low energy seismic reflection which uses sound waves to produce echoes as they reverberate off the sea floor and a photo of the vessel used to conduct these surveys which tows a P-cable array of 14 hydrophone streamers each 50 meters long. Dr. Nishenko reported that the CCCSIP study was one of the first studies to use this technology outside of the oil and gas industry. The survey creates bins of data with dimensions of 2 meters vertically and approximately 3 meters horizontally, which define the minimum spatial resolution of the independent geological features on the sea floor.

Dr. Nishenko displayed photos which show the capabilities of the technology available in the 1980's including those used for the LTSP and compared the results to the data acquired in 2009/2010 using multi beam echo sounder imagery which now shows the Shoreline Fault existing 600 meters offshore from DCPD and provides much greater clarity and resolution than was available with the 2009/2010 data. He reviewed the survey activities conducted for the CCCSIP during 2009/2011, pre AB 1632, and those continuing in 2012. The 2009/2011 work included multi beam echo sounding and potential field mapping for the LTSP, 2-D/3-D low energy seismic surveys (LESS) of the Shoreline Fault zone, and 2-D/3-D onshore seismic reflection surveys in the Irish Hills and Los Osos Valley. The 2012 work included 3-D LESS on the southern Shoreline Fault zone, 3-D High Energy Seismic Survey (HESS) on the Hosgri Fault zone to Point Sal, 3-D HESS on the Hosgri Fault zone to Estero Bay, and 2-D/3-D onshore seismic investigations of the western Irish Hills and DCPD. In response to Dr. Peterson's inquiry Dr. Nishenko stated the Shoreline Fault was discovered as a result of micro seismic activity aligning along the fault's trace, the coincidence of the epicenters, and a number of

marine magnetic anomalies in its central section. Dr. Nishenko stated part of the initial investigation was to obtain a better understanding of the Shoreline Fault's geometry and length and the location of its intersection with the Hosgri Fault, the nature of that intersection, and how far it extends into San Luis Obispo Bay. The 2012 work focused on specific sites where estimates could be obtained on fault slip rates and had the advantage of more experience using LESS techniques with a primary objective to understand how fast the Shoreline and Hosgri Faults are slipping.

Dr. Nishenko displayed a schematic diagram showing the product of the digital data on a survey block area of San Luis Obispo Bay and that of a 3-D perspective view of a smoothed similarity bedrock surface of San Luis Obispo Bay, which strips off 15 meters of sea water and 25-30 meters of sediment to allow the cretaceous sandstone structural features at depth to be examined. He described the technology as analogous to a person having a CT scan as opposed to an x-ray as it shows different angles and orientations that were not possible previously with vertical seismic profiling such as was used in the 1980's. Dr. Nishenko reported the photo indicated that a valley had been created and eroded numerous times associated with past glaciation, most recently 20,000 years ago, and the offset of the faults, which have occurred in the last hundreds of thousands of years, can be spotted more easily on the valley walls where they cross geomorphic features. Dr. Nishenko remarked that the spacing between survey lines in the past was approximately 800 meters and now that has been reduced by the use of high resolution data collection and post processing techniques to 12-15 meters and therefore more subtle features on the sea floor topography are revealed including sharp lineations associated with the Shoreline Fault and Oceano Fault zones. In response to Dr. Peterson's query Dr. Nishenko confirmed these data sets consist of terabytes. He pointed out the location of the Shoreline Fault, the Oceano Fault and the Los Berros Faults which converge toward the northwest in the vicinity of a navigational hazard known as Souza Rock. Dr. Nishenko stated the motion of the Shoreline Fault zone is shown to be in the order of hundredths of a millimeter a year with the rate of horizontal motion to vertical motion being 10 to 1. The Oceano Fault, predominately a vertical high angle reverse fault, has a rate of amount 0.1 millimeter per year and, together with the Los Berros Fault, shows little evidence for horizontal motion. In response to Dr. Budnitz inquiry on the difficulty of determining the vertical motion of the mostly horizontal Shoreline Fault, Dr. Nishenko stated that this determination is dependent upon its age because the 3 meter cube data envelope can only resolve features that have offsets greater than 3-6 meters so the strata do not show a cumulative offset accumulated beyond 3-6 meters but Dr. Nishenko stated with some of the horizontal horizons evidence is seen for vertical offset of older horizons which are a few hundred thousand years old.

Dr. Nishenko described a slide showing the paleoshoreline dating to 155,000—185,000 years ago in the vicinity of the Shoreline Fault which he reported shows approximately 10 meters of right lateral offset, giving a rate of 0.06 millimeters per year over the last 100,000 years and he stated in response to Dr. Budnitz' comment that the major uncertainty is the age of the feature which is based upon relative stratigraphy and not an absolute age date and could be off by 35,000—50,000 years. Dr. Nishenko stated a similar analysis was done for the Hosgri Fault where a number of submarine channels were identified, likely related to drainage of the Santa Maria River, and the data shows the offset of the Hosgri Fault over the last approximately 342,000 years with an estimate of the rate of offset on the order of 600—650 meters which gives a slip rate of 1.8-1.9

millimeters per year which he described as consistent with estimates of slip rates determined farther to the north. In response to Dr. Peterson's comment, Dr. Nishenko displayed a graphic showing data for the Hosgri Fault slip rate which appears to be approximately ten times larger than the slip rate for the Shoreline Fault and Dr. Nishenko reported relatively the Hosgri Fault remains the primary source. Dr. Peterson observed that, by way of comparison and context, there are structures on the Hayward Fault in the San Francisco Bay area that have been offset by 10 inches in the last 70—80 years. In response to Dr. Lam's inquiry, Dr. Nishenko stated the interpretation of the data on the slip rates for the Hosgri and Shoreline Faults would be addressed by the Senior Seismic Hazard Analysis Committee (SSHAC) study which PG&E is in the process of completing in response to the NRC's 10 CFR 50.54(f) letter and the SSHAC study takes a probabilistic approach to seismic hazards as opposed to the CCCSIP report which employs a deterministic analysis.

Dr. Nishenko reported that in response to the CEC recommendation and AB 1632, PG&E determined to employ both high energy and low energy 3-D seismic surveys and made the decision to do the low energy surveys first because permits were received from the State Lands Commission, while PG&E continued to explore the possibility of doing the high energy surveys using air guns. A geophysical permit was subsequently granted from the State Lands Commission but the California Coastal Commission denied the permit on the grounds of environmental concerns. Dr. Nishenko stated PG&E remained interested in the questions to be addressed by the high energy surveys and in the geometry of the Hosgri Fault, as during the LTSP there was controversy about whether the Hosgri Fault was a vertical strike-slip fault or a low-angle thrust fault dipping to the east or possible a listric fault. In response to Dr. Lam's query Dr. Nishenko stated this controversy was driven by two groups, one of which believed the major faults on California's borderland were low-angle listric faults while the other group believed the faults in the Santa Maria Basin were high-angle strike-slip faults. He remarked that the data now available from seismic monitoring in the area includes studies on gravity, magnetics, and observations from more earthquake activity and he stated the controversy, in his opinion, has now been resolved in the CCCSIP report.

Dr. Nishenko displayed a graphic showing the comparison with the depth of penetration into the earth's crust using different techniques including low energy seismic surveys penetrating 200—300 meters, air guns using high energy survey techniques which penetrate 5—6 kilometers with clear imagery but remain above the seismogenic zone, which for earthquakes occurring along the Hosgri Fault is typically at depths greater than 3—4 kilometers, down to 15-16 kilometers. He reported the combination of potential field data and seismicity is consistent with the Hosgri Fault being a high-angle vertical fault and strong evidence is not present for a reverse fault or a listric fault as previously hypothesized. Dr. Budnitz observed that the data appears to indicate there is a much lower probability of shallow reverse fault characteristics and Dr. Nishenko confirmed that the data in the report shows that if the dip of the Hosgri Fault is changed the variation on the magnetic field values constrain the dip, indicating it is characterized as vertical rather than shallow. In response to Dr. Lam's question, Dr. Nishenko confirmed that with a record including 40 years of seismic activity and with advances in the ability to more accurately locate earthquakes, review patterns of magnetic and gravitational anomalies, and better assumptions concerning composition of the rock, which led in part to the identification of the Shoreline Fault, there is an increased level of confidence in the interpretation of the Hosgri Fault as a vertical fault.

Dr. Nishenko displayed a photograph of the vibrocise vehicles, each weighing 65,000 pounds, used to conduct high energy seismic reflection profiling surveys in the Irish Hills during 2011 and 2012. The purpose of this effort was to integrate surface geologic mapping with shallow high resolution seismic profiling down to 5—8 kilometers. He displayed a map of the Irish Hills where survey activities occurred on 110 miles of access roads over very steep topography with limited access which made the feasibility of doing true 3-D profiling somewhat limited. He displayed a ‘fence diagram’ summarizing the major elements of the interpretation of the geology and geologic structure of the Irish Hills which he stated is an asymmetric basin formed about 22,000,000 years ago in a transtensional regime with active spreading and opening of the basin about 3,000,000—4,000,000 years ago coincident with plate motion in the Gulf of California which altered its features from transtensional to transpressional and then the basin closed again. Dr. Nishenko stated the Edna Fault near the center of the Irish Hills is a steep fault, on the order of 60—80 degrees dip, and it appears to be the major structural boundary of the basin to the northeastern side and there are a number of blind faults associated with the Edna Fault. The Los Osos Fault to the east is also a steep fault with a dip of 55—80 degrees and is characterized by a mostly reverse or reverse oblique motion but it does not appear to be as well developed as previously believed and as you approach Morro Bay, the Edna Fault dives and becomes a blind fault or a fault propagation fold rather than an actual fault surface. To the west is the Shoreline Fault which has been demonstrated to be a steep vertical fault and the San Luis Bay Fault which cuts across DCP’s Avila Beach gate and obliquely across the Irish Hills and joins with the Shoreline Fault further to the north. Dr. Nishenko stated that while the fence diagram only shows the top few kilometers it is believed that all the faults he mentioned converge or coalesce at depth into a single root zone associated with the Edna Fault zone and he confirmed, in response to Dr. Budnitz’ remark, that this is consistent with the change from transtensional to transpressional occurring 3,000,000—4,000,000 years ago.

Dr. Nishenko stated that the formations are Franciscan and are very broken up. He displayed graphics which compared geologic cross sections with the proponent model which PG&E is addressing as part of the IPRP and AB 1632 process. He compared the cross sectional view proposed by Dr. Douglas Hamilton on which Dr. Hamilton based his prediction about the geometry of certain faults. Dr. Nishenko stated Dr. Hamilton’s proposal inferred the offshore thrust of the Los Osos Fault as the essential feature of geology to explain the uplift of the Irish Hills. Dr. Nishenko stated the CCCSIP data collection and seismic imaging process now demonstrates that the Los Osos Fault dip is steeper than the 45 degree dip originally proposed. With reference to the San Luis Bay Fault zone, the projected zone where Dr. Hamilton inferred offshore thrust is proposed to exist shows no evidence of cross cutting the vertical fault zone and the data shows no evidence for vertical faults being offset by sub horizontal faulting and Dr. Nishenko stated the geology in that area is best represented by a steeply dipping San Luis Bay Fault. However, Dr. Nishenko stated the Irish Hills are uplifting but other models may need to be considered to explain this including the role of the Los Osos Fault and the southwest boundary zone, with a series of reverse faults dipping toward one another to produce the uplift and also perhaps other offshore faults such as the Hosgri Fault.

Dr. Nishenko reported the CCCSIP report also addressed concerns with the Diablo Cove Fault which

was uncovered during excavation for DCPD during the 1960's and he displayed a photo of the mouth of Diablo Creek taken in 1972 during the construction of DCPD. He stated there is no dispute that the fault is present and that it goes underneath the corner of the Turbine Building. He displayed a graphic showing the attitude of the fault with reference to excavations done during initial construction of DCPD and two pictures of the fault. He stated there is not a lot of displacement across this feature and when it was mapped in the 1960's it was observed that there is a quaternary alluvial terrace deposit atop the bedrock surface that dates to 125,000 years ago and the fault does not disrupt that deposit indicating its lack of activity during that period. The fault appears to be discontinuous with directional surface traces which do not follow the same trend and no evidence is present for significant or any offset at depth based upon high resolution seismic profiling and no convincing evidence of an offshore connection. Dr. Nishenko described this as a secondary faulting feature more akin to a bending moment fault associated with the bending and folding of rock rather than a through-growing seismic feature. Dr. Nishenko stated that all lines of evidence have led PG&E to disregard the Diablo Cove Fault as a seismic threat to the plant.

Dr., Nishenko reported the third element of the seismic imaging project involved the installation of an array of ocean bottom seismometers (OBS), comprised of a three component accelerometer and a three component broadband seismometer, offshore from Point Buchon to monitor in detail the area of the intersection of the Hosgri and Shoreline Faults and he displayed a map of the installation area and a photo of the 1-ton concrete cap containing the OBS which protects the device from trawling activities on the sea floor. The OBS devices are connected by cable to provide real time monitoring capability when earthquakes occur.

In summarizing his presentation, Dr. Nishenko stated the Hosgri Fault slip rate has been revised from 0.5 to 6 millimeters with a preferred rate of 2.25 millimeters per year to approximately 1.8 to 1.6 millimeters per year and the Shoreline Fault slip rate previously estimated at 0.3 millimeters per year has been revised to 0.01 to 0.06 millimeters per year. The previous assumption in the LTSP of a boundary between the Hosgri Fault and the San Simeon Fault has been relaxed to assume a rupture could propagate and produce a larger magnitude earthquake on the Hosgri Fault. The possibility of a linked rupture of the Hosgri and Shoreline Faults was analyzed and no convincing evidence was found for a joint simultaneous rupture in the past but for purposes of the analysis and investigation of the consequences they were linked together. Finally, the length of the Shoreline Fault was established as 45 kilometers, from its intersection with the Hosgri Fault off Point Buchon to its southern terminus near Guadalupe in Point South, which is almost double its 2011 estimate of 23 kilometers due to extending the Shoreline Fault through San Luis Obispo Bay. As a result, the Shoreline Fault was found to have an increased maximum magnitude length relationship.

Dr. Norman Abrahamson, Chief Seismologist for PG&E Geosciences, continued the presentation. Dr. Abrahamson stated that two approaches exist to doing a seismic hazard analysis. A deterministic approach postulates that an earthquake has occurred and estimates what the range of ground motion might be. A second approach is probabilistic and focuses upon how large is the ground motion produced at a specific site from all possible faults, adds those contributions together, and tracks the rate at which seismic events occur. Dr. Abrahamson remarked the NRC is moving toward the use of probabilistic results for risk assessment and the CCCSIP studies were not prioritized to

optimize deterministic results. He stated the sensitivity diagram used by Dr. Nishenko impacts probability. A common currency of seismic moment is developed taking the area of the fault, the amount of its slip (or an abrupt release), and the rigidity of the crust to calculate the energy released by the earthquake. This calibration of magnitude uses data from the seismogenic portion of the rupture not the aseismic slip so that for a fault that is creeping, such as the Hayward Fault, it is not releasing the type of energy which concerns seismologists. Dr. Abrahamson reported energy is determined using the area of the fault and its rigidity but the slip rate is used and he described the area of the fault and the slip rate as key parameters, as doubling the slip rate and if the other factors stay the same, the rate of earthquakes is doubled. Events of lesser magnitude, slower slip rates with less area are not screened out of the data but are included in the sum of the data. In response to Dr. Budnitz' question concerning how a paleo event which occurred long ago can be differentiated, Dr. Abrahamson replied that if no evidence of creep exists but active creep is ongoing it is assumed it is all seismogenic and an episodic release is presumed. He remarked that very few faults creep and the San Francisco Bay area is unusual in that a number of such faults exist there.

Dr. Abrahamson reported that initially in the study of the Shoreline Fault there was no direct evidence of its slip rate. Gravity and magnetic data were consistent with a vertical strike-slip fault and the only manner to assess the slip rate was to review its gross geomorphology compared to other faults. Its slip was accordingly estimated at between 0—1.0 millimeter per year. With data now available on the Shoreline Fault deformations an actual measurement of the slip rate is possible. In 2011, with an assumption of 1/3 millimeter per year, the Shoreline Fault was believed to contribute 20% to the seismic hazard at a 10⁻⁴. With the new slip rate calculation using CCCSIP data the Shoreline Fault is now believed to contribute 4% to the seismic hazard at the same level. Dr. Abrahamson stated that at that level it is not worthwhile to engage in an effort to refine the slip rate calculation by taking core samples. The Shoreline Fault is now seen as a much smaller contributor to the probabilistic hazard. A different case is established under a deterministic approach, as the deterministic approach does not include how often an event might happen. Dr. Abrahamson stated the seismic hazard approach is to be mean-centered and to capture the scientific uncertainty and there is no intent to be conservative. The energy from an earthquake may be released in many small events or in one large event or in an even larger earthquake which will happen less often. He stated the probabilistic risk type of analysis is somewhat counter intuitive in that larger earthquakes and a linkup of faults produces a lower hazard because such earthquakes happen less often. For the deterministic approach, when faults are linked a larger earthquake is produced with a larger ground motion. So what is conservative for deterministic is unconservative for probabilistic. Dr. Abrahamson described the CCCSIP efforts as therefore being directed to using the best science to track and reduce uncertainty by collecting data to begin to limit ranges of the models that are not inconsistent with observations. Dr. Budnitz observed, and Dr. Abrahamson agreed, the logic of the probabilistic approach to seismic hazard assessment enables disparate faults and sources to be pulled together in a way that produces a coherent measure of the hazards at the site. Dr. Peterson observed that an understanding is required of the energy imparted at different frequencies during an earthquake and Dr. Abrahamson agreed and confirmed that strong ground motion can be produced from moderate as well as large earthquakes. Dr. Abrahamson remarked the analysis presented to the DCISC was simplified to use 5 hertz as the frequency but the

broad range of frequencies are covered in the CCCSIP study. In response to Dr. Peterson's question on predicting the frequency at which energy will be delivered by a seismic event Dr. Abrahamson replied that determination is empirically derived from earthquake recordings taken around the world with a large standard deviation employed as part of the probability calculation and seismic hazard calculation includes a combination of the chance that an earthquake will occur, the probability of the event, and the site's location relative to the distribution of the ground motion. Dr. Abrahamson remarked that DCPD is more likely to get strong shaking from a very unusually energetic moderate-sized earthquake, magnitude 6—6 ½, than it is from a larger event. Dr. Peterson observed Dr. Abrahamson statement illustrated the argument for probabilistic analysis as it looks at what gives the greatest risk from the events which happen with the most frequency and Dr. Abrahamson agreed and added the probabilistic approach recognizes that strong shaking can be produced by a range of earthquakes with varying magnitudes but if lesser magnitude events are more frequent then there is a higher chance that one of them will produce excessively strong ground motion.

Dr. Abrahamson observed earthquake scenarios involve magnitude, geometry, and location. He stated geometry is an important parameter for DCPD due to the 'hanging wall effect' whereby the hanging wall of a thrust fault can produce up to twice the ground motion and high frequency content as produced on the other side of the fault. Global ground motion models are constructed using data from earthquakes around the world and use distance, reference to the rock site conditions, and the frequencies observed and the strength of shaking for an average rock site. The results are then applied to assess DCPD's site response with data on site-specific rock and soil property and recordings at DCPD from past earthquakes. This permits a spectrum to be created whereby the worldwide models are calibrated to the site conditions at DCPD to provide an accurate representation of what the shaking will be under different earthquakes. In response to Dr. Lam's query, Dr. Abrahamson replied the latest data set has approximately 20,000 earthquake recordings, including almost 1,000 recordings within 20 kilometers for magnitude 6 and above events, which he described as greatly improved from the amount of data available when the initial work was begun in the 1970's and later. In response to Dr. Peterson's observation, Dr. Abrahamson stated the directivity effect, the increase in strength as the energy propagates, is addressed as a contribution to the distribution in the models and is included in the calculation of the broad standard deviation although broad uncertainties still exist.

Dr. Abrahamson displayed a graphic of the geophysical survey activity in the vicinity of DCPD including the locations where the vibroseis trucks operated and the location of the thousands of seismometers used to take readings and he stated that these seismic exploration efforts have produced data that no one has ever had access to in terms of attempting to characterize the site conditions. He remarked these surveys propagated underneath the power plant and with that data tomography can be done and inverted to determine velocity. He displayed a 3-D site velocity model for DCPD with high velocities of 1,500—1,800 meters per second through very hard rock indicated in red, lower velocities of 1,000 meters per second in green, and even lower velocities of 600 meters per second in blue. He described the area of DCPD as having complicated geometry, as the area was in a previous subduction zone from which the accretionary wedge is scraped off, but he stated that the deeper readings become more consistent. Dr. Abrahamson remarked this type of

image has never before been available and previous data was acquired by boring into the subsurface. Dr. Abrahamson stated PG&E now has a better understanding of the variability of the geologic structures below the power plant and this is important as higher velocities typically lead to lower ground motion.

Dr. Abrahamson provided a graph of the average of the shear wave velocity profiles for the DCPD Power Block and the Turbine Building foundations, as determined by data previously acquired and data acquired as part of the CCCSIP surveys. He observed the Turbine Building is a lower velocity structure, with more amplification when compared to the Power Block and this would result in larger ground motions going to the Turbine Building for the same earthquake than for the Power Block. In response to Dr. Peterson's question Dr. Abrahamson confirmed the Turbine Building and the Power Block are not coupled together in such a fashion that they would move together during an earthquake.

Dr. Abrahamson stated the traditional DCPD site response evaluation uses the recorded ground motions at the DCPD free-field site, particularly from the San Simeon and Parkfield earthquakes, to adjust the global average models to DCPD site-specific characteristics. He stated a key finding, as the global data sets have increased, is that the global average is not correct. Wave propagation through the crust is a systematic, repeatable, behavior. Dr. Abrahamson stated that ten earthquakes in the same area going to the site are going to pass through the same crust and each site has its own personality and with the new empirical data from the CCCSIP it is now possible to observe this deviation from the global average and measure the elastic properties of DCPD buildings and calibrate the model for DCPD's shallow and deeper soils. Drs. Peterson and Budnitz observed this is important for a fragility assessment and provides a firmer basis for infrastructure response spectra. Dr. Abrahamson stated that before those spectra can be established it is necessary to account for attenuation by distance using recordings at other sites to remove the average affective source and the propagation by distance from those earthquakes. This records the event as a function of distance but does not use DCPD-specific data to compare to the global model. After correcting for the path and the source, site-specific data indicates that there is a site resonance in the range of 2—3 hertz and the DCPD site has stronger amplification at low frequencies and weaker amplification in the range greater than 5 hertz as compared to an average rock site in California.

Dr. Abrahamson displayed a graph of the DCPD site-specific terms from the San Simeon (in blue) and Parkfield (in red) earthquakes showing the site-specific high and low ranges and the global average high and low ranges. He confirmed Dr. Peterson's observation that the data shows a higher content in the lower frequency ranges and less in the higher frequency ranges where mechanical equipment might be expected to be more fragile. Dr. Abrahamson stated the data shows a lower content than the global average would indicate. He stated PG&E is now developing new and better fragility models based upon the data from this site-specific spectrum. More data, even from very small earthquakes, will be evaluated from the densely recorded areas around DCPD which will give an even better evaluation.

Dr. Abrahamson reported the data collected for the source characterization will be used in the

SSHAC study and a deterministic evaluation is being done to evaluate whether a problem exists using bigger magnitudes including assuming a longer Shoreline Fault and a linked event on the Hosgri and Shoreline Faults to assume a larger earthquake. Dr. Abrahamson remarked DCCP is not very sensitive to the magnitude of the earthquake when assessing high frequency shaking levels. He displayed a map of the Hosgri and Shoreline Faults and confirmed Dr. Peterson's comment that high frequency shaking comes from within an approximate distance of 25 kilometers and the main structural models are in the 3—8 hertz range with fragilities being key to the parameter he discussed. Dr. Abrahamson reviewed a graph of the latest ground models, developed last year, and noted that at magnitude up to 5—8 from magnitude 5—6 $\frac{1}{2}$ the ground motion goes up by a factor of 2, but once the 25 kilometer range is reached, around magnitude 6.2, the curves begin to flatten for both the Hosgri and Shoreline Faults and there is very little increase in the high frequency ground motion close to the fault as more and more total energy is added to the earthquake as it spreads out over a large diameter. As the data goes from magnitude 6 $\frac{1}{2}$ —6.7 or 7 the ground motion is changed by less than 10%. Dr. Peterson observed this data indicates that stronger earthquakes or earthquakes involving a longer length fault will generate stronger ground motion at low frequencies. Dr. Abrahamson reported the lowest frequency considered by the current approaches is $\frac{1}{2}$ hertz. Dr. Abrahamson reported the plant's cranes are sensitive to ground motion and sloshing of the spent fuel pools will occur and did occur during the San Simeon earthquake and new models include data to 0.1 hertz as the NRC has requested that studies go at least to 0.5 hertz. Dr. Peterson remarked that at Fukushima there was considerable uncertainty about the spent fuel pool water levels as the ground motion at low frequencies from the Great Japan earthquake occurred for a protracted period of time during which water was observed sloshing over the spent fuel pool handrails.

Dr. Abrahamson reported the scientific data in California shows the faults can produce large earthquakes and therefore allowance must be made for rare occurrences of earthquake faults rupturing simultaneously and creating larger earthquakes. Dr. Peterson observed this supports the fact that the most important vulnerabilities will tend to come from a combination of factors associated with smaller earthquakes and to focus on extremely large earthquakes misses this point.

Dr. Abrahamson displayed a graph showing deterministic sensitivity of the Power Block and the Turbine Building under the various design spectra including work done in 1977, in 1991 as part of the LTSP, and the CCCSIP studies using local data. The spectrum now peaks at 2 $\frac{1}{2}$ hertz, and is still bounded by evaluations done from the 1977 spectrum and the conclusion is that there is no immediate safety issue and PG&E will proceed with the SSHAC study to complete the full evaluation to build the full probabilistic analysis. He displayed a graph of the sensitivity when the Shoreline and Hosgri Faults are modeled as linked and rupture together. Dr. Abrahamson stated the geometry is such that as the rupture goes from one fault to the other it is releasing bend, which is basically an energy sink, and so the rupture stops. From all the dynamic rupture models conducted it was not possible to get more than 2 kilometers onto the next fault. Dr. Abrahamson remarked that if the Shoreline Fault had been located on the other side of the Hosgri Fault the conditions would have been more favorable for a longer rupture. He reported that postulating a 7.3 magnitude event on the Shoreline Fault and linking it to the Hosgri and San Simeon Faults creates a larger earthquake but with the magnitude at short distance it doesn't move the ground motion model as much and

therefore the plant is not especially sensitive to the magnitude of a seismic event and Dr. Abrahamson stated the biggest issue for PG&E is the angle and dip of the faults as those are the factors which have the most impact in terms of the near fault ground motion. Dr. Peterson observed and Dr. Abrahamson agreed that in the 5 hertz range, where many of the fragilities exist, the actual peak acceleration and duration shown on the graph would be significantly lower than the plant's design basis. Dr. Abrahamson confirmed that most of the equipment fragilities are not driven by fatigue and with the distances involved the strongest part of the shaking at large amplitudes lasts for approximately ten seconds even as the magnitude of the earthquake increases. Dr. Peterson confirmed his understanding that with the lower frequency coming from a longer distance the duration shaking at higher frequencies will not last long and the lower frequency will be of longer duration.

In summarizing his presentation, Dr. Abrahamson stated the new seismic source information shows the potential for larger magnitude events on the Hosgri and Shoreline Faults and the slip-rates for the Hosgri and Shoreline Faults are somewhat smaller than previous estimates which only affects the probabilistic results. There is now much more detailed site velocity information available specific to DCPD which Dr. Abrahamson described as unprecedented and unavailable in any other place in the United States. He stated the implications for DCPD include a showing that the updated ground motions are bounded by the results of the 1977 ground motion spectrum and the plant has more margin than previously estimated. Dr. Peterson observed that while this was valuable information, DCPD needs to also confirm that plant personnel are going to remain safe during an earthquake. Dr. Abrahamson confirmed Dr. Budnitz' observation that the studies Dr. Abrahamson discussed are feedstock for the SSHAC analysis which will then complete the probabilistic integration and later, after that integration, there is also a differentiation process as a part of the probabilistic SSHAC process and Dr. Abrahamson confirmed this work will be completed within the next six months. The full, updated hazard analysis is due to be completed by March 2015, and Dr. Abrahamson confirmed the three ground motion characterization workshops held recently were conducted using this data. In response to Dr. Lam's request, Dr. Abrahamson stated there is a potential, not a certainty, for larger magnitude events on a larger area of the faults but the margin for such events comes not from the magnitude of the event but from the ground motion model. He stated it is a two-part process, first to characterize the source which is determinative of the magnitude and the geometry involved and then to use the ground motion model to estimate the shaking from the event. Dr. Abrahamson stated the greatest change from what was done in 1977 and in 1991 is the improved ground motion model and that improved model is responsible for the difference in the spectra, not the source characterization. PG&E now has much larger data sets than previously available and now has local data for use to assist with calibrating and correcting the global model. In response to Mr. Wardell's inquiry, Dr. Abrahamson replied the Loma Prieta earthquake was too far away to be recorded at DCPD due to its distance. Dr. Peterson remarked he is now convinced that large earthquakes can occur on the Hosgri Fault and their frequency at under 1,000 years means that at some point in the future a large event will occur and this needs to be considered in the plant's seismic design basis. Dr. Abrahamson remarked there is no doubt that the Hosgri Fault is active. Dr. Abrahamson confirmed, in response to Mr. Wardell's question, that DCPD is near multiple faults and therefore a very robust design basis is required as DCPD has a higher seismic hazard than other nuclear power plants and accordingly it has a much higher seismic design basis. He remarked

that an analysis of the level of safety involves not just the hazard but also the capacity of the plant to withstand the hazard. Dr. Abrahamson stated the Diablo Cove Fault is a bedrock fault or fracture that goes only to depths of tens of meters and is incapable of producing a large earthquake. All of California has bedrock faults but he stated the Diablo Cove Fault is not a seismogenic source capable of releasing significant energy.

Dr. Peterson thanked Dr. Abrahamson for his presentation and opened the floor to public comment.

Dr. Gene Nelson was recognized. Dr. Nelson stated he previously discussed the subject of what he termed aperture earthquakes with Dr. Abrahamson and he described this as a core concept which he summarized as the concept that essentially the impact of an earthquake is going to be based upon the proximity of the faults and the earthquakes effects attenuate quickly over relatively short distances.

Mr. David Weisman, representing the A4NR was recognized. Mr. Weisman remarked that during the Committee's discussion of the Evaluation of alternatives to once-through cooling at DCPD it was agreed that the work was preliminary in nature and he suggested that PG&E's use of the term "Final" for its recent report on the CCCSIP seismic analysis was a misnomer and that report was really a preliminary draft. Mr. Weisman commented during Dr. Nishenko's report on the effort to identify the range of hazards by use of the tornado diagram Dr. Nishenko referred to the input of the IPRP but that represented the only discussion of the IPRP which, he remarked, was akin to the manner in which coordination with the IPRP took place. Mr. Weisman stated the IPRP last met on July 11, 2013, and the IPRP raised a number of issues which were discussed in Drs. Nishenko's and Abrahamson's presentations including the need for more data and more study. Mr. Weisman stated the IPRP was created by the CPUC to act as an ombudsman for PG&E's ratepayers and to ensure that PG&E's report on the seismic conditions at DCPD received a fair and open review. However, he stated PG&E delivered the CCCSIP report to the IPRP on the same day as the story of its release appeared in local newspapers. Mr. Weisman remarked in his discussions with the CPUC he was advised their review would take six to eight months and he observed this puts the schedule for conclusion of that review well past the date of March 2015 by which PG&E must complete the SSHAC study. Mr. Weisman reported the IPRP will meet on October 23 and again on November 17, 2014 and he suggested that the DCISC should attend those meetings. Mr. Weisman stated that as a member of the public and a PG&E ratepayer he would not characterize the CCCSIP studies as being final because the ombudsman assigned to protect the public and the ratepayers' interests was not consulted. He stated that PG&E has issued statements that the CCCSIP study would be made publicly available but he questioned when and to whom it would be made available. Dr. Budnitz replied that he and Dr. Peterson are planning to attend the scheduled meetings of the IPRP and will monitor the work of the IPRP as the DCISC has done for the SSHAC ground motion workshops. Dr. Budnitz stated it was not important to him what PG&E chose to title its report because until the IPRP has had a chance to review and opine on the work it will not be final. Dr. Lam stated he appreciated Mr. Weisman's comment and he was comfortable with labeling Drs. Nishenko's and Abrahamson's presentations as preliminary.

Dr. Nishenko, in response to Mr. Weisman's remarks, stated that as part of PG&E's commitment to

transparency all data collected for the CCCSIP project has been made available on two public websites. The marine data is located on the United States Geological Survey (USGS) website with the National Archive of Marine Seismic Data and the land seismic data is presently available on the Incorporated Research Institutions for Seismology (IRIS) website which is a university consortium. Dr. Nishenko reported that various levels of peer review were conducted as part of the CCCSIP studies including review of each individual chapter through an independent technical review process, and the entire CCCSIP report is being compiled under a nuclear quality assurance process. He remarked the DCISC, the NRC, and the IPRP all act as independent reviewers and all comments received will be taken into consideration. Dr. Nishenko stated the CCCSIP report is in the nature of a snapshot in time and PG&E continues to have a long term commitment to monitor and assess seismic safety issues for DCPD as part of the LTSP. Dr. Nishenko confirmed, in response to Dr. Budnitz' inquiry, that the data sets derived from the CCCSIP will be used by the SSHAC Level 3 group to inform the ultimate results of their analysis. Dr. Budnitz observed that in this process there is always the probability that there will be new information and in that sense the SSHAC results are a snapshot in time. Dr. Abrahamson stated that the best that can be done with the data is to set the ranges and uncertainty bounds such that when future studies are conducted the results are found to be within those bounds. Dr. Budnitz agreed and stated that with reference to the SSHAC guidance, if data is found to move within the center, the body, and the range this creates a level of confidence and the process is a success. Dr. Abrahamson confirmed that PG&E is not taking the position with the CCCSIP studies that the matter is closed and will not be further reviewed, and as new techniques and information are developed they will be incorporated into the hazard analysis. He commented the SSHAC study marks the end of phase one but incremental updates will continue with possibly a major update in ten years. Dr. Lam remarked he found merit in the willingness of the A4NR to also examine the data and the numerous assumptions involved in this approach in order to advance a safety agenda for DCPD.

Ms. Sherry Lewis representing MFP was recognized. Ms. Lewis commented use of the term 'final' would likely be confusing to the public and gives an impression that is not accurate. Dr. Budnitz replied the DCISC is without authority to direct PG&E with regard to the title of its study.

Mr. David Weisman representing the A4NR was recognized. Mr. Weisman reported that in the transmittal letter with the CCCSIP study from PG&E's Chief Nuclear Officer to the NRC it was stated that the underlying data would be made available to academic institutions and stakeholders after the peer review process and this statement is what caused him confusion as it appears to be different than the statements made following the presentation.

Mr. Wardell reported that he has transmitted a revision of the Evaluation of the Bechtel Addendum showing the changes from the version reviewed and discussed earlier in this public meeting to each DCISC Member and to Mr. Linnen, and Mr. Wardell asked that each of them provide comments directly to him this evening for preparation of a second draft to be considered the following day.

XI Adjourn Evening Meeting

Drs. Budnitz and Peterson thanked the PG&E representatives and the members of the public

for their attendance. The Chair commented the Committee has scheduled a public tour of DCPD for the following morning at 8:00 A.M. which has been booked by prior reservation, and the public meeting of the Committee will reconvene at 1:00 P.M. tomorrow. Dr. Peterson then adjourned the evening meeting of the Committee at 8:35 P.M.

Public Tour of Diablo Canyon Power Plant

The three members of the DCISC accompanied by 17 members of the public, PG&E tour guide Mr. John Lindsey and the Committee's consultants, conducted a tour of certain accessible areas of the Diablo Canyon Power Plant (DCPP). The members of the public responded to the DCISC advertisement concerning the public tour placed in a local area newspaper and on the DCISC's website. The group met at the PG&E Energy Education Center for an introduction to the Committee members and consultants and a short presentation on the background and role of the Committee. Mr. Lindsey provided a brief overview of DCPD including its history, operation, the nuclear fuel cycle, spent fuel storage and plant security. PG&E discussed how the plant's cooling systems work, with the ocean water two physical barriers away from the reactors. The group was issued visitor badges and then departed for DCPD.

After entering the plant through the Avila gate, the members of the public were then divided into two groups, each accompanied by at least one DCISC member and consultant, and each group visited in turn the Control Room Simulator Facility and the lobby of the Security Building for a demonstration of screening of personnel entering the protected areas of the plant and viewed the ocean water Intake and Outfall Facilities where DCPD pulls in and expels seawater used for cooling. The bus then drove by the site of the Independent Spent Fuel Storage Installation (ISFSI) for a description of its purpose and features and then stopped at the plant overlook site and the group received a briefing from PG&E representatives on the various external features and buildings.

Questions & Comments From the Public

During the ride back to the Energy Education Center the group received information on radiation protection and members of the public took the opportunity to ask questions of Committee members and consultants.

Conclude Public Tour

XXI Reconvene For Afternoon Meeting

The October 15, 2014, afternoon public meeting of the Diablo Canyon Independent Safety Committee was called to order by its Chair, Dr. Per Peterson, at 1:05 P.M.

XXII Committee Member Comments

Dr. Budnitz reported the discussion during the previous evening session on seismic issues was of great interest and contained a substantial amount of technical information which will take some time to fully assess.

XXIII Public Comments and Communication

The Chair invited any comments from members of the public.

Mr. David Weisman representing the A4NR was recognized. Mr. Weisman stated he would provide to Dr. Lam a legal brief on behalf of the A4NR dealing with cost recovery for PG&E's seismic studies. Dr. Budnitz remarked this brief had already been provided to the DCISC. Mr. Weisman stated he based his earlier comments regarding PG&E's treatment of the IPRP process as part of the final seismic review on the brief. Mr. Weisman remarked that from discovery and document requests made by the A4NR documents were identified from PG&E which address different levels of mitigation strategies proposed by PG&E to deal with contingencies posed by the IPRP's review including to address a situation where the IPRP might propose additional data processing or interpretation in its review of the CCCSIP project's results which are to be provided to the IPRP as a condition of CPUC funding for the CCCSIP project. Mr. Weisman stated documents received include information on PG&E's assessment of risks from the IPRP process including concern about the impact to scope and schedule which he stated were rated as a high level of concern by PG&E. Mr. Weisman reported PG&E has considered stressing with the IPRP that advanced processing and methods of interpretation techniques recommended by academia and the industry were used in the CCCSIP study and that the process and data will be made available to the IPRP before the technical reports are to be provided for IPRP review. Mr. Weisman stated PG&E has identified the charter of the IPRP to be the review of results and PG&E may be planning to potentially challenge any recommendation by the IPRP for additional processing or interpretation as being outside the scope of the IPRP's mandate. Mr. Weisman remarked that the California Coastal Commission did not completely reject PG&E's application for a permit to conduct the high energy offshore studies but rather the Coastal Commission stated the permit submitted by PG&E did not meet the needs of the Coastal Commission. Mr. Weisman cited information from an email provided to the A4NR concerning the high energy studies and Mr. Weisman observed PG&E never went back with a revised application for a Coastal Commission permit. Mr. Weisman also cited information from internal emails from PG&E's Legal Affairs Department, redacted in part by PG&E, and from PG&E's Director of State Agency Relations, to PG&E staff which Mr. Weisman stated were obtained by the A4NR pursuant to a discovery request concerning the IPRP Report No. 6 and PG&E's communication with CPUC staff regarding the IPRP and Mr. Weisman observed that after IPRP Report No. 6 all public meetings ceased. Mr. Weisman commented he remains skeptical concerning PG&E's commitment to further review. Mr. Weisman stated there were emails produced in response to A4NR's discovery request which he was not allowed to review as only the A4NR's attorney executed the required nondisclosure agreement. Dr. Lam stated that Mr. Weisman provided him with a copy of the A4NR Opening Brief dated February 28, 2014, and he confirmed the DCISC previously received a copy of the document. Dr. Lam stated without reference to the merits of counsel's arguments in the Brief, the Brief contributes to a useful public debate.

Ms. Jane Swanson, representing MFP, was recognized. Ms. Swanson requested confirmation that the DCISC was not a member of the inter-agency review committee (the RCNFPP). Dr. Peterson stated that Ms. Swanson's statement was correct. Ms. Swanson stated that the Evaluation claims during the August 13, 2013 meeting of the RCNFPP that the DCISC was asked to provide its

recommendations. She observed the notes of that meeting contain references only to the DCISC representatives making comments to Bechtel. Ms. Swanson stated her belief that the DCISC is attempting to give the impression that it has a more formal role in the SWRCB process than it actually has and therefore the comments of the DCISC to the SWRCB are entitled to the same weight as those provided by any individual citizen. Dr. Peterson replied that as a state-chartered committee, reporting to senior state government officials, the DCISC was not acting as members of the public in performing its review. Dr. Peterson remarked that review of operational safety at DCP is something the DCISC is obligated to conduct under its charter from the CPUC. Dr. Peterson stated it was his expectation that there is a corresponding obligation on the part of other state bodies to formally involve the DCISC in matters concerning its charter. Ms. Swanson commented that it was her belief that the DCISC was not requested to provide its Evaluation by the SWRCB/RCNFPP but instead the DCISC decided on its own initiative to do so. Dr. Budnitz remarked that this was not an accurate statement concerning the Evaluation of the Bechtel Assessment which was approved by the DCISC on September 4, 2013. Dr. Budnitz confirmed that at a previous meeting of the RCNFPP the DCISC expressed interest in conducting a review of the Bechtel Assessment and was asked to do so by the RCNFPP. Dr. Lam stated that it was his recollection the DCISC identified the obligation to conduct the review prior to being requested to do so by the RCNFPP. Dr. Peterson remarked he was surprised initially that the meetings of the RCNFPP were not well publicized and attending the meetings in person was a way to remain cognizant of matters that could potentially represent major changes to DCP and its operation. Ms. Swanson thanked the Members for their responses and stated she intended to state that the DCISC's Evaluation was not entitled to a standing different from that of the public. Ms. Swanson stated the draft Evaluation of the Bechtel Addendum draws unsubstantiated conclusion and, in her opinion, appears to be biased. She stated her belief that the DCISC should commence its review again from the beginning because the Evaluation gives the appearance of an attempt by the DCISC to lobby on behalf of PG&E's effort to gain an exemption from the state's Marina Protection Policy.

Dr. Peterson stated the FOE comments and critique of the Bechtel Addendum were focused on the ways in which cooling towers might be designed to reduce their cost. Dr. Peterson stated the Evaluation agrees that some of the changes proposed would be unlikely to have a substantive impact on plant safety. He remarked, however that a proposed six-year construction period on the south side of the plant with both units remaining in operation would have a substantive effect on operation of the plant as would the use of saltwater in the cooling towers with the associated potential to greatly increase the quantities of salt which would be deposited on the plant. Dr. Peterson remarked that after the attacks on September 11, 2001, modifications were made to the plant to enhance security and these modifications were very carefully reviewed for their impact on safety particularly in the area of emergency response and plant operations. Dr. Peterson stated his belief that a large scale construction project located to the south of the plant site would certainly require very careful review and would generate some negative impact on plant operation and the question which must be answered is the magnitude of that impact and whether it is acceptable as compared to the alternative of siting cooling towers to the north of the plant. Dr. Peterson stated he doubted that a conclusion could be reached that the DCISC has some ulterior motive in its concerns on these two particular issues as the Evaluation discussed several other design changes which could make the proposed design changes more affordable and which would likely not have a

substantive effect on plant safety. Dr. Peterson stated that in its Evaluation the DCISC must use its best judgment and the DCISC has committed to further study of the specific questions in greater detail in order to establish a better factual basis for its understanding.

Mr. Rathie distributed copies of the revised draft of the Evaluation of the Bechtel Addendum in a final version and in a version showing changes from the version provided with the public agenda packet for this meeting.

Dr. Lam proposed that a disclaimer be added to the Evaluation that the DCISC has no intention to assist any parties' effort or to contribute to any conclusion that would be counter-productive to compliance with the federal Clean Water Act. Dr. Budnitz strongly objected to adding the disclaimer proposed by Dr. Lam as the DCISC's Charter provides for its independent role. Dr. Peterson then called for public comment on the latest draft.

Dr. Gene Nelson was recognized. Dr. Nelson stated he emailed a formal statement regarding his position in opposition to the proposal to install cooling towers at DCP. He observed the SWRCB would force PG&E to place a large volume of highly conductive saltwater and brackish water with a high flow velocity above the 85 foot level at the plant. He stated his opinion this is a disaster waiting to happen and an earthquake would not be required to unleash what he described as a man-made saltwater tsunami at DCP and thereby seriously compromise long term plant safety. He recommended that the DCISC oppose the proposal by the SWRCB. Dr. Nelson commented he provided two articles from Forbes magazine to the Committee related to safety of the public and remarked that it was his belief the safety of the public should be within the DCISC purview because of the harm to the public which would occur if DCP were to shut down. He closed his remarks by stating the SWRCB proposal is just a way to shut down DCP similar to what happened to SONGS and it should be rejected.

Ms. Sherry Lewis of MFP was recognized. Ms. Lewis stated that a disclaimer in the Evaluation would mean nothing as she would not believe it.

Ms. Rochelle Becker of the A4NR was recognized. Ms. Becker, who serves on the RCNFP, stated the RCNFP very much appreciates having the DCISC's input and that the DCISC was formed for just such a role. She stated the DCISC was not initially invited to participate by the RCNFP because the RCNFP discussions were focused upon technology and then later upon economics. The DCISC was formed to assess and alert the public to safety concerns at DCP. She remarked the DCISC has a different opinion than Bechtel concerning the need for a license amendment and no decisions have been made. Ms. Becker thanked the DCISC for supporting a request that the SWRCB support a webcast of its meeting on November 18, 2014. She stated that PG&E has also agreed to support a local webcast of that meeting and has offered to pay the cost which, Ms. Becker observed, would come from its ratepayers. In response to Dr. Budnitz' inquiry. Ms. Becker confirmed that the invitation to the DCISC was discussed by the RCNFP.

Mr. Pat Kelly, President of the Avila Beach Community Services District, was recognized. Mr. Kelly stated he was pleased that there was no offshore high energy testing performed as the local

dungeness crab season proved to be the best in history. Mr. Kelly stated disturbing or destroying the marine mammal environment is not worth proving whether the plant is safe or not. Mr. Kelly inquired whether the water temperature, which he reported is currently higher than normal, has an effect on cooling. He remarked he was surprised to find the life of a dry storage cask was only 15 years and is now being extended to 20 years. He inquired how much it costs to change a dry cask but said he would not demand an answer of what that cost is over the 200,000 years that it will need to be addressed. He inquired who would pay for the waste created by DCPD and he suggested PG&E and its stockholders be required to contribute to an escrow account. Mr. Kelly stated that as DCPD is licensed to produce energy until 2024 after that date operation of the plant should cease. Dr. Budnitz replied that the efficiency of the DCPD cooling system is somewhat dependent upon the water temperature at the Intake Structure and the system is slightly more efficient when the ocean water is colder in the winter and accordingly the plant produces slightly less electricity during periods of warm ocean water due to the thermodynamic properties of the heat exchanger cycle. Dr. Peterson stated that dry cask storage at DCPD is licensed for 20 years but evidence indicates the casks could function effectively for approximately 100 years although the coastal environment at DCPD is more challenging to materials than an inland environment. Regarding the cost of storage, PG&E has a contract with the U.S. Department of Energy (DOE) that legally obligates the DOE to pay the cost for storage as the U.S. government is in partial default of these contracts by not beginning to accept the waste when it was contractually obligated to do so. The federal government is also under obligation to pay the cost for disposal of the fuel in consideration of the fact that PG&E previously paid a fee to the Nuclear Waste Fund. Dr. Peterson observed that the U.S. waste program has collapsed and is nonfunctional and therefore it is the federal taxpayers that will have to pay. Dr. Lam observed the NRC has a Waste Confidence Rule which means the NRC is fully confident and committed to licensing and operating a long term waste storage repository. Dr. Budnitz stated that the term of the license for dry cask storage is analogous to a state issuing a driver's license for five years and then subsequently requiring a reassessment, reexamination and relicensing of the driver's ability to drive. He observed that the duration of a license and the duration that something will remain safe are not the same thing and the NRC will be conducting a detailed evaluation before a license renewal or a new license for the ISFSI would be issued but until that process occurs no one knows whether engineering projections will be found to be correct. Dr. Lam stated he was sympathetic to the public concern over the period over which the waste will remain hazardous.

Ms. Simone Malbouef, a resident of Los Osos, California was recognized. Ms. Malbouef directed the attention of the Committee to, and she read from, an article by Mr. David A. Bunker which appeared in the Summer 2014 issue of the 'Tahoe Quarterly' which she stated contained revelations on the impact of the drawing out of ground water supplies in the California Central Valley and its impact on seismic activity. She reported that in some areas of the Central Valley land has dropped more than 28 feet due to the vacuum created by the evacuation of the aquifer. She reported the USGS has termed the sinking of the valley floor one of the largest alternations of land surface attributable to human activity and this activity has caused the Sierra Nevada and the California Coastal mountain ranges to rise and create more stress on seismic faults. Ms. Malbouef stated the earth's crust is surprisingly elastic and over the last 150 years a volume of water equivalent to the water of Lake Tahoe has been drained from under the land in the Central Valley without any

replenishment and water well drilling continues unabated. She commented she was surprised that emptying the Central Valley aquifer and the current drought conditions could affect mountains so dramatically and this is startling news for those in the local area living near 13 earthquake faults and serves as a reminder that the mountains, fresh water and the ocean are interconnected and she stated that we are just beginning to learn that this is the case. Ms. Malbouef stated the residents of Napa, California on August 24, 2014, experienced a 6.0 magnitude earthquake and she stated humans are not capable of predicting when an earthquake will occur or its magnitude and the same is true of tsunamis. She observed the accidents at Three Mile Island, Chernobyl, and at Fukushima were all the result of natural disaster, human error, or design flaws and natural disaster and human error are not within our control. However, destruction can be consciously mitigated by choosing to replace archaic and dangerous technology with safer more sustainable sources of power which support life on earth but do not threaten it, including solar, wind and wave technology which advance the creation of a world free of harmful effects of man-made carbon and radiation.

Dr. Peterson requested Mr. Cary Harbor, Director of Compliance, Alliance and Risk at DCPD to continue with the information presentations.

XXII Information Items Before the Committee

Mr. Harbor introduced the Engineering Supervisor for Digital Systems at DCPD Mr. Brian Maule. Mr. Harbor reported Mr. Maule has more than twenty years' experience in the industry, holds a Bachelor of Science Degree in Electrical Engineering, and has experience in the Instrument & Control organization at DCPD.

Digital Control Systems Overview.

Mr. Maule introduced himself and stated he is a resident of the San Luis Obispo area and a Cal Poly graduate. He stated use of the term "digital" means that control functions have moved from electro-mechanical control to computer control, much like has been done with modern motor vehicles. This change from electro-mechanical to computers matters because the end result is that control systems have become more reliable, ultimately providing a safer operating plant. Mr. Maule reported there are three primary digital control systems at DCPD:

- Turbine Control System (in-service 2004)
- Feedwater Control System (in-service 2005)
- Process Control System (in-service 2012)

Mr. Maule stated the purpose of the digital Turbine Control System is to regulate the governor valve position which in turn controls steam flow during all modes of turbine operation. Essentially, the system controls the turbine generator during plant startup, normal operations, and plant shutdown. In response to Dr. Peterson's observation, Mr. Maule confirmed the Turbine Control System has been digital for some time and was replaced in 2004 with a new digital system.

Mr. Maule reported the purpose of the Feedwater Control System is to automatically maintain SG

water levels during steady-state operations. The system restores and maintains the water levels within safe levels during normal unit transients. Newer controls have reduced or eliminated operator interaction during system transients, preventing unnecessary plant trips, and simplifying operation.

Mr. Maule described the function of the Process Control System as to convert physical plant parameters such as temperature, pressure, level, and flow into electrical signals during normal operation. These signals are used for plant control (pumps, valves, heat exchangers, and tanks), operator indication, and computer monitoring and recording. He remarked that the recorded signals are used by Operations to trend parameters and also to provide a historical record which assists in identifying any system degradation.

Mr. Maule displayed computer 'screen shots' of the turbine control display and feedwater control display and a photo of the control board display. He described some of the control functions and their locations on the displays and stated that the digital displays are recreations of the previously used Westinghouse displays and therefore they remain familiar to the plant operators.

Mr. Maule described and discussed the common benefits and features of the Process Control Systems as follows:

- Common Benefits

- Common/shared platforms, inherent redundancy
- Cost savings (parts & labor)
- Reduced impact on maintenance
- Reliability
- Ease of redundancy
- Less maintenance required
- Flexibility—used for different systems
- Zero moving parts

- Common Features

- Triple redundancy
- System functionality not affected by module failure
- Faulted modules can be replaced online, thus maintaining uninterrupted control
- Built-in online diagnostics without additional external hardware or software
- Utilized in critical petroleum and chemical production plants

In response to Consultant Linnen's question, Mr. Maule replied that redundancy is not required by regulation but is a design feature and redundancy is valued and used in the petroleum and the

chemical industry as well as in the nuclear industry. He stated that all three process control systems share a common hardware platform and a flexible software commonality in that they are flexible as they function as logic controllers and are not similar to home-based computers. In response to Consultant Wardell's inquiry Mr. Maule confirmed that the process control systems are safety-related systems. In response to Dr. Budnitz' question Mr. Maule stated the systems are comprised of three separate modules, each processing the same signals and if one detects a fault the other two will continue to work. In reviewing the performance history for the process control systems Mr. Maule reported that none of the digital control systems he discussed have ever caused a unit trip at DCPD or at another nuclear power plant, lost their ability to perform a safety function, or caused an unplanned change in reactor power. As a result, the operators have an overall system that they can depend upon to safely and reliably control the plant under all conditions. Mr. Maule reported that recent upgrades include the process control system (in-service 2012) and the auxiliary control system (in-service 2006). He stated future upgrades are planned for the Condensate Polisher Control System and the Reactor Protection System, which he stated is not a control system.

In reply to Dr. Lam's inquiry, Mr. Maule stated he has a total of seven people in his group, six employees and one contractor. He stated that his group does not do maintenance on the systems but rather maintains the data and tracks the replacements necessary to keep the process control systems operational. In response to Dr. Budnitz' comment, Mr. Maule stated during refueling outages there is a goal not to have to touch the process control systems and therefore there is not a work overload during refueling outages for his group as most work on the process control systems is done offline without interaction with the control room. Mr. Maule confirmed Dr. Peterson's observation that DCPD has been designated as a lead plant on replacement of its Reactor Protection System. In response to Dr. Budnitz' inquiry, Mr. Maule replied that DCPD has more digital systems than most other nuclear power plants and is considered to be a leader in the area of digital systems and frequently consults with other plants to identify and solve problems which he stated provides valuable operating experience to DCPD.

Mr. Harbor remarked that from his previous experience as a control room supervisor he found the use of the digital process control systems to be extremely beneficial for the operators as the systems have protections built into them prior to actuation which greatly assist in avoiding human performance error.

Ms. Sherry Lewis, a representative of MFP and resident of San Luis Obispo, California was recognized. Ms. Lewis inquired what might happen if the computers described by Mr. Maule were somehow disabled and whether the possibility for human intervention in the process control systems existed. Mr. Maule replied that from a control systems perspective the situation described by Ms. Lewis was not an issue as the process control systems control the operation of the power plant but it is the Reactor Protection System which would operate to safely shut down the plant and the process control and Reactor Protection System are entirely separate systems by design and they do not interact. Dr. Peterson confirmed that there are many opportunities for human intervention to bypass a Reactor Protection System initiated shut down or 'scram' and the plant can be shut down automatically or manually and this dual functionality is required by NRC regulation.

Mr. Harbor introduced Mr. Jeff Harker, Maintenance and Technical Training Manager at DCP. Mr. Harbor stated Mr. Harker has worked in the nuclear industry for 25 years, holds a Bachelor of Science degree in Nuclear Technology and has held positions in the Chemistry, Radiation Protection, and Training organizations at DCP.

Maintenance and Technical Training Update

Mr. Harker stated he was proud to work at DCP and recognized that his job includes the responsibility for safe operation of the plant and he described the DCP workforce as a motivated group. He began his presentation with a review of its objectives which include describing the basic elements of the Maintenance and Technical Training Programs Strategic Plan, providing a timeframe for completion, highlighting actions completed to date, and describing results achieved and the ongoing monitoring efforts.

Mr. Harker stated training programs at nuclear power plants are required to be on a four-year accreditation renewal cycle. Operations training programs are on a separate cycle from Maintenance and Technical (M&T) training programs and this cycle is offset by two years with an onsite accreditation team visit scheduled in the interim between Operations and M&T cycles. The last Operations training program accreditation renewal was in January 2014. The next onsite Training Program Accreditation Team Visit (ATV) is scheduled at DCP for the week of December 7, 2015, and Mr. Harker described this as a week-long evaluation visit in preparation for making a recommendation to the Training Programs Accrediting Board regarding the M&T training programs which are due for renewal in March 2016.

Mr. Harker described the origin of the M&T Training Programs Strategic Plan as including a Accrediting Board critique which was conducted immediately following the last Operations training program accreditation renewal. The results of this critique are captured as a self-assessment. Recommendations include developing a plan for M&T program renewal activities, scheduling and conducting mock boards to prepare for the process earlier, and holding a first board with internal members. The M&T program's focus kickoff will be conducted to reenergize the group for the M&T programs and to demonstrate board experience to program owners and inspire line personnel to leverage training opportunities.

Mr. Harker discussed and described the contents of the M&T Training Programs Strategic Plan as follows:

- Challenge Statement
- Actions to Leverage Training Programs
 - Communications
 - Organizational awareness of Board discussion
 - Provide Systematic Approach to Training (SAT) refresher

Routine communications to station personnel

- Training Staff Action
- Functional Organization Actions
- Strategic Communication Plan—Included in the Overall Plan
- Power History Events Analysis—Evaluated Against Training
 - Contains each event in power profile
 - Identifies Training activities associated with each event
 - Update on an ongoing basis
 - Reviewed at each Training Oversight Committee (TOC) meeting

In response to Dr. Budnitz' inquiry, Mr. Harker described this as an across-the-board plan and he replied the Strategic Communications Plan is communicated to the DCPD workforce through the plant's E-Connect communications network, within the training committees, and to the training oversight and advisory organizations. The TOC is comprised of plant senior leadership.

Mr. Harker described the training organization staff's actions as including benchmarking to learn from the accreditation renewal process experienced by other nuclear power plants including South Texas, Callaway, Constellation, Entergy, and Wolf Creek; the development and implementation of a comprehensive process to prepare and issue an Accreditation Self Evaluation Report (ASER); prepare for the Accreditation Team Visit (ATV); prepare for the review by the Accrediting Board; as well as periodically briefing the TOC on industry findings; developing a peer review process through the STARS Alliance; and participating in industry self-assessments, ATVs, and mock boards at other plants. In response to Dr. Budnitz' inquiry, Mr. Harker stated the Accrediting Board is made up of five members with extensive experience and gave as examples experience as ex NRC inspectors, senior executives from universities, senior executives from the airline industry. The ATV team is provided with the ASER which is then provided to the Accrediting Board. Mr. Harker reported other functional organizational actions at the departmental level include:

- Identifying at least one "training for performance improvement" item or aspect from 1R18.
- Identifying training successes resulting in better performance in 1R18.
- Rejuvenating the Performance Improvement Roll-Up process by review of Corrective Action Program documents, ensuring self-assessment techniques are used to identify opportunities and low level trends or issues are identified and addressed promptly.
- Identifying more than one benchmark or program in the next 12 months.
- Participating in industry mock boards to gain practice and experience

Mr. Harker stated the response to performance analysis requests of the DCPD Training Department is improving. He described the STARS Alliance accreditation renewal process as placing a focus on

accreditation renewal by going from the critique stage to a process for the next fourteen months. Mr. Harker reported DCPD sponsored the creation of the STARS alliance document which is now used by the entire STARS Alliance. The STARS Alliance accreditation renewal process consists of three main sections addressing maintenance of the accreditation process including:

- ASER Development (tables with actions completed and to be completed)
- Station Preparations for ATV
- National Nuclear Accrediting Board

Nineteen separate attachments include check lists, lists of due dates, and owner-identified items. Mr. Harker reviewed the key ASER dates for the upcoming M&T Training Programs Strategic Plan which provides for the completion and issuance of the ASER (Rev 0) during the first quarter of 2015 and provides time for revision and review before issuance of ASER (Rev 3) by the end of the third quarter of 2015.

Mr. Harker reviewed the results achieved by the M&T Training Programs as follows:

- Heightened awareness in training committees
 - TOC review of ATV preps (standard agenda item every quarter)
 - Lower threshold for evaluating issues for training solutions
 - Mechanical Maintenance performance improvement training for low level rework activities identified in 1R18
 - Process clarification through written guidance
 - STAR's Accreditation Renewal Process document
 - Alignment with STARS partners
 - Peer review of Comprehensive Self-Assessment Report and potential Station Identified Findings
 - On-going monitoring primarily through all training committees
 - Weekly phone call with directors and managers at other plants

Mr. Harker stated that the results involve a three-tiered approach with the Curriculum Review Committee consisting of students serving as the first tier, the Training Advisory Committee as the second tier, and the TOC as the third tier.

In concluding his presentation, Mr. Harker stated DCPD recognizes strong training programs are critical to the safe operation of the plant. DCPD has strong accredited training programs and a sustainable accreditation renewal process. Guidance is provided to help maintain accredited

training programs. DCPD uses extensive industry peer involvement in multiple activities to help guard against isolation and encourage adoption of industry best practices. In response to Dr. Lam's request, Mr. Harker identified the involvement of the students in the training process, using a process of analysis, design and evaluation, as the single most essential feature of a successful training program. Dr. Budnitz thanked Mr. Harker for a good report.

Ms. Sherry Lewis representing MFP was recognized. Ms. Lewis stated she had understood only the final portion of Mr. Harker's presentation. Dr. Budnitz remarked that Mr. Harker provided information on the requirements for training and had described how the process to meet those requirements is successfully implemented at DCPD. Dr. Budnitz confirmed that it is the ATV team not the Accreditation Board that visits the plant and the accreditation process, while it is monitored by the NRC, is conducted by the nuclear industry.

Ms. Elizabeth Brousse representing MFP was recognized. Ms. Brousse inquired whether persons who have been trained at DCPD by its accreditation process could use or employ their accreditation at another nuclear power plant. Dr. Budnitz replied and clarified that the accreditation process is for plant programs not plant personnel. He observed that skills acquired at one plant would not be adequate without additional training if an individual were to be transferred to or employed at another nuclear power plant. He confirmed Ms. Brousse's observation that Mr. Harker's presentation was a discussion of an industry model for training accreditation.

Dr. Gene Nelson was recognized. Dr. Nelson observed he was impressed with Mr. Harker's presentation and the process described by Mr. Harker as a living process with the lessons learned disseminated to ensure errors are not repeated. Dr. Nelson remarked that 'Focused Learning' is a company located in San Luis Obispo, California and Focused Learning was responsible for the development of the approach described by Mr. Harker as analysis, design and evaluation.

This concluded the informational presentations requested by the Committee from PG&E for this public meeting. Dr. Peterson expressed the thanks of the Committee to Mr. Cary Harbor and to all the PG&E personnel who attended and made presentations to the DCISC at this public meeting.

XXIV Concluding Remarks & Discussion By Committee Members Of Future DCISC Activities

The Chair requested Consultant Wardell to review the revisions made to the Evaluation of the Bechtel Addendum. Copies of the revised Evaluation in both its final proposed version and a version showing the changes made to the draft which was a part of the agenda packet for this meeting were distributed to the Committee and made available to the public at the same time. Mr. Wardell described the process he used to incorporate comments received from the Members, Consultant Linnen and Assistant Legal Counsel Rathie and the comments made by members of the public during the discussion of this matter earlier in the public meeting including the comments offered by Mr. Bill Powers on behalf of FOE. Mr. Wardell summarized the changes to the Evaluation which concerned the following:

- Statement by Mr. Powers that the NRC would defer to the State of California regarding a decision to require cooling towers in place of once-through cooling at DCPD. The DCISC does

not fundamentally disagree with that observation but believes that the NRC will retain the ability to review such a proposal for its nuclear safety effect.

- Experience of the DCISC with NRC licensing activities. Information has been added to the Evaluation addressing this question.
- FOE's comments regarding the effects of salt deposition from the use of saltwater by the proposed cooling towers. The Evaluation was revised to further address this issue.
- Risk to operational safety. The Evaluation was revised to clarify that the DCISC is primarily concerned with a risk to nuclear safety during the estimated six year period when both units are proposed to continue operations while construction activity occurs in the area where the south parking lot is presently located. The DCISC agrees the primary nuclear safety issue during the two year dual outage period is likely to be continued cooling to the plant's SFPs.
- References to Hope Creek using saltwater for cooling. The DCISC's research shows that the single unit at Hope Creek operates well but uses brackish water from the Delaware River estuary for cooling not saltwater. This brackish water is believed to have a salinity level approximately 1/3 that of saltwater.
- Salt deposition study taking into account the potential elimination of the Outfall and its effect on salt distribution location and rates. The DCISC agrees that in such a study related to the Outfall's replacement by cooling towers this would be appropriate. However, the DCISC believes the impact of the Outfall on salt deposition at the plant is less than what would be produced by the proposed cooling towers.
- Conclusions in the Evaluation on the impact on nuclear safety. Changes to the Evaluation were made to references in terms of the likelihood of such changes having a potential to impact nuclear safety. The Evaluation retains the conclusion that everything presented to date for the DCISC's review requires further study and analysis before any final conclusion or decision on any of the matters under consideration.

Dr. Lam stated he was comfortable with the revisions to the Evaluation as presented by Mr. Wardell but offered the following as an additional paragraph: "The DCISC's charter is to review and make recommendations concerning the safety of operations at DCP." Dr. Lam stated his suggested revision was prompted by his sensitivity to public comment that the DCISC's evaluation is being conducted outside of its charter, that by providing its evaluation the DCISC is doing another organization's bidding, and that the DCISC lacks independence in this matter. Drs. Peterson and Budnitz accepted Dr. Lam's proposed change to the Evaluation.

Dr. Peterson stated he remains sensitive to the concerns expressed by Dr. Lam, particularly to concerns expressed regarding the DCISC's evaluation of certain design changes which were proposed in the interest of reducing cost. Dr. Peterson observed that the Evaluation's review of cooling options includes reference to certain of the options being unlikely to generate significant nuclear safety concern. Dr. Peterson commented that concern with an increased risk of flooding may lie principally in that such a design change might trigger the need for a license amendment. Dr. Budnitz' agreed but he remarked the change to the flooding risk still needs to be evaluated as a potential safety risk. Dr. Peterson remarked that the use of saltwater for makeup cooling is a

significantly greater concern as there appears to be no similar use to serve as a precedent, with the Palo Verde plant in Arizona serving as the closest potential model but Dr. Peterson observed the salinity of water used by Palo Verde is less by a factor of three or four, the plant is located in different topography from DCP, and the desert produces much lower humidity than DCP's coastal setting. Dr. Peterson observed the information provided by Mr. Powers concerning Hope Creek appears to have been inadvertently inaccurate and more investigation is needed on the issue of salt transport and its effects on safety related equipment and systems. Dr. Peterson remarked that the use of reverse osmosis to treat seawater should not be dismissed too soon as it need not be prohibitively expensive because the water to be produced need not be treated to a level greater than necessary to remove salt. Dr. Peterson stated that the DCISC differs from Bechtel in that the DCISC believes that the modifications to the DCP cooling system suggested by Bechtel are very likely to require a license amendment from the NRC.

Dr. Gene Nelson was recognized. Dr. Nelson stated he was on the faculty at Cuesta College, had previously taught at Cal Poly, is a member of the group Green Nuclear Power, holds a Ph.D. in radiation biophysics and also has prior experience in the area of water treatment. Dr. Nelson expressed his opinion that the flooding issue discussed in the Evaluation would require a license amendment from the NRC and he commented it was the need for a license amendment that resulted in the closure of SONGS. Dr. Nelson noted that the proposal would require large amounts of water moving at a high velocity.

On a motion by Dr. Budnitz, seconded by Dr. Lam, with the incorporation of the amendment offered by Dr. Lam and the changes reviewed by Mr. Wardell, the Evaluation of the Bechtel Addendum was unanimously approved as amended and the Members directed the DCISC Legal Counsel's office to transmit the approved Evaluation to the SWRCB and post it on the DCISC website.

On a motion by Dr. Peterson, seconded by Dr. Lam, the DCISC unanimously approved and directed, in response to a request by the Executive Director of the A4NR, that a letter be sent to the SWRCB expressing the support of the DCISC for the establishment of a location in San Luis Obispo County where the proceedings before the SWRCB on November 18, 2014, might be readily accessed by a live, real time, webcast made available to the members of the local community.

The Members and Consultants discussed with Ms. Zawalick confirming the dates in 2015 tentatively identified for future fact-finding, emergency response drills, and meetings of DCP's Nuclear Safety Oversight Committee. Dr. Peterson remarked the public tour during this meeting had fewer participants than usual and it was observed that as PG&E is again offering public tours which visit the protected area of the plant which are not currently a part of the DCISC tour and perhaps the format for the DCISC tour should be reviewed and revised. **The Legal Counsel's office was requested to obtain information on the number of persons who have recently toured DCP and to review this information in context of the format for the public tour to be conducted with the DCISC public meeting in February 2015.**

Ms. Sherry Lewis was recognized. Ms. Lewis stated the PG&E tour visits areas of the plant not a part of the DCISC public tour. Dr. Budnitz stated the PG&E and DCISC tours are not intended to be the

same and that on the DCISC tour the public is accompanied by and has the opportunity to interact with the independent safety experts who serve on the DCISC. Dr. Budnitz stated the DCISC public tours are an important element of its mandate to conduct public outreach.

Dr. Budnitz stated he had just learned that the NRC will be releasing on the day following this public meeting its underground safety report for the Yucca Mountain proposed waste storage site in a version which does not include previous redactions and that the report will be available on the NRC's website at 3:00 P.M. (EST) on October 16, 2014.

Dr. Peterson again expressed the thanks of the Committee to PG&E for its assistance with the informational presentations for this public meeting and to the technicians of AGP Video who recorded and live-streamed the meeting to the internet.

XXV Adjournment Of Seventy-eighth Public Meeting

There being no further business, the seventy-eighth public meeting of the Diablo Canyon Independent Safety Committee was adjourned by its Chair, Dr. Per Peterson, at 3:30 P.M.

[25th Annual Report, Volume 2, Exhibit B9, Minutes of the Diablo Canyon Independent Safety Committee February 4–5, 2015 Public Meeting \(Approved at the June 16, 2015 Public Meeting\)](#)

Wednesday & Thursday, February 4–5, 2015, Avila Beach, California

Notice of Meeting

A legal notice of the plant tour and public meeting and several display advertisements were published in the Tribune and the Five Cities Times Press Recorder local newspapers, posted on the Committee’s website at www.dcisc.org and mailed to the media and those persons on the Committee’s service list. Information on the public tour, the legal notice and a copy of the meeting agenda were also posted on the Committee’s website. Public meetings of the Committee may be viewed online in real-time over streaming video at [/www.dcisc.org](http://www.dcisc.org) and [/www.slospan.org](http://www.slospan.org) and are videotaped for later broadcast on the local government access television channel (Channel 21).

Public Tour of Diablo Canyon Nuclear Power Plant

The DCISC and 15 members of the public participated in a tour of Diablo Canyon Power Plant (DCPP). The group started off in the PG&E Energy Education Center for a brief introduction of the DCISC and its Members and Consultants. Afterward DCPP representatives made an information presentation about the plant. The group then boarded a bus for the plant, and on the way to the plant DCPP representatives discussed the history of the plant. Upon arriving at the plant, DCPP representatives took the group on a narrated drive-by of the Independent Spent Fuel Storage Installation (ISFSI), also known as the dry cask spent fuel storage facility.

At the plant proper the group split into two sub-groups, each with a DCPP escort and DCISC member/consultant accompaniment. Each group was processed through security and went into the plant. Wearing personal protective equipment (hard hats, hearing protection and safety glasses) and radio communications equipment, the groups took a narrated tour of the main turbine deck and window view of the control room. The two groups visited the Control Room Simulator, a true operating mock-up of the Unit 1 Control Room, separately for a discussion of how the plant operates, control room operators, and operator training.

The group then departed DCPP in the bus and had the opportunity to discuss the plant with individual DCISC members and consultants.

Conclude Public Tour

Agenda

I Call to Order–Roll Call

The February 4, 2015, public meeting of the Diablo Canyon Independent Safety Committee (DCISC), the seventy-ninth public meeting of the Committee, was called to order by Committee Chair Dr. Per Peterson at 1:30 P.M. at the Point San Luis Conference Facility at the Avila Lighthouse Suites in Avila Beach, California. Dr. Peterson welcomed the members of the public in attendance. Public meetings of the Committee may be viewed online in real-time over streaming video at www.dcisc.org and www.slospan.org and are videotaped for later broadcast on the local government access television channel (Channel 21). Dr. Peterson introduced and briefly reviewed the professional backgrounds of each of the other Members of the Committee. Committee Member Dr. Lam congratulated Dr. Peterson on his recent appointment to the position of Executive Associate Dean of the College of Engineering at U.C. Berkeley.

Committee Members:

Present:

Robert J. Budnitz

Peter Lam

Per F. Peterson (by teleconference)

Absent:

None:

II Introductions

Dr. Peterson introduced and briefly reviewed the professional backgrounds of the Committee's technical consultants, Mr. R. Ferman Wardell, P.E. and Mr. David C. Linnen and of the DCISC's Legal Counsel Mr. Robert R. Wellington. Dr. Peterson also introduced Ms. Maureen Zawalick, Nuclear Generation Risk and Compliance Manager at DCP, who ably assists the Committee Members, Consultants and Legal Counsel in their work and serves as the primary administrative liaison between the plant and the DCISC. Dr. Peterson observed technicians from AGP Video would be managing the streaming video broadcast of this public meeting and subsequently archiving the video on www.slospan.org or through the link to "Meeting Videos" on the Committee's website and arranging for subsequent broadcast of the meeting on television.

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 this 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 for the Alliance for Nuclear Responsibility (ANR) was

recognized. Ms. Becker stated she would be distributing a copy of proposed legislation to the Committee which would provide for the continuation of funding for emergency planning services after a nuclear plant is closed. Ms. Becker reported that funding from the State of California for offsite emergency planning services related to nuclear power plants is now scheduled to end in 2019. However, she observed DCP's two reactors are currently licensed to operate until 2024 and 2025 respectively. Dr. Budnitz commented the operating license for DCP includes a condition for emergency planning. Ms. Becker asked that the DCISC consider encouraging PG&E to continue its offsite emergency planning activities at least until the end of the licensed life for both units and possibly longer for offsite storage of spent fuel. Ms. Becker reported that Southern California Edison has filed a request with the NRC to eliminate offsite emergency planning in 2019 for its now closed San Onofre Nuclear Generating Station (SONGS) and that PG&E has made a similar request for its now closed Humboldt Bay Power Plant.

Mr. David Weisman, Outreach Coordinator for A4NR was recognized. Mr. Weisman confirmed a comment by Dr. Budnitz that the license from the Nuclear Regulatory Commission (NRC) includes a condition for offsite emergency planning but Mr. Weisman observed that the funding for emergency planning services is provided through the California Public Utilities Commission (CPUC) in its rate making proceedings and it is that mechanism that is now scheduled to end in July 2020, after having been extended previously in 1999. Mr. Weisman questioned the wisdom of eliminating a law which provides a funding mechanism to implement the NRC's emergency planning policy while reactors remain in operation.

Dr. Lam recognized California Energy Commission (CEC) Senior Nuclear Policy Advisor Ms. Danielle Osborn Mills who was present in the audience. Ms. Osborn Mills thanked the Committee for its commitment to making the DCISC's meetings public and its attention to very important issues. She stated she was attending and representing CEC Chair Dr. Robert Weisenmiller and that Dr. Weisenmiller closely follows the activities of the DCISC. On behalf of the CEC Ms. Osborn Mills observed the DCISC provides an excellent public benefit and she thanked the Members for their service.

IV Consent Agenda

The Chair introduced the first item on the Consent Agenda, approval of the Minutes of the Committee's October 14-15, 2014, public meeting held in Avila Beach, California. A draft of the October 2014 Minutes was included in the public agenda packet. Dr. Peterson expressed the appreciation of the Committee for the excellent quality of these Minutes. The members and consultants reviewed the Minutes, reviewed items for follow up action, provided clarification to Legal Counsel concerning typographical errors and the accuracy of certain references including the discussion on DCISC Recommendation R14-1 in the 24th Annual Report in the October 2014 Minutes and provided other editorial comments and substantive changes or clarifications concerning the draft of the October 2014 Minutes. Minutes of the Committee's public meetings become part of its Annual Reports on Safety of Diablo Canyon Nuclear Power Plant Operations (Annual Report). On a motion made by Dr. Budnitz, seconded by Dr. Lam, the Minutes of the Committee's October 2014 public meeting were unanimously approved subject to inclusion of the changes provided to the

Committee's Legal Counsel. The October 2014 Minutes will become part of the Committee's 25th Annual Report.

V Action Items

A. Review of PG&E's Response to the DCISC's 24th Annual Report on Safety of Diablo Canyon Operations: July 1, 2013—June 30, 2014.

The Committee members then moved to accept PG&E's response to the Committee's recommendation (R14-1) in its 24th Annual Report. Recommendation R14-1 addresses reexamination of the significance of the role that DCP's Operations Department played and could have played to avoid the loss of power to Unit-2 (U-2) 4 kV Bus G during refueling outage 2R17. In his letter responding to the recommendation PG&E Senior Vice President and Chief Nuclear Officer Mr. Edward D. Halpin acknowledged on behalf of DCP the role of Operations personnel in the loss of power to the U-2 4 kV Bus G and committed to a review of the root cause evaluation to ensure all aspects of the role of Operations in preventing a recurrence, including documentation by the Corrective Action Program of all causes, corrective actions, and gaps to excellence, will be addressed as to their effect on Operations processes and how the changes address Operations role in the loss of power to the 4 kV Bus G. **Upon Drs. Peterson and Lam's comment that the Committee will continue to monitor PG&E's actions in response to R14-1,** on a motion made by Dr. Budnitz, seconded by Dr. Lam the DCISC unanimously accepted PG&E's response to Recommendation R14-1.

B. Update on Financial Matters and Committee Activities.

Legal Counsel Wellington reported that the balance of the operational grant funds for the Committee's operations on hand from calendar year 2014 is expected to be approximately \$50,000 and that these funds will be returned to the PG&E ratepayers who provide the funds for the DCISC's operations. Mr. Wellington confirmed Dr. Budnitz' observation that this will be the third consecutive year the Committee has returned funds to the ratepayers.

Mr. John Geesman, on behalf of the A4NR, was recognized. Mr. Geesman inquired how a deficit incurred in any year's funding would be addressed by the Committee. Dr. Budnitz replied that such a deficit would be funded out of the following year's grant funding. Mr. Geesman observed that the DCISC during calendar year 2014 expended a substantial level of extra effort in addressing the issue of the possible elimination of once-through cooling at DCP and he suggested that in the future the DCISC would be required to expend an unprecedented level of effort to address seismic issues related to DCP operations. Mr. Geesman cautioned the Committee to remain vigilant to ensure it has adequate financial resources to accomplish its mission as the work of the DCISC is appreciated by the public. Dr. Budnitz observed that for so long as he has been a member and before, the DCISC has never reduced its level of inquiry due to concerns over insufficient funding. Dr. Peterson commented that if the DCISC's workload increases substantially on safety-related matters the Committee has an obligation to raise the issue with its appointing authorities, the CEC, the Governor and the state Attorney General, and to try to identify additional resources to accomplish necessary work.

The Members initially deferred scheduling of their future fact-finding and public meetings and returned to this task after the short break which followed the discussion below on the review of the Open Items List.

C. Discussion of Issues on Open Items List.

Dr. Peterson requested Consultant Wardell lead a review of items on the Open Items List, used by the Committee to track and also follow up on issues, concerns and information identified for subsequent action during fact-finding or public meetings. Dr. Budnitz stated he had identified 16 items on the list which are scheduled to be reviewed during the first quarter of 2015 (1Q15) and as there is only a single fact finding scheduled with PG&E during that period some of these items will need to be deferred. Items discussed or concerning which action was taken included the following:

Item	Re:	Action Taken
TBD	How often spray from OTC has caused flashovers in past 10-year period & does DCPD see this as a safety problem (Per E. Brousse at October 2014 PM)	Include in Open Items
TBD	Data on measurement of radioactivity around DCPD (Per L. Seeley at February 2015 PM)	Schedule 3/15 FF
CM-13	Rev. Maint. Dept. Performance Measures/Staffing	Move to 1Q16FF
CM-14	Maint. Risk & Online Maint. Risk Procedures	Incorporate w/CM-10
HP-1	Human Performance	Move to 4Q15FF
HS-6	Safety Culture	Schedule 3/15 FF
EP-5	Use of Social Media	Schedule 5/15 FF
RA-5	PRA Programs to include Internal Flood PRA	Schedule 3/15 FF
RA-6	Seismic Fragility Analysis	Schedule 7/15FF
RP-12	Radiological Release Reports	Move to 3Q15FF
SF-2	Relative Risk - Cask & Pool Storage Incorporate ref. to Info. from D. Gilmore	Schedule 5/15FF
SC-3	Long Term Seismic Program	Schedule 3/15FF(SF)
SC-4	Risk-based Probabilistic Tsunami Hazard Analysis	Schedule 3/15FF(SF)
SC-8	External Flooding Study	Schedule 3/15FF
SC-9	Dr. R. Sewell Tsunami Report	Schedule 3/15FF & 6/15 PM
SC-10	Tornado Hazard Review (Combine w/SC-11)	Schedule 7/15FF & 10/15PM
SC-11	Firenado Hazard Review (Combine w/SC-10)	Schedule 7/15FF & 10/15 PM
FP-5	Fire Protection Program	Schedule 5/15FF

OT-6	NRC Work Hour Rules	Close
CL-1 thru 4	Closed Loop Cooling	Clean Up Wording & Retain Each Item
Item	Re:	Action Taken
CL-5	Closed Loop Cooling	Delete (Same as CL-1)
BDB-6	FLEX Status	Review ESEP Schedule and Concentrate Seismic Damage
O-1	Observe Work Processes	Schedule 3Q15FF
O-3	Ops Role re 2R17 loss of U-2 4 kV Vital Bus G	Close & Open New Item re R14- 1 Follow up
10/14PM-3	Emergency ASW Test	Tie-in /Testing in Inlet Cove & Receipt of State Permits
10/14PM-4	Design Quality Released to Field	Close
10/14PM-5	Seismic Fragility, Magnitude, Duration, Acceleration effect on SSCs	Close
10/14PM-6	Access following BDB	Close
10/14PM-13	Number of persons taking DCPD tours	Close
TBD	Review re Protected Area Tour Format	(Feb 15 PM)
TBD	Review re 6 New Areas of Uncertainty re Tornado Diagram	(Feb 15 PM)

Certain other item numbers on the Open Items List for the February 2014 public meeting which were identified as “Close” and not otherwise discussed were approved for closure.

A short break followed.

VI Committee Member Reports and Discussion

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

Dr. Peterson reported the tour held during the morning was the first to be held after 9-11-2001 on which the DCISC was able to bring members of the public inside the protected area of the plant. Due to requirements to pass through security the tour was limited to 15 members of the public and was fully subscribed. **The Members discussed and directed the Legal Counsel’s office to work with PG&E to increase the tour to include up to 25 members of the public and to consider splitting the group into two subgroups to permit one subgroup to observe activities in the Simulator facility**

while the other subgroup clears security. The Members also directed review of the impact of scheduling public tours on Tuesdays when the Simulator is generally otherwise in use by PG&E for training. Members also observed that as PG&E is now conducting two or three plant tours each week, the demand for the DCISC tour may be reduced although they remarked that the public and the Committee both benefit greatly from the interaction afforded by the DCISC's tours.

The members confirmed public meetings of the DCISC are now scheduled for June 16–17 and October 21–22, 2015, and February 3–4, 2016, and are all to be held at the Avila Lighthouse Suites in Avila Beach, CA. Fact-finding visits were confirmed and scheduled as follows:

[2015] March 30–31—April 1 (RJB/DCL); April 21–22 (PL/RFW); May 19–20 (PFP/DCL); June 10–11 (RJB/RFW); August 5–6 (PFP/DCL); September 29–30 (PL/RFW); November 18–19 ((RJB/DCL w/NSOC observation); December 9–10 (PFP/RFW).

[2016] January 19–20 (PL/DCL); March 16–17 (RJB/RFW) April 20–21 (PL/DCL). May 17–18 (PFP/RFW).

Dr. Budnitz reported that in August 2014 PG&E released for review the results of a multi-year seismic study which the DCISC has reviewed and which was also reviewed by the CPUC's Independent Peer Review Panel (IPRP). Dr. Budnitz reported DCISC representatives have attended each of the three IPRP public meetings and have found the IPRP reviews to be helpful in understanding certain technical issues. Dr. Budnitz stated this was a prelude to the release by PG&E in March 2015 of its post Fukushima, NRC-mandated, Senior Seismic Hazard Analysis Committee (SSHAC) Level 3 probabilistic seismic hazard analysis (PHSA). Dr. Budnitz reported in March 2015 PG&E will also release its NRC-mandated reassessment of the external flooding hazard at the plant site from precipitation, rivers or creeks, hurricanes, or tsunamis and the DCISC will be conducting fact-finding on both the seismic and flooding hazard studies prior to its June 2015 public meeting. Dr. Budnitz stated the NRC is also expected to convene a public meeting concerning the studies at a date to be determined later.

Mr. John Geesman, representing the A4NR, was recognized. Mr. Geesman commented that the latest version of the tornado diagram which ranks seismic hazards, as it was presented to the IPRP, disclosed for the first time six new items at the top of the diagram related to ground motion characterization all of which were rated substantially larger in their impact on the seismic hazard than any of the seismic source characterization items previously identified by PG&E and discussed during the presentation PG&E made to the DCISC at its October 2014 public meeting or identified in the report submitted by PG&E in August 2014, which Mr. Geesman termed the so called AB1632 Final Report. Mr. Geesman stated it was not known whether PG&E would address the six previously omitted items in the PHSA due to be released in March 2015. Mr. Geesman stated that PG&E Geoscientist Dr. Abrahamson's statement that the items would be addressed in an update in ten years' time suggests a level of temerity which no regulator should consider acceptable and nor should the DCISC.

Dr. Budnitz explained that in trying to understand the seismic hazard at DCPD it is important to consider the frequency with which earthquakes will occur and the size of those events. He

remarked that these are different, although related, concepts and that the tornado diagram referred to by Mr. Geesman was a sensitivity demonstration from PG&E's analyses of the sensitivity of how frequently seismic events occur and does not reflect how large any one event might be. Accordingly, Dr. Budnitz observed that if the plant is found to be strong enough to withstand any event which might occur, then the frequency of those events is not so important and accordingly there is a hierarchy between the size and the frequency of seismic events and the tornado diagram speaks to frequency not size. Mr. Geesman observed and Dr. Budnitz concurred that the way in which a site responds is a function of the way in which the ground motions are characterized. **In response to Dr. Lam's request, the Members directed that an item be added to the Open Items List to reviewing Mr. Geesman's statement and to further reviewing issues related to the latest version of the tornado diagram provided by PG&E specifically with reference to the six new sources of uncertainty.**

Ms. Sherry Lewis, a representative of the group San Luis Obispo Mothers for Peace (MFP) was recognized. Ms. Lewis stated she attended the November 2014 meeting of the IPRP and commended Dr. Blakeslee's statement to the Environment and Public Works Committee of the California State Senate to the DCISC's attention. She stated her understanding was that the term "Frequency" referred to ground frequency not how often a seismic event occurs. Ms. Lewis commented that Dr. Blakeslee states that as time has passed more and more seismic faults have been found in the vicinity of DCPD and faults that were known when the plant was built have been found to be larger and to have a capacity to link together. Ms. Lewis stated it was her opinion there were some shenanigans going on between PG&E and the NRC to hide the true extent of the hazard to make the plant appear to be safer than it is. She observed that for purposes of a seismic analysis there are very few data points which can be reliably applied to the plant site as only the Parkfield and San Simeon earthquakes were large earthquakes in the vicinity and they were located to the north and east and not within close proximity to the plant, while the Hosgri and Shoreline Faults are located to the south and west of the plant and are much closer. Ms. Lewis stated she has been attending meetings of the DCISC for years but is now beginning to question how honest people are being in making statements and presentations to the Committee and she observed that if the DCISC does not devote attention to these matters it is not doing its job.

Mr. David Weisman representing the A4NR was recognized. Mr. Weisman commented that the DCISC scheduling its follow up to the 2003 Tsunami Study by Dr. Robert Sewell in June 2015 was akin to conducting a postmortem on that study. He stated the tsunami assessment by PG&E which is due to be released in March 2015 is a separate probabilistic study, not a SSHAC process. Mr. Weisman stated that in his correspondence with Dr. Sewell, Dr. Sewell indicated that his preference would be for a Level 4 Tsunami SSHAC study. Mr. Weisman stated the DCISC appeared to be adopting a reactive rather than a proactive stance concerning Dr. Sewell's tsunami study. Dr. Budnitz replied that in January 2015 the Committee conducted fact-finding on PG&E's work on reviewing tsunamis which will be reported upon later in this meeting.

Ms. Elizabeth Brousse of MFP was recognized. Ms. Brousse stated that MFP recently hosted a "No Nukes California" conference to address issues of seismic and tsunami threats to DCPD, operation of the plant outside its design basis in violation of its operating license from the NRC, the impact of

the use of once-through cooling, waste storage and the safety of the canisters used for dry storage of spent fuel. Ms. Brousse commended the work of Ms. Donna Gilmore of the group San Onofre Safety to the attention of the Committee concerning the effect of salt crystals on the spent fuel storage canisters which she stated had been found to cause corrosion and minute cracking and confirmed that sea salt crystals have been found on DCPD spent fuel canisters after only two years of operational life. Ms. Brousse stated that she learned that the canisters can fail after only 30 years and there is no current method available to mitigate defective canisters. She commented that San Onofre Safety is circulating a petition to stop California from wasting \$400,000,000 on inferior nuclear waste storage canisters which may leak in 30 years. Dr. Peterson confirmed that the DCISC is familiar with Ms. Gilmore and her work and will be following up on the issues she has raised concerning spent fuel storage and that the DCISC has already identified salt deposition on the spent fuel canisters as an important safety issue. Dr. Peterson observed that he remembers being castigated recently for suggesting that the proposal to use saltwater cooling towers at DCPD to replace once-through cooling which would result in an increase in salt deposition at the plant site might cause safety issues.

Ms. Sherry Lewis of MFP remarked that salt on cooling towers would be addressed by frequent cleaning but there is no mechanism to clean inside the spent fuel canisters.

Dr. Budnitz confirmed that the term “frequency” is used as a term of seismic analysis in two ways. It is used to describe the frequency by which earthquakes occur and the frequency, expressed in Hertz, with which the energy arrives and that accordingly it is necessary to use care when using the term.

B. Documents Provided to the Committee:

The list of documents which are provided by PG&E on a monthly basis was included in the public agenda packet for the meeting. The list included all documents provided since the last public meeting of the DCISC in October 2014.

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

The Chair requested Consultant Wardell to report on the November 19–20, 2014, fact-finding visit with Dr. Budnitz to DCPD. Mr. Wardell reviewed the topics discussed with PG&E during the November 19–20 visit as follows:

- Pressurizer Weld Overlay Issue - Mr. Wardell reported the Pressurizer is part of the Reactor Coolant System (RCS) piping and weld overlays were added to strengthen the nozzles. Only U-2 is affected by this issue. The work was subsequently inspected using ultrasonic testing (UT) techniques and passed. However, during 2R17 flaws were found using a more advanced UT inspection technique and U-2 was allowed to operate for one cycle while a root cause analysis was performed to support long term operation. That analysis was submitted and approved by the NRC and operation of U-2 was approved to 2045, with inspections required during outages to demonstrate that the flaws have not grown. The DCISC fact-finding team

found this to be satisfactory.

- Containment Fan Cooler Unit (CFCU) Modification/Issues - the CFCUs operate to cool the atmosphere in Containment during normal and post-accident situations. Several years ago a problem with possible reverse rotation of the CFCUs was identified and anti-reverse rotation pawls were installed to protect the fan motors. Subsequently, some of these pawls required replacement as they were not made to tolerance and the plant committed to operate the CFCUs on low speed which was found to be adequate for both normal and emergency operation. Analysis is being performed to change the sequencing circuitry to permit a shift from high to low speed without damaging the motor or the shaft. **Mr. Wardell stated the team recommends that the DCISC follow up on the corrective actions for the CFCUs after each outage.**
- Fire Doors Update - Mr. Wardell reported that several years ago a number of fire doors were declared inoperable and compensatory fire watches were required by requiring personnel to frequently inspect the area near an inoperable door. **The DCISC was concerned regarding the time taken to fully address this issue and Mr. Wardell reported a new program has now been approved for the fire doors and the DCISC should monitor this situation.** Dr. Peterson observed that during the morning's public tour PG&E personnel were attentive to ensure that each fire and security door was properly secured and Mr. Wardell observed that a failure to secure those doors requires a report be made.
- Intake Concrete Inspection and Repairs - Mr. Wardell reported the Intake structure is a concrete and steel structure located above the ocean and is inspected during each refueling outage for concrete or rebar damage due to its exposure to saltwater. During outages 1R18 and 2R18 inspections were performed which found very minor damage and repairs were made. **The DCISC will review this issue following the next refueling outage.**
- Safety System Functional Failures (SSFF) Update - SSFF failures affect or cause the loss of ability of a system's safety function to shut down the plant and maintain the reactor in safe shutdown and to mitigate any accident. During 2010 and 2011 the number of SSFFs increased and a root cause evaluation was performed. The DCISC reviewed this issue in March 2014 and little progress was found. Since that time a new action plan has been developed and Mr. Wardell reported the trend in SSFF is slightly improving for U-2 and is steady for Unit-1 (U-1) and he described the results as disappointing. **Mr. Wardell stated the fact-finding team has a recommendation that DCPD review this issue and the causes of SSFF and DCPD's efforts to take action to reduce the number of SSFFs to near zero.**
- Outage 2R18 Results - Mr. Wardell reported the plant met all its goals for 2R18 and he described it as a very successful outage with no nuclear safety events or concerns.
- Radioactive Waste Systems Review and Walkdown - Mr. Wardell reported there are three component systems used to address gaseous, liquid and solid radioactive wastes. The Radioactive Waste System is currently rated in White2 health status with minor issues identified. The DCISC team toured the system with the system engineer and found the systems were working properly and the plant condition in those areas was good.
- Equipment Qualification Program Update - this program addresses mostly electrical

equipment which must be qualified for normal and post-accident environmental conditions when radiation, temperature, humidity and pressure could increase substantially. The system was in White status due to personnel changes due to retirement and departure of engineers and when new engineers are assigned to a system the system's health is accordingly downgraded until the assigned personnel have achieved a certain number of years of experience with their respective systems. Dr. Budnitz observed that this downgrade is not related to any system deficiencies related to its functional capabilities.

- Steam Generator (SG) Performance and Inspections through Outage 2R18 - Mr. Wardell reported that the SGs for both units were replaced, in 2008 for U-2 during 2R14, and in 2009 for U-1 during 1R15. The new SGs have been operating very well since that time and the SG tubes, which separate the primary (radioactive) and secondary (non radioactive) systems, are inspected for leaks or indications of leaks using UT techniques with only very minor flaws found and with sludge lancing performed on the secondary side producing only three pounds of sludge due to corrosion or metal in the four U-2 SGs.
- Radiation Monitoring System Long Term Strategy - the Radiation Monitoring System monitors radiation in systems and components within and outside of the plant. Some components, which are both digital and analog, date from the 1970's, 1980's and 1990's but Mr. Wardell reported they are not considered obsolete as parts remain available. **However, there have been reliability and availability problems with the Radiation Monitoring System and corrective actions have been taken and a long term strategy is now being developed and is due for completion in April 2015. The system is currently in White health status and Mr. Wardell recommended the DCISC follow up on the long term strategy for this system in the third quarter of 2015.**
- Observe NSOC Summary Session - Mr. Wardell reported the Nuclear Safety Oversight Committee (NSOC) consists of five external (to PG&E) high-level nuclear industry leaders who regularly visit DCPD for three and one half days, three times per year, to observe plant activities, review work, and reports. A summary meeting is conducted on the final day of each NSOC visit to review functional areas, major projects, outage work, work management, etc. The DCISC has agreed with PG&E to protect information received from DCISC observations of NSOC meetings and review of NSOC reports in order to protect an open dialogue between PG&E, the NSOC, and the DCISC. Mr. Wardell reported the DCISC team observed the NSOC meeting on November 20, and concurred with the findings and conclusions of the NSOC.
- Meet with NRC Resident Inspector - the DCISC representatives met and had a useful discussion with the NRC Resident Inspector concerning the tsunami study by Dr. Sewell, progress on the seismic hazard analysis, and the main steam valve replacement event.
- DCISC Member Meeting with PG&E Chief Nuclear Officer - following the fact-finding Dr. Budnitz met with Mr. Halpin to review the results of the fact-finding visit and certain other matters.

Ms. Elizabeth Brousse of MFP was recognized. Ms. Brousse stated she had a concern about the Radiation Monitoring System as this topic came up recently at the MFP's recent conference and she stated people are buying Geiger counters to monitor radiation but there are questions as to the

accuracy of those Geiger counts. She inquired whether PG&E might consider regularly reporting regarding the radiation levels emitted by DCP's operations. Dr. Peterson responded and stated that Professor Kai Vetter and Prof. Vetter's students at U.C. Berkeley have been monitoring radiation levels but radionuclides released from the Fukushima accident can only be detected at specific energies and this requires very sensitive instruments that have the ability to discriminate and generally liquid nitrogen-cooled germanium radiation detectors are used for this purpose. Generally, a Geiger counter would not be able to detect radiation from DCP operations as the variability of background radiation would greatly exceed any amounts of radiation produced by DCP. Mr. Wardell and Mr. Linnen observed that the DCISC's Annual Reports contain information based on the information PG&E provides annually to the NRC on radiation emissions from DCP and the environmental studies done around the plant have detected only minuscule amounts of radioactivity which are significantly below the technical specification limits established by the NRC based upon impact to the environment.

Following Mr. Wardell's report and the public comment following, on a motion made by Dr. Lam seconded by Dr. Budnitz, the November 19–20, 2014, Fact Finding Report was unanimously approved and its transmittal to PG&E authorized.

The Chair requested Consultant Wardell to continue his report by reporting on the items covered during the January 21–22, 2015, fact-finding visit to DCP with Dr. Lam. Mr. Wardell reviewed the topics discussed with PG&E during that visit as follows:

- Fukushima FLEX Quick Hit Self-Assessment - Mr. Wardell reported FLEX is a descriptive term (not an acronym) for the portable equipment being put into place to provide the ability to tie-in electrically or mechanically, by piping or wiring, to components which may have failed during a Fukushima-type event. The DCISC fact-finding team reviewed DCP's compliance with industry standards and NRC requirements for FLEX and found the FLEX initiative to be in compliance and on schedule to meet implementation dates of October 2015 for U-1 and May 2016 for U-2 for the required equipment, communications, lighting, wiring, procedures, training and testing. Mr. Wardell reported the NRC is expected to conduct a full inspection of FLEX in late 2016. He reported the quick hit self-assessment was well done and the recommendations and findings were placed into the plant's Corrective Action Program to be formally tracked. **Mr. Wardell suggested the DCISC again review FLEX in November 2015 regarding its implementation for U-1.**
- Seismic Studies & Submittal to NRC - this review was in follow up to an issue raised by Mr. Geesman on behalf of A4NR during the DCISC's June 2014 public meeting with reference to concern about PG&E's interactions with the NRC, as the federal regulator, concerning a final seismic report to be submitted to the Atomic Safety and Licensing Board (ASLB). The DCISC team concluded the analyses of the seismic and tsunami hazard appeared to be appropriate. Dr. Lam commented that fact-finding team found PG&E was on schedule to make reports on these matters to the NRC, in response to a 10 CFR 50.54(F) letter, and he was informed there was no ASLB proceeding pending and that PG&E was not planning any submittal on these issues to the ASLB.

Clearance Process Performance in 1R18 & 2R18 - Mr. Wardell reported the clearance process is used to document when equipment has been cleared for mechanical, electrical or other work such that there is no safety hazard from the work to employees or to other plant components. The DCISC representatives reviewed the clearance process used for 1R18 and 2R18 and found only minor clearance error issues. One issue was what Mr. Wardell described as middling significance concerned a red tag indicating Maintenance clearance being mistakenly posted for an Operations procedure and he commented PG&E has taken this matter very seriously to ensure the situation does not repeat.

- Performance Improvement Program Performance - this program includes the Corrective Action, Benchmarking, and Self-Assessment Programs and Mr. Wardell stated DCP is making major changes in its Performance Improvement Programs based on industry guidelines to focus more on prevention and less on administrative requirements. **The DCISC team reviewed the new procedures which appear to be sound but the team recommends a future fact-finding be held to review implementation of the program and its results in order to determine its effectiveness.** Mr. Wardell reported the human error rate at DCP is decreasing and further improvement in the Performance Improvement Program could lead to other improvements in the plant.
- Component Review - Reactor Coolant Pumps - the Reactor Coolant Pumps (RCP) are used to pump water around the RCS to cool the core, provide heated water to the SGs, and to return the water to the nuclear vessel. Mr. Wardell stated the RCPs are working well and have a triple seal to eliminate or control leakage from the pumps which injects seal water into the seals and to return pre-designed amounts of seal leakage back to the seal injection system. Mr. Wardell stated that these seals do fail periodically, often due to debris, and this is usually indicated by increased leakage and it requires a plant shutdown to inspect the seals if the amount of leakage exceeds a certain amount. This inspection is resource intensive and occurs in a high radiation area. DCP maintains a mockup of a RCP with its seal package in its Mechanical Maintenance Training facility and the DCISC team reviewed the procedures for replacing and aligning RCP seals. DCP will replace all its RCP seals with an improved Westinghouse passive thermal shutdown seal which he described as more rugged than the current seals and that includes a feature such that if the station were to lose power the seal leakage would not increase. **Mr. Wardell recommended that the DCISC monitor the installation of the new RCP seals at a future fact-finding.**
- Single Point Vulnerability Program - was reviewed by the DCISC fact-finding team.
- Reactor Vessel Material Surveillance Program - Mr. Wardell stated the bombardment of a reactor vessel by neutrons over a protracted period can cause a pressure vessel to become embrittled and accordingly specimens made of the same material as the vessel and its welds are placed within the vessel and are removed and tested periodically. These specimens experience the same neutron fluence as the vessel and destructive testing provides an indication of the parameters of the reactor vessel with reference to embrittlement which in the event of a sudden drop in temperature at high pressure could cause flaws in the vessel to open suddenly. He reported the Low Temperature Over-Protection System is available to prevent the pressure from increasing if the temperature of the vessel drops. Mr. Wardell

reported fracture toughness analyses for both DCPD units indicate the respective vessels are both in good shape for the end of the life of the plant out to 2024 and 2025, as well as for an additional 20 years should DCPD receive approval from the NRC for a license extension. Dr. Lam observed previously under NRC rules only Unit 2 would have been eligible for an extension of 20 additional years but under a new voluntary rule that option is now also provided for Unit 1.

- Trouble Shooting Program Implementation - Mr. Wardell stated that in the past the DCISC found the Troubleshooting Program to be fairly complex and hard to understand. A new procedure has simplified the program's procedures. The DCISC team reviewed two examples of the new Troubleshooting Program procedures. The first example involving pressurizer heaters went well while the second example involving a generator differential relay took several approaches to find the problem. Mr. Wardell stated this was expected as the problem was complex and the Troubleshooting Program appears to be improved.
- DCPD State of the Plant - the DCISC will receive a presentation on this topic later during this public meeting and Mr. Wardell deferred his discussion.
- Potential Gas Intrusion into the Containment Spray System - spray headers are used by the Containment Spray System to reduce temperature and pressure after an accident which generates steam, heat and pressure. The system takes its initial suction from a tank which contains sodium hydroxide which is used during injection for radioactive particle control. At other nuclear plants it has been found that if this tank went dry air could be introduced into the Containment Spray System resulting in a condition of gas intrusion into the system and DCPD identified this operating experience as one which could potentially affect the plant. Westinghouse performed a prompt operability assessment which determined the void fraction in the containment spray pump sump suction to be less than 2% which would not pose an operability issue for DCPD. However, the licensing basis for the plant assumed 0% void fraction. The NRC determined that DCPD had not taken action quickly enough and issued a non cited violation (NCV). DCPD has addressed the immediate problem and has changed the system that keeps track of licensing issues to ensure adequate priority is assigned to this type of issue so that the issue should not recur.
- Meeting with NRC Senior Resident Inspector - the DCISC fact-finding team discussed with NRC Senior Resident Inspector Mr. Thomas Hipschman the NRC inspection schedule, flashover events, and the gas intrusion into Containment issue, as well as the fact-finding agenda. Dr. Lam stated he found his meetings with the NRC Senior Resident to be extremely useful particularly as to learning about the NRC's inspection priorities.
- DCISC Member Meeting with PG&E Chief Nuclear Officer - Dr. Lam met with Mr. Ed Halpin to discuss the fact-finding and other items of mutual interest.

Mr. John Geesman representing A4NR was recognized. Mr. Geesman stated he agreed with the Committee's action to close out review of the report to the ASLB on seismic issues as the concerns he expressed at the June 2014 DCISC public meeting were now moot. However, Mr. Geesman stated that Dr. Lam had been misinformed concerning the existence of a pending ASLB proceeding, as there is a proceeding pending which plays a large role in the state-funded seismic studies and an

ASLB panel remains convened to study and consider the extension of DCP's two operating licenses. He reported that while the ASLB suspended the proceeding in June 2011 to enable PG&E to complete the state-funded studies, for which the CPUC authorized \$64,250,000 of ratepayer funds, the report PG&E submitted in August 2014 as its final report on the seismic studies was directed to the ASLB and in every month since June 2011 PG&E has provided updates to the ASLB on the progress and timing for those studies. Mr. Geesman stated the concern he expressed in June 2014 concerned a subsidiary issue regarding a letter from NRC staff which enabled PG&E to withdraw a License Amendment Request to change the design of the plant which commented upon PG&E's characterization of the ground motion associated with the maximum credible earthquake on the Shoreline Fault as bounded by the ground motion response spectra established in the Hosgri evaluation some years earlier. In that letter the NRC required PG&E to report on an interim basis any new information it may receive concerning the Shoreline Fault in terms of its greater capability. Mr. Geesman stated the A4NR has discovered the existence of emails between Mr. Halpin and his staff from 2013 wherein it is indicated PG&E had concluded the Shoreline Fault was in fact longer than previously thought and that it was linked to other fault such that a joint rupture with the Hosgri Fault was possible which was contrary to earlier reports on the Shoreline Fault. Mr. Geesman stated PG&E delayed informing the NRC of this conclusion for 14 or 15 months until it submitted the AB1632 studies to the ASLB in August 2014 wherein this conclusion was addressed and during that time PG&E continued to maintain the Shoreline Fault is bounded by the ground motion response spectrum associated with the Hosgri Fault, which Mr. Geesman described as a very controversial question. Mr. Geesman stated his dissatisfaction with the way in which PG&E and the NRC have handled this matter. Dr. Lam thanked Mr. Geesman for his clarification and stated his understanding that the letter from PG&E to the NRC regarding the relicensing had placed the matter in abeyance with the ASLB and that from Mr. Geesman's statement he would assume that the sitting Licensing Board is still in the process of accepting modifications without taking any action on the pending issue.

On a motion made by Dr. Peterson seconded by Dr. Budnitz the January 21–22, 2015 Fact Finding Report was unanimously approved and its transmittal to PG&E was authorized.

The Chair requested Consultant Linnen to report on the December 2–3, 2014, fact-finding visit to DCP with Dr. Peterson. Mr. Linnen reviewed the topics discussed with PG&E during that visit.

- Status of Large Station Transformers - Mr. Linnen reported the DCISC fact-finding team observed a continuing and increasing focus by the station on ensuring the reliability of large station transformers and PG&E will be making a presentation on large station transformers at this public meeting.
- Foreign Material Exclusion (FME) Program - the purpose of the FME Program is to prevent undesired and potentially harmful materials from entering plant systems. DCP tracks and records FME events and grades performance on a monthly basis. DCP has generally maintained the same level of improved performance observed during the DCISC review of the FME Program in 2012. Mr. Linnen observed workers were encouraged to immediately report impediments to error-free work and this engagement of the workforce appears to be a contributor to improved performance.

- DCISC Follow-up on Response to State Water Resources Control Board (SWRCB) Initiative on Closed Loop Cooling - Mr. Linnen reported the DCISC has been very active in reviewing issues involved with the potential elimination of once-through cooling at DCP, most recently on the potential implications on plant operations from the installation of cooling towers using saltwater south of the plant site. **Dr. Peterson commented that the DCISC will also follow up concerning any changes in the flooding hazard from the current flooding hazard assessment for circulating water in the Turbine Building which would be one of the potential safety impacts.**
- Office/Personnel Seismic Safety - Mr. Linnen commented this issue is similar to that addressed by the Seismically Induced System Interaction Program which addresses the potential for plant systems and components to be impacted during an earthquake. The DCISC's emphasis on office and personnel seismic safety recognizes that the effect of an earthquake can potentially impede access within the plant or injure key personnel who would be required to respond to off-normal conditions. Mr. Linnen stated the fact-finding team found office and personnel seismic safety at PG&E to have improved.
- Residual Heat Removal (RHR) System - the RHR System is a safety-related system used to transfer heat during the latter part of plant cool-down from the RCS to the Component Cooling Water System at a controlled rate. The RHR System health was rated Green for U-2 and White for U-1. An open item affecting both units was the need to have actions completed by a test lab regarding the recirculation of coolant in the aftermath of a potential loss of coolant accident (LOCA) to ensure the coolant is not impeded by debris impinging on the screens to the containment sump.
- Maintenance Training Program - Mr. Linnen stated the DCISC representatives found the Maintenance Training Program to be extremely structured, very in-depth and well implemented.
- Management Observation Program - this program provides for observation and a critique by directors and leadership of workers during performance of work in the plant. Mr. Linnen reported this program has been made more interactive to create an environment which provides an opportunity for support and feedback as well as a critique.
- Status of the Independent Spent Fuel Storage Installation (ISFSI) - Mr. Linnen began his description of the fact-finding by reviewing the expansion of the ISFSI from two to seven storage pads and he reported that the DCP Quality Verification (QV) organization is very active in its oversight of this project. Mr. Linnen reported the ISFSI expansion appears to be proceeding in a well-managed manner. **Mr. Linnen confirmed the fact-finding report recognized that after the visit an issue emerged concerning the potential for stainless steel to be susceptible to chloride stress corrosion cracking, pitting corrosion, and crevice corrosion when exposed to certain environmental conditions and the DCISC will pursue the potential impact of atmospheric chlorides on carbon steel and stainless steel structures used in the ISFSI canisters and overpacks and on other equipment on the DCP site.** In response to Dr. Budnitz' inquiry, Mr. Linnen confirmed that the corrosion issue does not constitute an imminent or immediate problem and the DCISC will receive a presentation on the ISFSI at this public meeting.

- Flexible Power Operations - Mr. Linnen reported nuclear power plants were generally intended to run at 100% power generation and now some plants are reviewing operation at varying power levels in response to demand for electric power. **The fact-finding team learned that no decisions concerning flexible power operations at DCPD have been made and the DCISC will continue to monitor this issue.** Dr. Peterson commented that there is now less probability for flexible power operations at DCPD due to grid demands. **Dr. Budnitz observed that flexible power operation if not done correctly can represent a safety compromise and the DCISC should remain vigilant to assure it understands the effect of flexible power operations at DCPD.**
- Update on Tsunami Hazard - Mr. Linnen reported the tsunami hazard analysis includes not only tsunamis generated by distant sources but also includes near-source tsunamis which could be produced by large underwater landslides in the vicinity of DCPD. He reported the studies were not complete at the time of the fact-finding visit but are being actively pursued by PG&E and will be documented by the tsunami hazard assessment scheduled to be submitted to the NRC in March 2015 which will include three-dimensional models of the bottom of the sea floor. In response to Dr. Budnitz' inquiry, Dr. Peterson stated the DCISC fact-finding team did not receive any specific detail about the results of the tsunami analysis that would lead to a conclusion that the hazard is significantly greater than previously thought. The DCISC will review the PG&E tsunami hazard study when it is available as well as the tsunami study prepared by Dr. Robert Sewell in 2003 and assess the implications for safety. Dr. Peterson commented the major uncertainties do not have to do with distant tsunamis but rather with potential submarine landslide induced tsunamis and a principal question relates to the location and how large an area could be affected by such a landslide. Dr. Peterson observed there is a credible possibility that a tsunami could disable the Auxiliary Saltwater System (ASW) even if it did not exceed the height of the ASW snorkels due to debris deposit but this would not be difficult for a plant to cope with. A tsunami in excess of 85 feet could impact DCPD's diesel generators which could be managed by the application of FLEX equipment, while a tsunami exceeding 140 feet could affect the plant's battery systems. Tsunamis also have the potential to severely impact the coastal area around DCPD and it is possible that the time available to evacuate low-lying areas or to ramp down power operations at DCPD could be very short. **Dr. Peterson stated understanding the potential for a landslide-induced tsunami was an important area for the DCISC to continue to study in more detail to understand the actual risk but at this point the DCISC does not have sufficient information to reach any conclusions.** He remarked that experiences in Japan after the March 2011 earthquake and tsunami demonstrated a lack of preparation not only by the Japanese nuclear power plants but also in the capacity in Japan to warn and evacuate the population. Dr. Peterson confirmed that while the DCISC fact-finding team did not review Dr. Sewell's tsunami study with PG&E, PG&E is aware of that study and is working with the study's conclusions. Dr. Lam expressed his appreciation and the thanks of the Committee to Mr. David Weisman and the A4NR for bringing the Sewell study to the attention of the DCISC. Dr. Budnitz reported that PG&E initiated a tsunami study in 2008 by the Pacific Earthquake Engineering Research Center at U.C. Berkeley and that this report was published in 2010, but the report is not specific to DCPD and lacks detail. Accordingly, and at the direction of the

NRC, PG&E commissioned the study that is to be released in March 2015.

Dr. Budnitz observed that at the present time the design basis for tsunamis was based upon a very large tsunami which might cross the ocean and its purpose was to demonstrate that the plant design is robust against this threat but when the current design basis was developed the possibility of a tsunami developing due to a slump in the nearby continental shelf was not considered. Dr. Budnitz stated that a near-generated tsunami could be as large as one generated at a distance and the warning time for a near-generated tsunami would be very short or nonexistent. He remarked that nuclear plants are designed to trip offline automatically upon the occurrence of earthquakes of a certain size but this is based upon different considerations than those created by a near-source tsunami and he remarked the industry and DCPD will need to look carefully at this issue including deciding whether the plant should be automatically tripped offline upon occurrence of a lesser earthquake.

- Meeting with NRC Senior Resident Inspector.
- DCISC Member meeting with PG&E Chief Nuclear Officer.

Mr. John Geesman on behalf of A4NR was recognized. Mr. Geesman stated that it was the action of the DCISC in making its Freedom of Information Request to the NRC that prompted the NRC to release Dr. Sewell's 2003 Tsunami Study. He stated that by retaining and not releasing that study the NRC engaged in the type of misconduct which has led to its discredited status among people in California and he expressed thanks to the Committee for its persistence. Mr. Geesman requested Dr. Peterson to comment further on his remarks concerning grid conditions making flexible power operations less likely and he inquired whether the Committee members had the opportunity to review the report by the Areva firm on this subject. Dr. Budnitz confirmed he has reviewed the Areva report and Dr. Peterson stated he had not done so. Dr. Peterson stated that qualitatively it appears less likely that flexible power operations will take place at DCPD although he stated nuclear power plants in France routinely operate in that mode. However, in order to do so Dr. Peterson stated it is necessary to make appropriate modifications to equipment. He further observed that at DCPD power generation operations are routinely reduced to clean the circulating water system or because of winter storm activity.

Dr. Gene Nelson was recognized. Dr. Nelson stated he serves on the Physical Sciences faculty at Cuesta College. Dr. Nelson stated he found Dr. Sewell's 2003 Tsunami Study to be speculative and beyond the state of the art. Dr. Nelson observed that scree slopes are above ground manifestation of the angle at which material accumulates and in an environment that is subject to frequent shaking from earthquakes. With large earthquakes occurring approximately every 350 years in the local area, the idea of having a so-called 40-mile event strains credulity. He remarked that due to this frequent shaking, material in the local area is at the angle of repose all the time and does not accumulate such that mass accumulations could generate a large tsunami. Dr. Nelson stated he provided a report by the group Californians for Green Nuclear Power to the DCISC for review, and Appendix A of that report includes recommendations regarding the importance of DCPD in fighting greenhouse gas emission. Dr. Nelson stated he was pleased the State Water Resources Control Board (SWRCB) recognized this as a key benefit of DCPD and he contrasted this with the closure of

SONGS which he stated has resulted in millions of tons of carbon being released into the atmosphere. Dr. Nelson stated that renewable sources of power such as wind and solar cannot have a meaningful impact on meeting the demand for power in California. Dr. Nelson stated that to replace DCCP would require 300 square miles of land to be covered with wind turbines and the wind blows intermittently. He remarked a new solar thermal power plant located at Ivanpah, California, must run its gas-powered boilers on the average of four and one half hours every day. Dr. Nelson closed by asking the DCISC to do everything in its power to encourage the SWRCB to adopt the recommendation in Appendix A of the report.

Dr. Peterson thanked Dr. Nelson and the other members of the public for their comments and remarked that the principal review activities of the Committee relative to the issue of cooling towers are related to their potential impact on safety.

Legal Counsel Wellington stated that upon their approval fact finding reports are made available to the public and become part of the Committee's next Annual Report.

Upon a motion by Dr. Lam, seconded by Dr. Budnitz, the December 2–3, 2014, Fact Finding Report was unanimously approved and its transmittal to PG&E authorized.

VIII Correspondence

Copies of correspondence sent and received at the office of the Committee's Legal Counsel since the last public meeting of the Committee in October 2014 were included with the public agenda packet for this meeting.

IX Adjourn Afternoon Meeting

The Chair adjourned the afternoon meeting of the DCISC at 5:45 P.M.

X Reconvene For Evening Meeting

Dr. Peterson convened the evening meeting of the DCISC at 5:55 P.M.

XI Committee Member Comments

There were no comments by any Member at this time.

XII Public Comments and Communications

Dr. Peterson invited any member of the public to attend this public meeting and to address comments to the Committee.

Ms. Gina Mori was recognized. Ms. Mori stated she was a new attendee at the DCISC's public meetings and she stated it was her observation that each of the DCISC members has a background in nuclear energy and she acknowledged that was needed in order to fulfill their role but she questioned why the Committee should not include representatives who do not favor nuclear power

in order to get different opinions.

Dr. Gene Nelson, a member of the Cuesta College faculty, was recognized. Dr. Nelson stated he has a Ph.D. in biophysics and he observed most people's knowledge of nuclear power is not informed by knowledge of physical science, engineering or mathematics but rather by works of fiction. Dr. Nelson remarked that many persons base their opinions about nuclear power on these works of fiction. Dr. Nelson stated he is working to inform people about basic science and engineering so that what goes on at DCPD would not be so much of a mystery. Dr. Nelson remarked that informing the public and making people aware of the facts about nuclear power is part of safety as doing so could avert panic and he stated there is, overall, a great need for more education. He closed his remarks by stating that he hopes the DCISC endorses the concept of improving public outreach and general knowledge on nuclear safety issues.

Ms. Sherry Lewis, a representative of MFP, was recognized. Ms. Lewis stated that members of her group and of the A4NR have scientific knowledge and do a great deal of research and study on issues related to nuclear power. Ms. Lewis stated she has attended several SSHAC workshops, meeting, as well as meetings of the IPRP and the SWRCB.

The Chair thanked the members of the public for their comments.

XIII Information Items Before the Committee

The Chair introduced Mr. Cary Harbor, Director of Compliance, Alliance and Risk at DCPD and who will introduce the PG&E presenters this afternoon and assist and respond to Committee inquiries. Mr. Harbor thanked the members of the public for attending and for their interest. Mr. Harbor stated PG&E encourages participation and values all perspectives. Mr. Harbor stated education is a key value of PG&E and DCPD is increasing its tour program in response and conducting outreach in the local community on the value of DCPD for all parties involved. Mr. Harbor then introduced Mr. John MacIntyre, Director of Maintenance Services at DCPD. Mr. Harbor reported Mr. MacIntyre has more than 30 years of nuclear industry experience. Mr. MacIntyre has held leadership positions in the Quality, Operations, and Training organizations and holds a Bachelor of Science Degree in Nuclear Technology and a Senior Reactor Operator's License.

Update on State of the Plant Events, Station Activities and a Summary of Performance Indicators for Refueling Outage 2R18.

Mr. MacIntyre stated he has been in the nuclear energy field for 41 years, having started in the U.S. Navy submarine service and has been employed at DCPD since 1984. Mr. MacIntyre reported he served in the Quality Control organization as a group leader and section supervisor, as Director of Maintenance Training, a general foreman in Mechanical Maintenance, as a reactor operator, shift foreman, shift manager, and as Manager of Electrical Maintenance and Director of Maintenance Services. He reported that in his presentation to the DCISC he would be providing an update on the station's 4th quarter 2014 performance, the fall 2014 U-2 refueling outage and upcoming key station activities.

Mr. MacIntyre reported both units are now safely operating at 100 percent power with all probabilistic risk assessments (PRAs) per the Safety Monitor program in Green status. Mr. MacIntyre, in response to a question from Consultant Wardell, described Safety Monitor as the program which reviews defense-in-depth key safety features while the plant is online and assesses the impact on safety of performing maintenance on equipment during planned maintenance outage windows.

Mr. MacIntyre reviewed the flashover event which occurred in the 230 kV switchyard on October 31, 2014, when arcing occurred across an insulator due to a buildup of dirt, dust, debris, and sodium chloride from the plant's marine environment. The 230 kV system provides startup power and its loss due to the flashover resulted in the loss of the 230 kV System standby ability for a period of hours. In response, DCPD conducted a root cause evaluation including input from PG&E Transmission System personnel and designated a project manager with single-point accountability for oversight of DCPD switchyard reliability improvements. The station also developed and implemented a time-based 230 kV washing preventive maintenance strategy and will reconstitute the 500 kV standoff insulator wash program for the insulators located against the Turbine Building for both units. Mr. MacIntyre reported DCPD has developed and implemented a contamination /dust mitigation procedure for activities, including dust mitigation strategies during construction that occurs in the vicinity of high voltage transformers in the 230 kV and 500 kV Switchyards.

Mr. MacIntyre commented concerning workforce management that DCPD's total current employment consists of 1,421 individuals and that the plant has made 25 new hires during 2014 as follows:

- Emergency Services—4
- Operations—13
- Engineering—7
- Strategic Projects—1

Mr. MacIntyre reported on two NRC Assessments of U-2 during its refueling outage 2R18 as follows:

- 2R18 Occupational Radiation Safety Inspection
 - Inspectors evaluated performance using nine different radiation protection inspection procedures.
 - Positive feedback received on workers stopping when unsure using human performance tools.
 - One non cited violation for a 2013 self-identified inadvertent movement of a radiation barrier. There has been no recurrence of this issue.
- 2R18 Baseline In-service Inspection
 - Inspectors noted that the station's Boric Acid Review Team meetings were a positive, and

that DCPD had a good boric acid corrosion control program.

- o No findings or violations

In response to a request from Consultant Linnen, Mr. MacIntyre stated DCPD leadership is pleased with the results of the Management Observation Program and has expanded the program from its initial scope of using managers and directors to perform observations and coaching for work in the plant to ensure workers are meeting management's expectations and standards. The program provides feedback to supervisors and, while feedback is not always positive, Mr. MacIntyre stated human performance errors have been reduced and there are plans to involve first line supervisors in making rotational observations for one full day in the field. He remarked this will improve first line supervisors' ability to engage and to coach workers and to bring information back to their respective crews. Mr. MacIntyre observed there is great benefit from a leadership standpoint to interacting with personnel and to engaging in improvement efforts rather than simply critiquing their performance.

For U-1 Mr. MacIntyre reported DCPD replaced its 500 kV polymer lightning arresters with ceramic arresters to improve station reliability as the ceramic arresters are less likely to experience a catastrophic failure such as experienced by U-2. Power was reduced on U-1 and the unit separated from transmission grid and this work was completed on December 6, 2014. Ceramic arresters have now been installed for both units. The lightning arrester work was scheduled with a planned circulating water tunnel cleaning for U-1 which was completed on December 9, 2014. The condenser tube sheet was cleaned, picked and dredged and the entire circulating tunnel between the Intake structure and the Turbine Building was cleaned of biofouling to ensure a high degree of reliability for the condensers throughout the operational cycle.

U-1 experienced a power reduction to 92% to repair a feedwater heater. U-1 reduced power and separated from transmission grid due to a ruptured tube in feedwater heater 1-5A which was plugged. Feedwater heaters 1-5B and 1-5C were also inspected and tubes were preemptively plugged in those heaters also with this work completed on January 3, 2015, with the offline duration for U-1 of 4.6 days. In response to Dr. Lam's inquiry, Mr. MacIntyre confirmed the feedwater heaters remain well below the plugging limits for maximum numbers of plugged tubes for continued operation.

Mr. MacIntyre reviewed the performance goals and result of the 2R18 refueling outage as follows:

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	Goal	Final
Recordable & Disabling Injuries	0	0
Nuclear Safety Events	0	0
Human Event Site Clock Resets	0	0
Outage Duration (days)	≤ 33	32

He reviewed and discussed the 2R18 refueling outage for work on the primary, secondary and

electrical systems as follows:

- Primary
 - Steam Generator tube sheet clean and tube integrity inspection
 - RCP 2-2 motor overhaul, stator and rotor replacement
 - RCP 2-3 seal package replacement
 - CFCU inlet damper modification
- Secondary
 - Circulating Water Pump Motor overhaul and rebuild
 - Turbine extraction steam bellows replacement
- Electrical
 - 480 V vital bus G breaker replacement
 - 500 kV switchyard relay and breaker upgrades
 - Battery and DC panel 2-2 replacement
 - Lightning Arrester replacement

Mr. MacIntyre reviewed upcoming key station activities for 2015:

- Emergency Response Organization (ERO) Drill—NRC Performance Indicator (PI) Evaluated—March
- Access Authorization NRC Inspection—April
- OPS Operator NRC Requal Inspection—May
- ISFSI Routine NRC Inspection—June
- 1R19 Refueling Outage—Fall

In response to Consultant Linnen's inquiry Mr. MacIntyre reported that of the new hires approximately one-third have previous nuclear industry experience with some personnel coming to DCP from San Onofre Nuclear Generating Station (SONGS). He reported for 2015 there is a hiring plan in place for Maintenance Services with ten new hires in Mechanical Maintenance, six in Instrument & Control, and six new personnel in Electrical Maintenance. Some of the new hires previously worked at DCP as contract personnel during outages. In response to Dr. Lam's inquiry, Mr. MacIntyre replied that for the near term he will be focusing most of his efforts on equipment reliability improvement and human performance with additional focus on maintenance fundamentals which is consistent with information received during a recent workshop conducted by the Institute of Nuclear Power Operations (INPO). In response to Dr. Budnitz' follow up inquiry, Mr. MacIntyre stated that if you have low experience but good human performance tools your performance should be safe but may not be efficient. However, with good maintenance

fundamentals and good human performance tools, performance should be both safe and efficient. He observed that maintenance fundamentals come from training and building engagement with the craft workers in the plant and will require involvement by managers and supervisors.

Mr. Harbor requested Mr. Philippe Soenen, Interim Manager of Regulatory Services at DCP, to make the next presentation to the DCISC. Mr. Harbor stated Mr. Soenen has 12 years' experience in the nuclear industry and holds a Bachelor of Science degree in Mechanical Engineering.

Review of NRC Performance Indicators, Licensee Event Reports, and NRC Notices of Violation.

Mr. Soenen reported all NRC performance indicators are currently meeting NRC green performance expectations. He reviewed a chart which summarized the NRC Performance Indicators that all nuclear stations report to every quarter. Mr. Soenen stated that DCP continues to meet all NRC performance indicator thresholds and sets more rigorous thresholds for the Performance Indicators well below the thresholds set by the NRC and investigates and focuses upon any declining areas of performance, currently including that for Safety System Functional Failures and issues or equipment reliability, before these areas impact the performance on the NRC indicators. 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. Soenen reported during the period from October 2014 to January 2015 the NRC identified seven violations of low level significance including six non cited violations (NCVs) and one finding, all of which were rated Green, meaning that they have a very low safety significance. He reviewed and

discussed these with the Committee including the NRC-identified cross-cutting aspect (C-C).

- NCV (Green)—Failure to Document Degraded Conditions in the Corrective Action Process (C-C Aspect H.11 Challenge the Unknown). This violation was due to two examples of unexpected conditions, the first being associated with the 480 V Bus room ventilation system high temperature alarm, while the second was associated with a register louver being in a closed position. Mr. Soenen reported there was no loss of system function or operability associated with either event. Expectations were reinforced for Operations and Maintenance that all unexpected conditions are to be entered into the Corrective Action Program for future evaluation and trending.
- NCV (Green)—Inadequate Maintenance Procedure Resulted in Improper Configuration of Safety-Related Equipment (C-C Aspect H.7 Documentation). This violation was associated with two examples where proper preplanned maintenance procedures were not implemented. The first was related to the register louver being in a closed position and the second with source range nuclear instrumentation being in a configuration that required operator action to perform its function. Documentation was revised and there was no loss of operability or functionality of the systems.
- Finding (Green)—Failure to Provide Adequate Procedural Guidance Resulting in a Loss of U-1 230 kV Off-site Power (C-C Aspect H.5 Work Management). **Mr. Soenen reported this was a self-revealing finding for failure to provide adequate acceptance criteria associated with a contractor's torquing of a non safety-related load tap changer. Mr. Soenen and Harbor stated PG&E would need to review and respond to Dr. Budnitz question concerning why a procedure was not in place for this work.** In response to Dr. Peterson's request, Mr. Soenen stated NCVs were issued in accordance with the NRC's more recent Reactor Oversight Process while findings are issued under the former NRC oversight process.
- NCV (Green)—Inadequate Procedure Results in Unnecessary Main Steam Safety Valve Lift (C-C Aspect H.12 Avoid Complacency). This violation was due to not having procedural guidance that would prevent an unnecessary lifting of an atmospheric dump valve or a main steam safety valve during a rapid shut down. These safety-related valves are designed to lift under certain conditions and procedures have been revised to ensure the valves will not lift during a controlled shut down.
- NCV (Green)—Failure to Document Degraded Emergency Diesel Generator Fuel Injector Nozzles in the Corrective Action Program (C-C Aspect P.1 Identification). This violation resulted from two instances when degraded conditions were not entered into the Corrective Action Program. The first was associated with maintenance on a diesel generator with degraded fuel injectors and the second involved loose bolts found on an electrical panel. Expectations have been reinforced concerning the threshold for entering items into the Corrective Action Program.
- NCV (Green) - Inadequate Technical Specification Surveillance Requirement for Emergency Diesel Generators (C-C Aspect P.3 Resolution). This violation was occasioned due to failure to adjust the parameters of full load testing requirements and undertake an appropriate surveillance testing demonstration for a diesel generator after having revised the generator's

full load test surveillance requirement. In response to and in accordance with Surveillance Requirement 303, all of the diesels were successfully tested at the new, higher values.

- NCV (Green)—Longstanding Uncompensated Nonconforming Condition (C-C Aspect H.14 Conservative Bias). This violation was for failure to take timely corrective action after identification of a potential path for gas intrusion into the Containment Spray System. The system was determined to be operable but non conforming and compensatory measures were not put into place. DCPD reviewed the list of degraded, unanalyzed and non conforming conditions and reprioritized the list based upon safety significance of each item and the item's age in order to expedite resolution of these existing conditions.

Mr. Soenen stated that each violation he discussed was determined by the NRC to have a low safety significance but DCPD recognizes that each must be reviewed for any indication of a trend. In response to Dr. Lam's inquiry, Mr. Soenen reported the NCV related to diesel generator testing also resulted in DCPD initiating a Licensee Event Report (LER) with the NRC. Mr. Harbor reported that in response to the NCV related to potential gas intrusion into the Containment Spray System DCPD has undertaken to review any other items that are considered degraded or non conforming and is reviewing its bridging strategies and compensatory measures and has made this a focus area.

Mr. Soenen briefly summarized and reported the NRC issued the following inspection reports during the October 2014–January 2015 period:

- Integrated Inspection Report (2014-004, 10/27/14)
- Problem Identification and Resolution Inspection Report (2014-007, 10/22/14)
- Focused Baseline Inspection Report (2014-008, 12/15/2014)
- Emergency Preparedness Inspection Report (2014-502, 12/1/14)

He stated that all NRC performance indicators are meeting NRC Green expectations. Cross-cutting performance is strong, with no cross-cutting themes identified.

Dr. Peterson thanked Mr. Soenen for his presentation. There was no public comment.

XIV Adjourn Evening Meeting

The Chair adjourned the evening meeting of the Committee at 6:50 P.M. and reported the meeting would reconvene at 8:00 A.M. on February 5, 2015.

XV Reconvene for Morning Meeting

The February 5, 2015, morning public meeting of the Diablo Canyon Independent Safety Committee was called to order by its Chair, Dr. Peterson at 8:30 A.M. Dr. Peterson welcomed those persons present in the audience and watching the proceedings on live streaming video. Dr. Peterson requested any of the members who wished to make remarks to do so at this time.

XVI Committee Member Comments

There were no comments by any member at this time.

XVII Public Comments and Communication

The Chair reviewed the protocol for addressing comments to the Committee for matters on and not on the agenda and invited any member of the public present 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 the Chair's invitation.

XVIII Information Items Before the Committee

Dr. Peterson introduced Mr. Cary Harbor, Director of Compliance, Alliance and Risk at DCPD and asked Mr. Harbor to introduce the next presentation to the Committee. Mr. Harbor introduced Mr. Barry Allen, DCPD Vice President of Nuclear Services. Mr. Allen has more than 30 years' experience in the nuclear industry and has held leadership positions at several stations at the executive level and holds a Master of Science degree in Civil Engineering.

Update on the 2015 Operating Plan and Performance Goals and Comparison with Accomplishments Under 2014 Operating Plan.

Mr. Allen reported the DCPD Operating Plan is refreshed each year and looks ahead to the next five years. He described it as a roadmap for the station to communicate with its employees, the PG&E Corporation and the public as to where DCPD is at the present time and where it is headed in the future. Mr. Allen stated key activities completed in 2014 include: accreditation of Operations' training programs; safe completion of refueling outages 1R18 and 2R18 with very good outage performances; a successful NRC and FEMA-evaluated Hostile Action Based Drill with no findings or violations; a Problem Identification and Resolution (PI&R) inspection by the NRC reviewing the Corrective Action Program; and a technical program training self-assessment of the Maintenance, Chemistry, Radiation Protection and Engineering training programs, which are scheduled for accreditation in 2016. Dr. Peterson commented a DCISC fact-finding team observed the Hostile Action Based Drill and he observed there is value to having realistic training for contingent scenarios and this drill served the plant well with training for beyond design basis FLEX-types of response. The drill conducted at DCPD was the first for an NRC Region IV plant and Mr. Allen remarked that feedback from FEMA on the drill indicated local and state agency cooperation and participation was the best FEMA had seen. Dr. Peterson remarked these drills provide an excellent opportunity for local officials to build emergency response skills and they emphasize the importance of flexibility and decision making in a wide range of situations.

Mr. Allen reviewed the elements and use of the "OUR TEAM" concept used with the Operating Plan to align key elements of short term tactical and long term strategic focus items including: "O" outage planning and execution; "U" human performance tools; "R" reinvigorating employee engagement; "T" transferring and training on critical knowledge; "E" enhancement of facilities; "A" achieving a better work-life balance; and "M" making it a mission to maintain a disciplined

approach to safe, event-free operations. Dr. Budnitz observed that six of these seven elements focus on safety culture, the exception being enhancement of facilities. Mr. Allen replied DCPD has constructed an off-site Technical Support Center and Operational Support Center which give the plant the capability to enhance safety by locating the Emergency Response Organization (ERO) offsite.

Mr. Allen reviewed and discussed some of the individual components of the OUR TEAM concept.

Outage Planning & Execution: key elements include increasing line ownership of the outage planning and scheduling processes; a continued focus on risk-related work to ensure effective risk recognition, contingency planning and bridging strategy implementation for outage and online work execution. In response to Consultant Wardell's question, Mr. Allen stated a preference for establishing a baseline outage duration which might be capable of achieving a 25-day outage when no significant plant modifications were scheduled. Mr. Allen stated that in approximately five years the plant is looking to replace the generator stator for U-2 and that from time to time there may be outages during which it is necessary to drain down the RCS lower than usual.

- Use of Human Performance Tools: key elements include increasing leadership presence in the field, observing and interacting with workers; emphasizing behaviors to stop when unsure or to stop when documents don't work as written, to reinforce a questioning attitude; streamlining the use of performance improvement coordinators and trending processes to ensure high performance. Consultant Linnen observed and Mr. Allen agreed that emphasizing a behavior to stop when unsure requires overcoming significant barriers as workers may see that behavior as unprofessional. Mr. Allen remarked that the effort to reinforce this behavior is not just with individuals working within the plant but extends station-wide.
- Reinvigorating Employee Engagement: key elements include reinforcing a facilitative leadership model and behaviors that focus on tapping the power of participation; using employee teams (such as advisory councils) to identify opportunities and develop plans of action and Mr. Allen reported employees have suggested positive changes including the use of reverse pre job briefings and better strategies to introduce and integrate new employees into the DCPD workforce and that improve performance and foster employee ownership of human performance.

In response to Dr. Lam's question regarding resources dedicated to each element of the Operating Plan, Mr. Allen stated appropriate resources have been dedicated to each area but not necessarily in equal amounts in terms of funding as certain elements are more capital expenditure intensive than others but each area receives an appropriate budget and time and attention from leadership.

- Transfer Critical Knowledge: key elements include involving the workforce in implementing tools and processes for knowledge management and transfer and leveraging technology such as the use of wiki-type applications and videos to store and access key knowledge, particularly for infrequently performed activities. Mr. Allen remarked DCPD is working to install wireless access throughout the power block. Dr. Budnitz commented that during a fact-finding visit the DCISC representatives accompanied an operator during the operator's rounds

in the Turbine Building and witnessed the application of new technology. In response to Dr. Peterson's inquiry, Mr. Allen confirmed DCPD is using wireless technology for plant health monitoring, instrumentation, video observations and other uses but he remarked that DCPD is not yet an industry leader in the application of wireless technology but the infrastructure to reach that goal should be in place within one or two years and he commented it is necessary to proceed cautiously and ensure security concerns are addressed. Dr. Peterson observed it is important for leadership to encourage the rapid adoption of the use of wireless technology and tools as more data collection allows earlier and better capabilities for problem identification and higher reliability for equipment and systems. Dr. Peterson observed that plant health monitoring functions do not include the ability to perform plant control functions and the reactor protection systems will remain operated by hardened, very robust systems and retain a capability for manual intervention. Plant health monitoring data gathering does not have the same challenging cyber security issues as plant control functions.

- **Enhancing Facilities:** key elements include the offsite establishment of the alternate Technical Support Center and Operations Support Center; new facilities for FLEX equipment and the DCPD Fire Station; upgrading the Outage Control Center and the plant's fitness facilities. In response to Dr. Peterson's question, Mr. Allen confirmed FLEX equipment and components will be available at different seismically-qualified locations designed to withstand appropriate forces.
- **Achieving Work-Life Balance:** key elements include involving the workforce to implement continuous improvement initiatives; implementing an evaluation and specific actions to reduce the cumulative effects of existing and new requirements; implementing a long-term strategy to reduce overtime; and facilitating healthy fitness activities and opportunities such as wellness seminars and onsite walking trails. Mr. Allen reported through the DCPD Annual Campaign for the Community employees have raised more than \$433,000 pledged to local non profit organizations. In response to Dr. Peterson's request, Mr. Allen provided the example of addressing the issue of the level of resources that go into a notification or conditional report on an issue which is of very low level significance as directed to reducing a sense of frustration from having to spend a significant amount of time and resources on an issue which is not creating a problem.
- **Maintain Event-Free Operations:** key elements include improving key controls for protecting vital power equipment; upgrading equipment for better long term reliability of the emergency diesels, electrical distribution and fuel handling systems.

In response to Consultant Wardell's request, Mr. Allen commented for 2014 the station achieved its goals within the budget established for the Operating Plan and experienced a good year for nuclear safety performance with no loss of shutdown cooling during two refueling outages and met its goals for radiation, environmental and industrial safety. Mr. Allen confirmed that for 2015 the Operating Plan goals will be similar to those for 2014 and be directed toward DCPD achieving top quartile performance in the nuclear industry.

Mr. Harbor introduced Mr. Dean Overland, the Chair of the DCPD Nuclear Safety Culture Monitoring Panel. Mr. Harbor stated that Mr. Overland has more than 20 years' experience in the nuclear

industry with roles in connection with power plant operations and 12 years' experience with the NRC. Mr. Overland holds a Bachelor of Science Degree in Nuclear Technology and an MBA.

Overview of Nuclear Safety Culture.

In response to a query from Dr. Budnitz, Mr. Overland stated he had several prior roles with the NRC including doing probabilistic risk assessment for research, as well as serving at the NRC Region IV office in Arlington, Texas, and as a senior resident inspector at the Waterford Nuclear Generating Station in Louisiana and at DCP. Mr. Overland stated he was relatively new in his job as Chair of the Nuclear Safety Culture Monitoring Panel having recently assumed that position which was previously held by Mr. Harbor.

Mr. Overland described nuclear safety culture as being made up of core values and behaviors which result from a collective commitment from leaders and individuals to emphasize safety over competing goals to ensure the protection of people and the environment. He emphasized that it is not just plant leadership, the entire plant needs to participate and practice nuclear safety culture principles. Mr. Overland described and discussed the traits of a healthy nuclear safety culture as follows:

- Individual Commitment to Safety
 - Personal Accountability
 - Questioning Attitude
 - Effective Safety Communication
- Management Commitment to Safety
 - Leadership Safety Values and Actions
 - Decision-Making
 - Respectful Work Environment
- Management Systems
 - Continuous Learning
 - Problem Identification and Resolution
 - Environment for Raising Concerns
 - Work Processes

Mr. Overland reported that the Problem Identification & Review (PI&R) inspection described previously by Mr. Allen includes the NRC's review of the station's Safety Conscious Work Environment (SCWE) which is stressed by industry guidance to ensure that individuals feel free and are openly willing to identify and raise issues, questions or concerns, express differing viewpoints or perspectives dealing with nuclear or radiological safety, quality, security, environmental or

regulatory compliance and do so without fear of retaliation. Mr. Overland stated that the preferred route for persons to raise issues is through their supervisor, however, individuals can also go to managers, directors, the NRC, or raise their concerns through the plant's Employee Concerns Program (ECP). Issues identified are addressed promptly, with timely feedback to the initiator. In response to Dr. Peterson's inquiry about verifying that a chilled environment for raising concerns does not exist Mr. Overland stated that employees can raise concerns anonymously and one measure of the existence of a chilled environment is assessing the number of anonymous concerns and he remarked that the number of anonymous notifications or concerns raised by DCPD employees is low. He remarked some of the concerns raised anonymously may not necessarily be germane to nuclear safety culture or issues and some may be raised anonymously for reasons of expediency.

Mr. Harbor commented the plant also periodically conducts surveys of its employees concerning their perception of nuclear safety culture and also arranges for independent assessments by outside organizations which include interviews, surveys and observations to assess nuclear safety culture. DCPD leaders also spend time in the plant observing activities and seeking feedback from the craft. Dr. Peterson remarked he was skeptical that there were no employees who feel that in some way their concerns have not been adequately addressed and Mr. Harbor confirmed Dr. Peterson's observation. Mr. Harbor stated DCPD also monitors its contractors in these efforts and he observed that the Corrective Action Program provides visibility for management's actions in response to notifications or concerns. Mr. Harbor reported DCPD leadership works to employ facilitative leadership behaviors. He confirmed Mr. Overland's observation that the data obtained from surveys does not demonstrate a decline in a healthy nuclear safety culture. Mr. Overland commented that sometimes employees may disagree with the outcome or resolution of their concerns but that this is not necessarily indicative of a chilled environment relative to nuclear safety culture. Dr. Peterson remarked that having a fair method for adjudicating disagreements, akin to a peer review process in academia, is a critical element to avoid a chilled environment. Mr. Overland agreed and commented that providing feedback to the individuals raising concerns is a key element and attribute of a healthy nuclear safety culture. Mr. Harbor remarked that, similar to the peer review process cited by Dr. Peterson, DCPD also has a Differing Professional Opinion (DPO) program which allows an appropriate level of review for technical issues.

Mr. Overland stated the Nuclear Safety Culture Monitoring Panel (NSCMP) assesses nuclear safety culture using the recommendations of NEI 09-07, "Fostering a Healthy Nuclear Safety Culture," which places primary responsibility on management to provide an ongoing holistic, objective, transparent and safety-focused process. The process evaluates inputs from:

- Corrective Action Program
- Performance trends
- NRC inspections
- Industry evaluations, audits, and Operating Experience
- Independent and self-assessments

- Employee Concerns Program

The NSCMP monitors these inputs to identify early indications of potential concerns in the work environment that merit additional attention by the organization. Mr. Overland stated the NSCMP is comprised of experienced personnel with diverse backgrounds and its membership is limited to protect the confidentiality of personal information. **In response to a question from Consultant Wardell, Mr. Harbor and Mr. Overland agreed to provide data on the current activity levels for both the ECP and the DPO programs during a future fact finding.** Mr. Harbor remarked it was rare for DCPD to receive a concern under the DPO Program. Mr. Harbor reported that five years previously there were fairly high numbers of concerns raised through the ECP but since then those numbers have declined at DCPD and are now in line with industry norms.

Mr. Overland reviewed results of the recent efforts to assess safety culture and reported DCPD has undergone a number of NRC inspections that examined nuclear safety culture attributes of its regulatory, correction action, performance improvement, human resources, ECP, security and quality assurance functions. The latest assessment of the data used for evaluation and trend identification concluded in September 2014, by both the NRC through its PI&R inspection as well as recent NSCMP assessments, indicates that DCPD continues to exhibit the traits of a healthy nuclear safety culture. Mr. Overland concluded his presentation by observing that nuclear safety culture is a constantly evolving concept and DCPD continues to learn from, and make improvements to its nuclear safety culture and has a focus area for 2015 on human performance. He closed with a quote from M. Shawn Covey that “an empowered organization is one in which individuals have the knowledge, skill, desire, and opportunity to personally succeed in a way that leads to collective organizational success”. Mr. Overland stated that the responsibility is placed on management to lay the groundwork for nuclear safety culture and to ensure there is a framework in place in which employees can raise concerns in a respectful work environment and the onus is on individuals to demonstrate personal accountability and a commitment to safety.

Dr. Peterson remarked that safety culture places a great deal of emphasis on achieving a high level of performance and reliability during normal operations and he observed that during the accident at Fukushima the plant staff saved that plant and terminated a severe accident in an environment where the plant staff had no previous training in a FLEX-type response and virtually no resources and abysmal leadership due to a lack of preparation and an unwillingness to believe that an accident of the magnitude experienced at Fukushima was possible. Dr. Peterson observed it is important to develop confidence that nuclear safety culture principles and resources will be available so that they may be depended upon if needed to respond to any accident which may go beyond a plant’s design basis. Mr. Overland agreed and stated his belief that nuclear safety culture principles and training, to work together toward a common goal, are germane to any response to an incident such as that described by Dr. Peterson, and when those principles are embraced and internalized they are not necessarily specific to the magnitude of such an event. Consultant Linnen stated his observations of training in the Simulator facility showed DCPD has developed a method and environment where personnel behave in a reasonable fashion when confronted in drills with worst case scenarios and these types of drills reinforce the kinds of attitudes and behaviors that become embedded in any response.

Dr. Peterson remarked that federal regulations explicitly authorize and transfer responsibility for making decisions and to take actions related to safety to the staff at the involved plant and this is quite different from the approach employed in Japan prior to and during the accident at Fukushima. Dr. Budnitz observed that a Japanese cultural model emphasized loyalty to a particular company as a value, however, this did not allow personnel at the individual utilities to communicate effectively with one another and it prevented the implementation of best practices across the Japanese nuclear industry prior to Fukushima. Dr. Budnitz stated that unless a larger interaction is taking place to foster a cultural affinity for learning from all available sources the implementation of nuclear safety culture will not be as effective as it needs to be.

Mr. Overland commented that DCPD has a healthy Operating Experience program to learn from and to incorporate lessons learned from the experiences of other nuclear power plants and the plant performs internal and external self-assessment in the effort and to feed into a healthy nuclear safety culture. In response to Dr. Budnitz' inquiry Mr. Overland stated he did not see issues at DCPD in incorporating lessons learned from other facilities. Mr. Harbor observed that PG&E after the San Bruno, CA gas line explosion identified safety culture elements associated with that event and has implemented a corporate, three-year program that includes leadership training, observations, and coaching on a peer-to-peer level to improve safety culture throughout the company and that DCPD is a part of that effort and has also been involved in demonstrating safety culture values present in the nuclear industry to the larger PG&E organization. In response to Dr. Peterson's inquiry Mr. Overland stated that as he was relatively new in his position he would look to the NRC inspection reports to identify best performers in demonstrating nuclear safety cultural attributes within the industry. Mr. Harbor remarked that the Palo Verde Nuclear Generating Station in Arizona is recognized within the industry for doing an excellent job in creating and sustaining a healthy nuclear safety culture. Dr. Lam commented on the small book each DCPD employee carries while onsite which sets forth the principles and conduct to be employed by a nuclear professional and Mr. Overland confirmed it was DCPD's expectation that all employees will have and employ these principles available to them at all times and act in accordance while at work at DCPD.

Dr. Gene Nelson, a member of the Cuesta College Physical Sciences Department, was recognized. Dr. Nelson stated he received and reviewed a copy of the small book referred to by Dr. Lam and remarked he found much common sense in its contents. Dr. Nelson stated he appreciated the edition year was given on the cover, indicating it is updated on a frequent basis, and that it included blank pages for employees to make notes which he stated increases their involvement with the principles contained therein. Dr. Nelson stated the Onagawa Nuclear Power Plant in Japan experienced the most shaking ever at a nuclear power plant during the March 2011 earthquake which also affected the Tokyo Electric Power Company's Fukushima Daiichi plant and the Onagawa plant also experienced a taller tsunami than that at Fukushima. However, the Onagawa plant, managed by the Tohoku Electric Power Company, was able to shut down and the plant proved robust enough to provide shelter to the hundreds of individuals from the local area whose homes were destroyed. He remarked that it was his belief that the experience and performance of the Onagawa plant were the result of a focus by that company on nuclear safety culture. Dr. Peterson stated that Mr. Akiyoshi Obonai, one of his earliest students, was now the Deputy General Manager

of the Onagawa plant and served in that capacity in March 2011 during the earthquake which devastated the region. Dr. Peterson confirmed Dr. Nelson's observations and stated the Onagawa plant had a substantially greater design basis for tsunami protection than that at Fukushima Daiichi.

A short break followed.

Mr. Harbor introduced Mr. Jeff Summy, Senior Director of Technical Services for DCP. Mr. Harbor stated Mr. Summy has more than 30 years of nuclear industry experience and has held roles in leadership in engineering at several power plants. Mr. Summy holds a Bachelor of Science degree in Engineering.

Overview of the Action Plan for High Voltage Flashovers

Mr. Summy began his presentation with the display of a single line diagram of the electrical distribution system for a single DCP unit. He reported DCP has three sources of electrical power serving the plant, with the immediately available offsite power being the 230 kV System coming from the Morro Bay switchyard either directly or through the Mesa switchyard to the 230 kV DCP switchyard. A second source of offsite power, which Mr. Summy described as a delayed off-site source, is supplied by the 500 kV System which feeds DCP through various offsite switchyards. A delay is involved when DCP separates from the power grid due to a turbine or reactor trip and the 500 kV switchyard breakers open and in order to supply power back through the 500 kV System, Operations must open the motor-operated disconnects before the breakers can be reenergized. Mr. Summy reported a third source of power is supplied by the three emergency diesel generators (EDGs) serving each DCP unit. In the event of loss of 230 kV and 500 kV power, or a combination, the EDGs start automatically and supply the safety-related vital buses at the 4 kV level. In response to a question from Dr. Peterson, Mr. Summy stated that, if necessary, the portable generators provided post Fukushima would tie-in at the 4 kV level and could also be tied-in to directly to Buses F, G and H. **In response to Dr. Peterson's inquiry concerning plans to tie-in portable generators in the event of severe damage to the electrical switchgear areas, Mr. Summy stated that this was a complex subject which should be discussed in context of a presentation on DCP's post Fukushima emergency planning efforts and Dr. Peterson requested that this topic be identified for future follow up during review of FLEX.** Dr. Budnitz observed and Mr. Summy concurred that DCP has the ability to connect portable generators directly to its vital loads below the bus level. In response to Dr. Lam's question, Mr. Summy confirmed that load transfers take place automatically and involve very large and specialized sets of equipment.

Mr. Summy described and provided a summary of the recent flashover events involving the 500 kV Main Bank Transformer Yard. He stated that none of these events impacted DCP's ability to supply the safety-related buses. In response to a question from Dr. Peterson concerning any influence played by salt deposition in these events or on the potential for degradation or corrosion of spent fuel canisters Mr. Summy responded that salt deposition did play an important role in the events he will describe. Three 500 kV flashover events occurred, each associated with U-2 and each of which caused U-2 to trip offline from 100% power. These events were a capacitance coupled voltage transformer (CCVT) flashover in Oct 2012; a Phase A lightning arrester flashover in July 2013; and a

Phase B lightning arrester failure in February 2014

Mr. Summy reported lightning arresters are designed to withstand more than one lightning strike. He stated that upon each event the electrical buses transferred to 230 kV and continued to be supplied with power with no challenge to safety-related equipment. In response to Dr. Peterson's inquiry, Mr. Summy stated that a turbine trip from a power level greater than 55% results in an automatic reactor trip. The Palo Verde plant in Arizona is one of a few plants with the ability to drop in selected groups of control rods and to open steam bypass valves to avoid a reactor trip in response to a turbine trip. Dr. Lam commented that in recent years the number of reactor trips within the nuclear power industry has significantly decreased and an actual event, while not desired, does provide an opportunity for operators to experience an actual trip. Mr. Summy reported that with each of the three events involving the 500 kV System, U-2 tripped offline and the equipment and Operations personnel responded as designed and there were no consequences as a result of the trips.

Mr. Summy described and reported on two challenges with 230 kV offsite power flashover events which involved the Morro Bay 230 kV Switchyard in June 2013, and the DCPD 230 kV Switchyard in Oct 2014. Mr. Summy reported the October 2014 event followed 190 days without rain which played a role in these events. He provided a schematic graphic showing the location of the 230 kV and 500 kV occurrences. He remarked that the Morro Bay event on the 230 kV System occurred while the plant was on a single feed from Morro Bay due to reducing work taking place on the Mesa Substation lines in preparation for tying in new solar units and all 230 kV power was lost as a result. The occurrence in October 2014 resulted in all six EDGs starting preemptively but the EDGs did not load to the buses as the buses never lost power. Mr. Summy confirmed that the PRA model has improved to incorporate the loss of switchyard access.

Mr. Summy reported in 2008 a main transformer bushing failure root cause corrective action resulted in the replacement of porcelain-style high voltage insulators with polymer-style insulators and in 2011 and 2012 ceramic CCVTs and lightning arresters were replaced with polymer and he noted that previous to this replacement DCPD had no history of any flashover events in the 500 kV System. He observed that the transformer oil-filled bushing failure was a much different failure mechanism than experienced with the CCVT or lightning arresters. An independent review of the CCVT and lightning arrester insulator failures found a common cause in the very heavy buildup of salt and dust, caused by the repeated sequence of morning fog followed by afternoon drying, on the insulator sheds which the polymer devices could not handle and when rain fell the flashovers occurred. Mr. Summy stated that field service conditions at DCPD for this equipment are classified as unusual service conditions by industry standards. He reported the CCVTs have now been removed. The recommendation from the common cause report was to minimize the generation of airborne dust and dirt and continue to monitor and characterize insulator buildup constituents and deposition rates and evaluate the feasibility of returning to porcelain insulated lightning arresters. DCPD now monitors for insulator dust buildup, has a mitigation plan in place for dust and dirt, and the lightning arrester insulators have been replaced with porcelain and the insulators are now greased which absorbs dust and dirt.

Mr. Summy reviewed the common cause for the 230 kV flashover events which included the installed insulators not meeting the manufacturer's specifications and insufficient margin for DCP - Morro Bay service conditions. Mr. Summy reported on the actions taken to address the 230 kV flashover events including time-based cleaning and planned replacement in 2015. In response to Consultant Wardell's inquiry Mr. Summy remarked that the manufacturer may have overstated the capability for the insulator.

Mr. Summy reviewed the Los Padres - DCP Electric Power Reliability Plan and summarized the plan as a broad plan designed to improve electrical reliability and capacity of DCP onsite/offsite power down to the 4 kV level. He reported the objective of the plan, which PG&E began formulating in May 2014, is to provide an integrated assessment of and recommendations for improving the reliability of electric power to the DCP 4 kV buses and represents a joint effort between DCP and PG&E Electric Operations. The plan was published in October 2014 and encompasses a five-year strategy based on the principles of meeting compliance, safety, reliability, and affordability goals. He provided a map with an overview of the area addressed by the plan which includes, for the 500 kV System, DCP, the Gates, and the Midway Substations, and for the 230 kV System, the Morro Bay, Mesa and DCP substations. He provided a schematic which showed the internal configuration of the 230 kV and 500 kV Systems at DCP. Mr. Summy described the plan highlights as having compiled action items from previous studies, self-assessments, root causes, independent reviews and including improvements to maintenance strategies, bridging strategies, and modifications. He reported there was a total of 244 actions, each with an assigned owner and a forecast completion date. To date, actions have been taken to resolve 186 items and 58 items remain open and in progress. Mr. Summy stated the plan requires periodic meetings to track and update actions and will be updated periodically to adjust for new information. He discussed and reviewed with the DCISC the long-term plan improvements and schedule for completion as follows:

Improvement	Forecast Completion Date
Generator Output Breakers	2018
Diesel Generator Margin Improvement	To be determined
Relay Upgrades (500 kV, 230 kV and 115kV)	2015–2018
Replace RG165 insulators (Morro Bay, Diablo, Mesa)	2015–2016
Diablo 230 kV SVC	2018
Diablo 230 kV BAAH GIS	2018
Replace Diablo 230 kV circuit switchers	2018
Second 230 kV interconnection line & breaker to DCP	To be determined
Morro Bay 230 kV BAAH GIS	2018
Morro Bay 115kV BAAH GIS	2016
Morro Bay 230/115kV Bank #2	2018
Midway—Andrew 230 kV line	2019+

Mr. Summy reported that for longer-term plant modifications, bridging strategies have been developed as safeguards until the plan can be fully implemented. He remarked that the population

of the Los Padres area is growing and the load on the 230 kV System has increased accordingly and as the load increases it is harder to maintain voltage on the system and this is being addressed by installing a static VAR compensator for the 230 kV System. In response to Dr. Lam's inquiry, Mr. Summy confirmed the above schedule was not dictated by budget concerns.

Mr. Summy summarized the DCPD Flashover Prevention Plan as having a focus on electric power reliability in 2015 and he remarked definite actions are in progress to prevent future flashover events. He described these actions as an integrated, robust plan developed for the broader electrical system with many of the actions having been completed and bridging strategies being implemented until longer term improvement items are completed. Mr. Summy reported that five persons from the Chubu Electric Power Company's Hamaoka nuclear plant visited DCPD to review and exchange information concerning seismic and tsunami related issues. Dr. Budnitz observed that there was considerable widespread destruction of the electric power grid in Japan following the March 2011 earthquake and a process is in place to upgrade the robustness and reliability of the grid. Dr. Budnitz remarked that during fact-finding the DCISC received information on the population and industrial growth of the local area which was affecting the 230 kV margin and Mr. Summy confirmed that a tie-in to the upgraded Andrews Substation was part of the plan to address that situation by providing another 230 kV feed but this requires obtaining permits and rights-of-way and he confirmed that this is part of PG&E's plans for serving the area. Dr. Budnitz observed that the design by PG&E was intended to address the problem over a 20-year period and to deal with both voltage sag and frequency sag during peak usage periods. Mr. Summy confirmed Dr. Budnitz' observation and stated that under design basis conditions if DCPD transfers two units worth of vital loads to the 230 kV System, that transfer under certain conditions will drag the voltage on the system down and this raises the possibility of an EDG startup which the plant would prefer to avoid. Mr. Summy confirmed that DCPD and PG&E have been working with the California Independent System Operator (ISO) concerning grid studies.

Dr. Gene Nelson, on the faculty of Cuesta College Physical Sciences Department, was recognized following Mr. Summy's presentation. Dr. Nelson inquired why the June 2013 flashover resulted in an outage of unusually long duration. Mr. Summy replied that due to the unusual alignment of the 230 kV System at that time, with one line out of service for reducting, it was necessary to replace insulators and repair lines in the 230 kV Switchyard which extended the outage duration beyond what it would have been had both 230 kV lines been available.

Ms. Sherry Lewis of MFP was recognized and inquired about the various colored lines and symbols use on the map displayed during Mr. Summy's presentation. Mr. Summy confirmed the triangles represented substations, while the green lines represented the 230 kV System and the red lines the 500 kV System.

Dr. Peterson thanked Mr. Summy for an excellent presentation and stated that the DCISC would be closely following the flashover issue and has a particular interest in understanding the effects of salt deposition on various plant components.

XIX Adjourn Morning Meeting

The February 5, 2015, morning meeting of the DCISC was adjourned by the Chair at 11:00 A.M.

XX Reconvene For Afternoon Meeting

The February 5, 2015, afternoon public meeting of the Diablo Canyon Independent Safety Committee was called to order by its Chair, Dr. Per Peterson, at 1:00 P.M. Dr. Peterson welcomed those present and inquired if there were any comments from the other members.

XXI Committee Member Comments

Dr. Budnitz stated that he found the two presentations made by PG&E during the morning session to be excellent and informative. Dr. Peterson stated the DCISC recognizes and appreciates the time and effort which PG&E devotes to making its presentations to the Committee.

The Chair invited any members of the public present to comment on matters not on the agenda at this time.

XXII Public Comments and Communication

Ms. Sherry Lewis of MFP was recognized. Ms. Lewis directed the attention of the Committee to the written comments by Dr. Sam Blakeslee of December 3, 2014. Ms. Lewis stated there is a significant amount of evidence that PG&E has systematically presented interpretations of seismic and ground motion data gathered over the past few years in such a way so as to indicate that whatever earthquake is likely to happen DCP is not vulnerable. She stated there were two problems with PG&E's position. Ms. Lewis stated that DCP is not in compliance with its license from the NRC which requires it to be built to standards to allow it to continue operating even if the strongest possible earthquake were to occur which she stated is known as the design basis earthquake standard. Furthermore, in the event of an even stronger earthquake the plant's systems, structures and components must have extra margin and continue to function to prevent the core from melting due to residual heat and that this standard is known as the double design earthquake standard. Ms. Lewis stated that since these standards were established two new faults were discovered. These are the Shoreline and Hosgri Faults and both have now found to be larger than previously thought and capable of joint rupture which would release greater energy than DCP is designed for. She observed the strongest earthquake is now much greater than the design basis standard and the Hosgri evaluation standard is inadequate to ensure safety. Ms. Lewis stated that PG&E is required to apply for a license amendment to address new information or to clearly explain why it is not required to do so. At present, she stated, PG&E has done neither and therefore it is out of compliance with the operating license for DCP and the law requires that the plant be shut down until regulations are met but the NRC has allowed PG&E to operate DCP outside its current licensing basis. Ms. Lewis stated Dr. Blakeslee's statement also addressed the research PG&E was required to undertake in response to State Assembly Bill 1632 in 2006. She observed it was these studies which brought to light the more hazardous faulting around the site of DCP but understanding the seismicity of the area is only part of the problem as the way in which vibrations travel from a fault to the plant site and how the plant components react to shaking is also required. Ms. Lewis stated seismicity, ground motion, and site characteristics all contribute to the hazard that

must be considered, but as the seismic hazard has grown the ground motion hazards have seemingly decreased so that whatever hazard appears on paper DCP is still shown to be a safe nuclear power plant. Ms. Lewis characterized this approach as criminal by PG&E and she stated PG&E has been allowed to continue operation of DCP by reassessing ground motion data to imply that the increasing danger of seismicity has been offset by lesser ground shaking at the plant site. She stated this is done by statistical analyses which average a wide range of data from around the world, the preponderance of which does not fit the local situation at DCP. Ms. Lewis concluded her remarks by stating the DCISC is charged with ensuring the plant is operated safely and that the regulations are being followed and she stated her opinion that for the most part the DCISC fulfills that charge, but she observed the plant is out of compliance with its current operating basis and much time and effort has gone into making it appear scientifically that all is safe enough but this is managed by sleight of hand as there is very little empirical data about how large an earthquake on a nearby fault or faults would be and how it would affect DCP. She stated that relying on a belief that the plant will be closed before a big earthquake causes a disaster is not adequate, as safety cannot be built upon a hope and a prayer.

Dr. Peterson thanked Ms. Lewis for her comments.

Dr. Peterson requested Mr. Cary Harbor, Director of Compliance, Alliance and Risk at DCP to continue with the information presentations.

XXIII Information Items Before the Committee

Mr. Harbor introduced Mr. Jearl Strickland, Director of Nuclear Projects at DCP, and stated Mr. Strickland has more than 30 years of experience in the industry in various leadership roles and he is a registered professional civil engineer. Mr. Strickland has addressed the DCISC on several previous occasions.

Update on the Independent Spent Fuel Storage Installation and Status of the Condition of the Multi-Purpose Canisters.

Mr. Strickland stated his presentation would cover the permitting and construction history for the DCP Independent Spent Fuel Storage Installation (ISFSI), the expansion in 2014 of its storage capabilities, current loading plans for 2015 and 2016, and an evaluation of extended storage. Mr. Strickland stated that PG&E in developing the ISFSI had to consider how much fuel would be stored at that facility. The premise was that the ISFSI should be licensed and permitted to accommodate all the fuel discharged during 40 years of plant operational life. This requires storage capacity for 138 casks and a license was issued to the ISFSI by the NRC for a 20-year operational life and the California Coastal Commission issued a permit for the ISFSI to operate as long as necessary.

Mr. Strickland reported that infrastructure was developed for the overall facility including for security, slope stabilization, and cask transfer facilities. As PG&E's expectation was that a federal repository at Yucca Mountain, Nevada, would be in operation at some point in time the ISFSI was developed in phases and initially only two of the seven foundations were constructed which

provided the capability to store 38 casks. With the plans for Yucca Mountain now in abeyance it was determined to complete the ISFSI by constructing the five additional foundations in 2014. Dr. Lam disclosed that during his tenure as an NRC Administrative Judge he sat on the licensing board that approved the installation of the ISFSI for DCPD.

Mr. Strickland displayed an aerial photo of the ISFSI which showed the two foundations and approximately 38 storage casks and the large paved area of the five additional foundations. Mr. Strickland also displayed photos of the completed excavation with mud mat in place and reported that the excavation above the mud mat is approximately 8 feet deep from grade to the surface of the foundation and the ISFSI is located on rock and is anchored to that rock by concrete which directly couples the ISFSI to underlying bedrock which is comprised of the same material as that underneath the power plant. Mr. Strickland discussed the embedment rings which he described as the top portion of very large embedded structures that are able to transmit large seismic loads into the lower levels of the foundation and he confirmed Dr. Peterson's observation that the design contains considerable conservatism and DCPD is the only nuclear plant which anchors its spent fuel storage casks. Dr. Lam commented that in his previous review of licensing issues it was determined that the anchoring system was not required as the generic casks manufactured by the Holtec firm have demonstrated significant margin against tipping. Mr. Strickland agreed that the Holtec design was robust and he stated DCPD chose to be conservative and received a site-specific license which included the anchorage system.

Mr. Strickland displayed a panoramic view of Pad 3 concrete placement and details of the pad expansion and reported each pad is 68 feet by 105 feet by 8 feet thick. There are 20 embedment structures in each pad, and the pad contains approximately 2,040 cubic Yards of concrete. More than 12,000 cubic yards of rock was excavated to allow for the additional pad placement. The expansion provides the capacity for 40 years of operation. In response to Dr. Budnitz' inquiry, Mr. Strickland stated each pad cost approximately \$2,000,000 and as part of the resolution of prior litigation all costs are funded by the federal Department of Energy and not through PG&E's rates. In response to Dr. Lam's question Mr. Strickland stated each cask cost approximately \$1,200,000 and loading a single cask adds approximately \$250,000 to that cost. Mr. Strickland reported DCPD has changed from using 304 stainless steel for the multi-purpose canisters to 316L grade stainless steel to provide better capability.

Mr. Strickland reviewed current loading plans and stated DCPD presently has 29 HISTORM casks in storage containing 928 used fuel assemblies. He reported nine casks will be loaded in 2015 starting in April and 12 casks will be loaded in 2016. This loading activity will achieve minimum spent fuel pool densities in 2016 to meet NRC spacing requirements.

Mr. Strickland stated DCPD is actively involved with the Electric Power Research Institute (EPRI) in researching the impact of chlorides on stainless steel and has volunteered as a test plant. He remarked that DCPD has multiple zones of coastal influence with the heaviest salt deposition occurring at the Intake structure with a lesser deposition at the 300-foot elevation where the ISFSI is located. Mr. Peterson reported the DCISC received a communication from Ms. Donna Gilmore of the San Onofre Safety group which discusses the potential for stress corrosion cracking of stainless

steel storage canisters due to salt deposition under humid conditions and the information Ms. Gilmore provided stated that dust samples had been collected from DCPD along with photos of salt crystals associated with that collection and information on sampling and the rate of chloride deposition. In response to Dr. Peterson's remarks, Mr. Strickland stated that EPRI collected swabs from the DCPD multi-purpose canisters and, to his knowledge, there were no visible salt deposits whatsoever on those canisters. Mr. Strickland stated that requiring A304L low carbon stainless steel for the canisters should reduce the potential for stress corrosion cracking or chloriding and by subsequently having required Grade 316L stainless steel this potential will be further reduced. **Dr. Peterson requested that DCPD review with the DCISC the information developed with EPRI during a future fact-finding so the Committee can better assess the question of the potential impact of salt deposition on canister corrosion and the potential for stress corrosion cracking.** Dr. Peterson noted the issue is different from that for structures which are under high levels of stress which can cause the cracks to propagate and in this case the issue would be the impact of corrosion on the integrity of the canisters. Mr. Strickland agreed and stated the potential for inner granular corrosion and for crack propagation and potentially a loss of helium would potentially change the environment within a multi-purpose canister. Dr. Peterson remarked the DCISC also has a significant interest in the question of salt deposition in context of the flashover events and also with the possibility of using saltwater cooling towers in place of once-through cooling. **The Members directed that Mr. Strickland be provided with copies of the material provided by Ms. Gilmore.**

Dr. Gene Nelson of the Cuesta College Physical Sciences Division was recognized. He requested a description of the thickness of the stainless steel used for the canisters and stated he has discussed this issue with Ms. Gilmore and in his remarks to her stressed that existing stress, chloride and moisture are all required for stress corrosion to propagate in the material used for the canisters. Dr. Peterson replied that while there is not a significant amount of internal pressure within the canisters, there would be residual stress remaining from the cooling of weld material and welded locations would be areas of particular interest in such an inquiry. Mr. Strickland reported that the multi-purpose canister shell is comprised of ½ inch stainless steel and the canister lid is a 9-inch forging, welded in place on top with partial penetration welds of approximately 1 inch in depth into the 9-inch thick lid.

A short break followed.

The Chair requested Mr. Harbor continue with the final informational presentation requested by the DCISC for this meeting. Mr. Harbor introduced Mr. Ryan West, System Engineering Manager for the Instrumentation & Control and Electrical Systems at DCPD. Mr. Harbor stated Mr. West has more than 20 years' experience in the nuclear industry including leadership roles in the Quality Assurance, Instrumentation & Control, and Engineering organizations with a primary focus on electrical systems and components. Mr. West holds a Bachelor of Science degree in electrical engineering.

Overview of the Action Plan for DCPD Large Station Transformers.

Mr. West reported the principal responsibility of the organization he heads is to monitor

performance, trends, and to provide long term planning to ensure the reliability of the instruments, controls, and electrical equipment at DCP. Mr. West reported his presentation would be an update of actions taken since 2010 to enhance the performance of DCP's large power transformers.

Mr. West reported that in 2010 DCP's large power transformers were not meeting station performance expectations. During 2008, a failure of a U-2 C-Phase high voltage bushing resulting in the shut down of the unit. In 2002 and again in 2009, U-2 C-Phase experienced a loss of cooling on a replacement transformer. In August 2009 an adverse trend was identified from monitoring of transformer bushings.

Mr. West stated that the actions taken by the plant since 2010 have focused on enhancing the performance and operation of large power transformers. He reported large power transformers provide a means for transferring power between the electric transmission grid and DCP electrical distribution system and he displayed a schematic diagram showing the seven large power transformers for each unit including three main bank transformers, two auxiliary transformers, two start-up transformers. The connections to the transmission grid are backed up by six onsite diesel generators, three serving each unit. He displayed a photo of a U-2 main bank transformer and described its components including high and low voltage bushings, coolers which he described as functioning like a radiator to remove heat from the transformer internals, pumps and fans. In response to a question from Dr. Peterson, Mr. West reported U-1 uses transformers manufactured by General Electric while U-2 uses Siemens transformers and he confirmed that the transformers can be mixed and matched but at present DCP has spares for both its GE and Siemens units. The transformers also have a control cabinet and an oil tank housing with a reservoir for additional oil.

Mr. West described and discussed the 2010 Action Plans as follows:

- Industry peer review visit to review equipment condition, performance trends and maintenance practices.
- Replace porcelain bushings with polymer
- Purchase improved thermography camera.
- Install improved online transformer gas in oil analyzers to monitor and trend transformer internal conditions. In response to Dr. Peterson's inquiry, Mr. West confirmed this data is not collected wirelessly but rather is collected by the system engineer on a monthly basis and there is a local alarm which alerts plant personnel to any adverse trend.
- Life Cycle Management Studies by the original manufacturer to determine based upon the installation, maintenance practices, operational history, material condition where each transformer may be within its projected life cycle.
- Single Point Vulnerability Studies recommended during the peer review visit and performed by the original equipment manufacturer.

Mr. West reviewed and discussed actions completed to date including:

U-2 generator step-up and start-up high voltage porcelain bushings replaced with polymer bushings resulting in less maintenance and increased personnel safety.

- Spare 500 kV/25kV, 230 kV/12 kV and 25kV/12 kV transformers purchased and ready for use with contingency plans and work orders pre-prepared for installation. In responding to questions from Drs. Budnitz and Lam Mr. West confirmed that a lead-time of more than one year might be necessary to procure a new transformer.
- Online gas in oil monitoring system installed on all generator step-up and auxiliary power transformers. In response to Dr. Peterson's question, Mr. West confirmed that the system engineer manually downloads and gathers trendable data and takes oil samples.
- New thermography camera purchased and in use by DCPD engineering personnel for performance monitoring. Mr. West stated this camera can provide temperature indication of delta T's between similar components and verifies that the components are actually operating.
- U-1 Generator Step-Up transformer control power single point vulnerabilities addressed by the studies.

Mr. West stated transformer oil coolers have been replaced for generator step-up transformers for both units' 230 kV startup transformers due to the salt environment near the ocean and resulting corrosion and he described this as a significant improvement on reliability.

Mr. West observed that station large transformer performance since 2010 has not been perfect and there are remaining challenges for large power transformers. U-1 start-up transformer experienced a load tap changer failure in August 2013, with no resulting loss of generation, and load tap changer control relay adverse trend corrective actions are in place to address this performance vulnerability including installing a newly manufactured load tap changer diverter switch, and maintenance practices have been revised.

In concluding his presentation Mr. West stated DCPD's large power transformers are operating safely and their performance is meeting station expectations. Scheduled actions to maintain and increase large power transformer performance include:

- U-1 Generator Step-up Transformer Cooling Pump upgrade 1R19 (2015).
- U-1 Generator Step-up Transformers High Voltage bushing replacement 1R19 (2015).
- U-1 Startup Transformers High Voltage bushings replacement 1R19 (2015).

In summary Mr. West reported the corrective actions implemented since 2010 have been successful at enhancing the performance of large power transformers. Actions to maintain or further increase the performance of large power transformers have been identified and scheduled to achieve continuous improvement. In response to Dr. Lam's observation Mr. West confirmed that transformer performance issues are not necessarily specific to nuclear power plants as they can be experienced by any power plant or industrial facility that connects directly to the electric transmission grid. In response to Consultant Wardell's inquiry, Mr. West stated DCPD expects, and

life cycle studies support, that the large power transformers can continue to function at least through 2025 when the current operating licenses for DCPD from the NRC will have expired. He stated the plant will be regularly reviewing the issues with the large power transformers on a frequency of every five years. In response to Dr. Budnitz' inquiry, Mr. West stated that most of the physical work on the large power transformers is performed by contractors but DCPD retains detailed procedures on that work.

Dr. Peterson thanked Mr. West for an excellent presentation.

Dr. Gene Nelson, who is on the Physical Sciences faculty at Cuesta College was recognized. Dr. Nelson commented the most recent studies on the proposal to use saltwater cooling towers at DCPD would increase the salt drift from 1,700 pounds to 1.7 million pounds per year. Dr. Nelson stated he provided information on the vulnerability of large power transformers to a so-called "Carrington" geomagnetic event and asked for confirmation that, given DCPD's location, there is very little to be concerned about regarding such an event. Dr. Peterson stated the NRC has reviewed geomagnetic events and their potential to impact nuclear power plants. He stated the DCISC review indicates the principal concern is that this sort of event could disrupt the power transmission grid for an extended period of time and accordingly DCPD could lose access to offsite power for some considerable period of time and also lose the ability to send power to the grid. Therefore, the inquiry turns in part on having an adequate supply of diesel fuel and this is now being addressed as part of the FLEX efforts. Concerning salt deposition, Dr. Peterson stated that issue requires further study and he confirmed the salt quantities would likely be significantly increased by the use of saltwater cooling towers but where the salt would be deposited has not been determined. Mr. West confirmed that salt impacts transformer performance but the impact from saltwater cooling towers is unknown. DCPD does have a monitoring program for salt contamination in the area of its transformers which validates that their current design is adequate for their present environment. If the environment were to change, there would need to be further design work and monitoring. Mr. West confirmed work is ongoing concerning geomagnetic events and the long term effects are on the transmission system in that resulting ground currents would impact transformers and result in outages. He reported DCPD now has a supply of diesel fuel sufficient for seven days' operation and that there are first-priority procedures in place to supply a generator to DCPD to reestablish offsite power.

Dr. Peterson observed this was the final informational presentation requested for this public meeting.

XXIV Concluding Remarks & Discussion by Committee Members Of Future DCISC Activities

Dr. Budnitz requested Ms. Zawalick to coordinate, if possible, a fact-finding visit by the DCISC to PG&E's Geosciences Department in San Francisco on March 30, 2015, in conjunction with the previously scheduled fact-finding visit to the plant on March 31—April 1, 2015, by Dr. Budnitz and Consultant Linnen. Dr. Budnitz reported that PG&E is scheduled to submit its reports to the NRC on the reevaluation of the seismic and external flooding hazards on March 15, 2015. **Dr. Peterson stated that concerning further information to obtain and review, the DCISC will follow up on the**

internal flooding hazard. It was noted that the November 2015 fact-finding visit is now scheduled on November 18^{#8211}19, 2015, and the July 2015 fact-finding visit is scheduled for June 10–11, 2015. Ms. Zawalick stated she would confirm the dates requested for 2016 fact findings.

The Members reviewed the new tour format and requested that Ms. Zawalick investigate whether it would be possible to have a slightly larger group than the 15 members of the public and five DCISC representatives who toured the plant on February 4, 2015. Dr. Peterson remarked that if 30 persons could be accommodated, the group could be split to have one subgroup view the Simulator facility while the other subgroup cleared security and visited the Turbine Building and viewed the Control Room, with the subgroups then exchanging locations. Ms. Zawalick stated she would coordinate arrangements for the June 2015 tour with Assistant Legal Counsel Rathie concerning the tour for the June 2015 public meeting. Dr. Budnitz observed that the DCISC Members gain insight from their interaction with the members of the public on these tours. In response to Dr. Peterson's suggestion, Mr. Rathie confirmed that information on the tour is posted on the DCISC website and he agreed to review the manner in which the DCISC advertises the tour to the public.

Ms. Sherry Lewis of MFP was recognized. Ms. Lewis inquired whether the tour format was now different from that used in the past and the Members confirmed that the tour now visits the Turbine Building, a location inside the plant's protected area and affords an opportunity to observe operations in the Control Room through a small glass window and the Members confirmed the Simulator facility is not located within the protected area.

Dr. Gene Nelson was recognized. Dr. Nelson inquired whether it would be possible to visit the location of the Spent Fuel Pools. Dr. Peterson replied that the Spent Fuel Pools were located within a radiological controlled area and, while DCISC Members and Consultants visit within radiological controlled areas during fact-finding, there is a very extensive process required for personnel to enter those areas which make public tours impractical.

Mr. Rathie reported the next public meeting of the DCISC will be held on June 16–17, 2015, at the Avila Lighthouse Suites in Avila Beach, California.

Dr. Peterson thanked Mr. Rathie, all the PG&E presenters and particularly Ms. Zawalick and Mr. Harbor for their hard work in setting up this public meeting and he thanked the technicians of AGP video who provide audio, video and internet live-streaming for the DCISC's public meeting. The Chair also thanked the members of the public in attendance and remarked that the participation by members of the public in the meetings of the DCISC is very important. Dr. Peterson also conveyed the thanks of the Committee to CEC Senior Nuclear Policy Advisor Danielle Osborn Mills for her attendance during this public meeting.

XXV Adjournment Of Seventy-ninth Public Meeting

There being no further business, the seventy-ninth public meeting of the Diablo Canyon Independent Safety Committee was then adjourned by its Chair, Dr. Per Peterson, at 2:47 P.M.

25th Annual Report, Volume 2, Exhibit B12, Minutes of the Diablo Canyon Independent Safety Committee May 14, 2015 Public Meeting (Approved at the June 15, 2015 Public Meeting)

Thursday, May 14, 2015, Hotel Durant, 2800 Durant Avenue, Berkeley, California

Notice of Meeting

A legal notice of the public meeting was published in The Tribune, a San Luis Obispo County newspaper of general circulation, and mailed to the media and those persons on the Committee's service list. The legal notice and meeting agenda were also posted on the Committee's website at www.dcisc.org.

Agenda

I Call to Order–Roll Call

The May 14, 2015, public meeting of the Diablo Canyon Independent Safety Committee (DCISC) was called to order by Committee Chair Dr. Per F. Peterson at 10:00 A.M. in the Boardroom Conference Room at the Hotel Durant 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. Peterson observed the meeting was also being recorded and that a video would subsequently be available on the DCISC website.

Present:

Committee Member Robert J. Budnitz

Committee Member Per F. Peterson

Absent:

Committee Member Peter Lam

Three members of the public were recognized on the conference telephone line and welcomed to the meeting including Ms. Annie Aguiniga with the office of State Senator William Monning in San Luis Obispo, California, Mr. Don Eichelberger with the Abalone Alliance Safe Energy Clearing House, and Ms. Denise Righetti with the office of the DCISC Legal Counsel.

II Establishment of a Quorum

Dr. Peterson 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 Asia. In attendance also was Mr. Robert Rathie of the office of the DCISC Legal Counsel. Dr. Peterson stated the agenda for this meeting includes a single item concerning approval of an Agreement with Structural Integrity Associates, Inc.

III Action Item

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.

Dr. Peterson recognized Dr. Budnitz to provide an introduction for this item.

Dr. Budnitz stated the DCISC has been concerned with the question about whether tsunamis pose a serious safety threat to the Diablo Canyon Power Plant (DCPP) for a very long time and that on March 11, 2015, Pacific Gas & Electric Company (PG&E) submitted a report to the Nuclear Regulatory Commission (NRC) in response to the NRC's request for information and direction that PG&E perform further analysis of the tsunami hazard at the site of DCPP. Dr. Budnitz reported PG&E's report is a public document. He stated the PG&E report updates the understanding of the tsunami hazard and includes the conclusion that although the hazard from tsunamis is different than PG&E initially believed, DCPP remains adequately safe against tsunamis. The NRC is reviewing PG&E's report as is the DCISC. However, the DCISC Members and Technical Consultants do not have sufficient technical expertise to do as thorough a review as is necessary and accordingly made a decision to consider engaging an outside consultant.

Dr. Budnitz reported that in June of 2014 the DCISC learned from a member of the public during a public meeting that in 2003 Dr. Robert T. Sewell had undertaken an independent analysis and published a study on the tsunami hazard at DCPP but that study, which had been submitted to the NRC, was not publicly available. In response to this information the DCISC filed a request under the Freedom of Information Act to obtain a copy of Dr. Sewell's 2003 study and in response the NRC released the study in November 2014. The 2003 study is now a public document and available to anyone to review upon request. Dr. Budnitz stated the conclusions in the 2003 study were based upon much more limited information than is now available and the study concluded that the hazard at DCPP from tsunamis was greater than PG&E believed in 2003 or previously when the plant was designed. Dr. Budnitz observed with the release of the 2015 report by PG&E there are now offshore data, advanced modeling information, and bathymetry studies available which contribute to the 2015 analysis. The DCISC concluded accordingly that the best way to advance its understanding of this matter would be to engage Dr. Sewell, an acknowledged expert in tsunamis, as a consultant to revisit his 2003 study in light of this new information and any other information, such as that developed at analogous sites, of which Dr. Sewell is aware in his professional capacity. Dr. Sewell's task will be to conduct a review, provide a report, and if appropriate prepare and make a presentation at a future DCISC public meeting, possibly at the October 21–22, 2015 regularly scheduled public meeting in Avila Beach, California. In this effort the DCISC will interact and conduct fact-finding with Dr. Sewell and Dr. Budnitz would serve as the DCISC technical lead for the

work. Dr. Peterson remarked that one of the specific technical issues for Dr. Sewell's assignment relates to submarine landslides. Dr. Peterson stated there are two major sources of tsunamis which are of concern with reference to DCP. The first is initiated by earthquakes, with the faults in proximity to DCP which data indicates have a limited capacity for generation of tsunamis due to their characterization as slip-strike faults, with the greatest danger from tsunami-generated earthquakes being from earthquakes generated by subduction type faults which are located much farther to the north of DCP. Dr. Peterson stated there is paleogeologic evidence of very severe tsunamis in the States of Washington and Alaska which if repeated could propagate down the coastline to Central California. Dr. Peterson observed that the basis for estimating the size of such tsunamis was relatively firm. However, there is the potential that submarine landslides could also generate tsunamis and this forms a major element of the 2015 report related to the potential size and quantity of sediment that might move and its position and the direction the material might move with respect to the location of DCP. He reported that this will be a principal focus of Dr. Sewell's assessment for the DCISC. Dr. Peterson stated that Dr. Sewell will also be asked to assess the potential run-up distances, and impact on the local area near DCP including the potential for an impact on DCP plant access and emergency response, particularly around Morro Bay and Avila Beach, California.

Dr. Budnitz reported that distant tsunamis which might arise from an earthquake in the vicinity of Alaska or Chile are addressed by the current tsunami design basis for DCP. He remarked that the plant was not originally designed for a tsunami arising from a local subsurface landslide or similar scenario. Dr. Budnitz reported that PG&E has concluded that DCP is adequately designed for the more distant scenarios but that the effects of a locally generated tsunami were not considered in the 1970's. Dr. Budnitz observed that PG&E has been studying tsunamis for five or six years and has a very extensive program and is utilizing competent personnel in its efforts.

Mr. Don Eichelberger, who joined by telephone, was recognized. Mr. Eichelberger stated he was fully in support of learning more about the tsunami threat at DCP in light of what happened at the Fukushima Daiichi Nuclear Power Plant in Japan. He stated he had respect for Dr. Sewell's expertise and the fact that Dr. Sewell has been a pioneer in studying this issue relative to DCP. Mr. Eichelberger encouraged the DCISC to adopt the proposal.

Dr. Peterson reported that Dr. Lam previously expressed his support for engaging Dr. Sewell.

On a motion by Dr. Budnitz, seconded by Dr. Peterson, the DCISC approved entering into an Agreement with Structural Integrity Associates, Inc., to provide for the services of Dr. Robert T. Sewell.

IV Public Comments and Communications

Dr. Peterson invited any members of the public to address the Committee on matters not on the agenda for this public meeting.

Mr. Don Eichelberger of the Abalone Alliance Safe Energy Clearing House was recognized. Mr.

Eichelberger stated he was surprised that the DCISC held this meeting in Berkeley, California, rather than in the San Luis Obispo area. Dr. Budnitz stated that this was a short agenda and, in the judgment of the Members, a noncontroversial issue and so the meeting was held in Berkeley for purposes of convenience, as both Dr. Peterson and Dr. Budnitz live and work in the area. Dr. Budnitz reported that in accordance with its mandate to conduct public outreach in the area of DCPD the DCISC will hold its next regularly scheduled public meeting on June 16–17, 2015, in Avila Beach, California. Mr. Eichelberger stated he appreciated that the DCISC held this meeting in Northern California where he resides as it demonstrates that the concerns of residents who reside to the north of DCPD are also being taken into account by the DCISC. Dr. Peterson observed that conservation of financial resources was also a factor in the decision to hold this meeting in Berkeley and that the DCISC's activities are funded by the PG&E ratepayers through a rate-making process mandated by the California Public Utilities Commission.

V Adjournment of Public Meeting

Dr. Peterson thanked Mr. Rathie for his work in making arrangements for this public meeting which concerned a matter which was too important to allow action to be deferred until the date of the next regularly scheduled public meeting. There being no further business, the Chair also thanked those present and participating by telephone and he then adjourned the eightieth public meeting of the Diablo Canyon Independent Safety Committee at 10:25 A.M.

25th Annual Report, Volume 2, Exhibit B15, Minutes of the Diablo Canyon Independent Safety Committee June 16–17, 2015 Public Meeting (Approved at the October 20, 2015 Public Meeting)

Tuesday & Wednesday, June 16–17, 2015, Avila Beach, California

Notice of Meeting

A legal notice of the public meeting was published in The Tribune, a San Luis Obispo County newspaper of general circulation, and mailed to the media and those persons on the Committee's service list. The legal notice and meeting agenda were also posted on the Committee's website at www.dcisc.org.

Agenda

I Call to Order–Roll Call

The June 15, 2015, public meeting of the Diablo Canyon Independent Safety Committee (DCISC) was called to order by Committee Chair, Dr. Per Peterson, at 8:30 A.M. in 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. Peterson welcomed those present in the room and introduced and briefly reviewed the background of the Committee's Technical Consultants Mr. R. Ferman Wardell and Mr. David C. Linnen and Assistant Legal Counsel Robert Rathie. Dr. Peterson then introduced and reviewed the professional background of each of his fellow Members, Dr. Robert J. Budnitz and Dr. Peter Lam. Dr. Peterson recognized and introduced Ms. Maureen Zawalick, Pacific Gas & Electric Company (PG&E) Nuclear Generation Risk and Compliance Manager, who acts as the principal point of contact for the DCISC with PG&E and the Diablo Canyon Power Plant (DCPP).

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. The Chair advised time would be set aside for members of the public to comment on those matters listed on the agenda at the time the matter was considered by the Committee and 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.

Mr. John Geesman representing the Alliance for Nuclear Responsibility (A4NR) was recognized. Mr. Geesman reported that Mr. David Weisman forwarded a discovery motion to the DCISC filed by A4NR which included an affidavit by Ms. Rochelle Becker, Executive Director of A4NR, which affidavit concerns emails from a former regional administrator for the Nuclear Regulatory Commission (NRC) Region IV wherein it is claimed that another former Region IV regional administrator who now serves as a consultant to PG&E voiced concerns about the seismic status of DCP. Mr. Geesman described this as another in a long series of ‘red flags’ which the A4NR has brought to the DCISC’s attention regarding DCP seismic issues and stated his opinion that the DCISC members were duty bound to make inquiries about the former regional administrator’s concerns. The Chair thanked Mr. Geesman for his remarks.

Dr. Lam recognized the presence in the audience of Mr. Andrew Bohan, Chief Deputy Director of the California Energy Commission (CEC). Mr. Bohan remarked this was the first public meeting of the DCISC he has had the opportunity to attend and reported CEC Chair, Dr. Robert Weisenmiller, was traveling and unable to attend. He thanked the Committee for acknowledging the CEC.

IV Consent Agenda

The only items on the Consent Agenda were approval of the Minutes of the Committee’s February 4–5, 2015, public meeting held in Avila Beach, and the Minutes of the Committee’s May 14, 2015, public meeting held in Berkeley, California.

Items were discussed and reviewed for follow up or action, and clarification was provided to the Committee’s Assistant Legal Counsel concerning certain references in the draft Minutes provided in the agenda packet for this meeting and regarding necessary typographical and editorial corrections, as well as concerning substantive changes to be made to the final version of the February 2015 and May 2015 Minutes which will be made in the final versions of both sets of Minutes which will become a part of the Committee’s 25th Annual Report on the Safety of Diablo Canyon Power Plant Operations (Annual Report) for the period July 1, 2014 to June 30, 2015.

Concerning discussion of the Minutes, Ms. Zawalick confirmed the evaluation of the root cause on the contribution of Operations personnel to the loss of the 4 kV Bus G event was completed shortly after the February 2015 public meeting and a copy will be provided to the DCISC. Mr. Wardell suggested the DCISC review be included in a future fact-finding visit. Concerning Committee follow-up on any changes in the flooding hazard at the plant Mr. Wardell stated this would be included in

the Open Items List. The Members and Consultants discussed and agreed that following approval at a public meeting, fact finding reports are to be transmitted in their entirety to PG&E.

On a motion by Dr. Budnitz, seconded by Dr. Lam, the Minutes of the Committee's February 2015 public meeting were approved as amended, subject to inclusion of the revisions discussed and changes provided to its Assistant Legal Counsel.

Concerning the Minutes of the public meeting held in Berkeley, California on May 14, 2015, for the purpose of considering and approving a consulting agreement with Structural Integrity Associates, Inc. for the services of Dr. Robert T. Sewell to review tsunami safety and tsunami issues at DCP, the Chair reported that a call-in number was established for members of the public. A brief discussion was had concerning items for clarification and editorial correction. Dr. Lam stated that although he was unable, due to a scheduling conflict, to participate in the May 14, 2015, public meeting he wanted the record to reflect that Dr. Sewell disclosed to the DCISC in context of the consideration of a consulting agreement with the Committee that Structural Integrity, Inc. and Dr. Sewell are currently providing consulting services to PG&E on a technical matter unrelated to tsunamis.

On a motion by Dr. Lam, seconded by Dr. Budnitz, the Minutes of the Committee's May 2015 public meeting were approved 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 DCISC has received two quarterly payments of the funding provided by PG&E's ratepayers under the terms of the decisions of the California Public Utilities Commission (CPUC) which established and continued the DCISC. Although the DCISC, due to the nature of its activities, expends funds at differing rates during its calendar/financial year it appears that the DCISC should finish 2015 within the amount of its grant funding with any unspent grant funds to be returned to PG&E's ratepayers. Mr. Rathie reported that with a remaining balance from 2014 of \$55,425.75 that 2014 will mark the third consecutive year in which the Committee will have returned funds to the PG&E ratepayers. Dr. Budnitz remarked that during his term of service on the DCISC the Committee has never curtailed any of its activities due to financial restrictions. Dr. Lam commented that the current fiscal health of the DCISC was due to the focus placed on that matter by the current and past Chairs. On a motion by Dr. Peterson, seconded by Dr. Budnitz, the DCISC unanimously approved the return of unspent 2014 grant funds to PG&E for credit to its ratepayers.

B. Discussion of Issues on Open Items List:

Dr. Peterson requested Consultant Wardell lead a review of items on the Open Items List, used by the Committee to track and follow issues, concerns, and information identified for subsequent action during fact-finding or public meetings. Items concerning which action was taken included the

following:

Item	Re:	Action Taken
EN-20	Observe Plant Health Committee Mtg.	Observed @ 4/15FF (PL/RFW) & 5/15FF (PFP/DCL)
EP-5	Social Media for Emergency Response	Schedule for 8/15FF (PFP/DCL) & 9/15FF(RJB)
NS-9	Track INPO Areas for Improvement	Schedule 4Q15
RP-12	Review Radiological Release Reports	Schedule for 8/15FF (PFP/DCL)
ER-5	Equipment Reliability Process	Schedule for 4Q16
SE-38	Containment Fan Cooler Units	Add review of wireless vibration monitoring capability, Schedule 12/15FF(PFP/RFW)
SE-40	Monitor Status of Transformers	Schedule 1-2Q17
SE-49	Emergency Diesel Generators LAR	Schedule 2-3Q16
OM-3	Containment Closure Drill	Schedule during 1R19 (PFP) PG&E to provide date
OM-4	Review Outage Safety Plan	Prior to or during outage 1R19
SF-2	Spent Fuel Storage Casks/Pools	Delete reference to clad embrittlement risk
SC-4	Tsunami Hazard Analysis	Coordinate w/Dr. Sewell
SC-5	Personnel Seismic Safety	Schedule 12/15FF (PFP/RFW) & 2/16 PM
SC-7	Follow up re Shoreline Fault	Combine w/SC-3 LTSP & Joint Fault Review
SC-8	Post Fukushima Flooding Studies	Close after 6/15PM
SC-10	Tornados and Firenados	Schedule 11/15FF (RJB/DCL)
FP-7	Fire Doors	Schedule 1/16FF
LD-3	Non Licensed Training Programs	Defer to 4Q15
CL-2	Response from SWRCB	Monitor SWRCB action delete ref. to RCNFPP
10/14PM-2	Environmental	Combine w/ BDB-6

	Permits	
10/14PM-3	Emergency ASW Test	Combine w/ BDB-6
2/15 PM-2	DCISC Public Tours	Close
2/15 PM-3	Seismic Hazard Tornado Diagram	Pending Report at this PM/Close or Combine w/SC-3
2/15PM-10	Loss of Unit-1 230 kV Off Site Power	Close
Various	Items Identified for Closure	Close All

During the Open Items List discussion, Mr. John Geesman was recognized and inquired if combining the Shoreline Fault and the Long Term Seismic Program reviews included review of the potential for a joint fault seismic event and Dr. Budnitz confirmed this was what was intended. Mr. Geesman later commented the SWRCB Review Committee for Nuclear Fueled Power Plants has completed its assignment and all future action would be taken by the SWRCB but will likely be deferred pending SWRCB concern regarding drought conditions.

Following the discussion on the Open Items List the Chair called for public comments

Mr. John Geesman representing the A4NR was recognized. Mr. Geesman stated the list of contractor/experts selected by PG&E for its Senior Seismic Hazard Analysis Committee (SSHAC) review process team is largely dominated by former members of the Long Term Seismic Program team and therefore lacks fresh eyes which might have been provided by other experts. Drs. Budnitz, Peterson and Mr. Geesman discussed the issues and difficulties in having meetings dedicated to seismic review of DCPD open to all interested members of the public in venues subject to seismic activity such as exist in Berkeley, CA.

Mr. David Weisman was recognized. Mr. Weisman stated that the considerations of an earthquake occurring during an event at the University of California (U.C.) Berkeley Memorial Stadium should be borne in mind when attempts are made to dismiss the chances that an emergency situation would occur at DCPD during the Fourth of July fireworks events in the local area.

C. Nomination and Election of Chair and Vice Chair for the July 1, 2015—June 30, 2016 Term.

On a motion made by Dr. Budnitz, seconded by Dr. Lam, the Committee reelected Dr. Peterson to the position of DCISC Chair and Dr. Lam to the position of DCISC Vice Chair for terms of office from July 1, 2015 through June 30, 2016.

A short break followed.

VI Committee Member Reports and Discussion

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

Dr. Lam reported that on April 27, 2015, he participated in a CEC-sponsored workshop held in Sacramento, CA on topics related to nuclear energy issues. Dr. Lam spoke concerning the issue of dry casks spent fuel storage and management at DCPD but stated his remarks were not made in terms of a consensus opinion of the DCISC but rather in context of his participation as a private individual and in furtherance of the Committee's obligation for members of the DCISC to conduct public outreach. Dr. Lam observed the CEC has made several recommendations concerning DCPD in the past including that the plant return the spent fuel pools to an open rack configuration and accelerate the movement of spent fuel from the spent fuel storage pools into dry cask storage at the plant.

The Committee members and consultants reviewed and scheduled fact-finding visits and public meetings of the Committee as follows:

Public meetings of the Committee were rescheduled and confirmed for: October 20–21, 2015, a change of dates from the previously scheduled October 21–22, 2015, and confirmed the date of February 3–4, 2016, and scheduled a public meeting for June 21–22, 2016.

Fact-finding visits were confirmed and scheduled as follows:

[2015] July 29–30 PFP/DCL (changed from August 5–6); September 9 RJB to observe the full scale Emergency Training Drill; September 29–30 PL/RFW; November 18–19 RJB/DCL; and December 9–10 PFP/RFW

[2016] January 19–20 PL/DCL; March 16–17 RJB/RFW; April 20–21 PL/DCL; May 17–18 PFP/RFW; July 26–27 PFP/DCL; August 9–10 RJB/RFW; September 20–21 PL/DCL

The Members and Consultants observed that the fact-finding schedule is subject to change based on emergent activities at DCPD. **The Committee requested and Ms. Zawalick agreed that these dates for the DCISC's future public meetings be provided to the NRC Senior Resident Inspector for DCPD to determine whether the NRC might coordinate its schedule for a public meeting during the same week a DCISC public meeting is scheduled.**

B. Documents Provided to the Committee:

Mr. Rathie directed the Committee's attention to the list of documents received since its last public meeting in February 2015. A copy of the list was included with the public agenda packet for this meeting. He also observed that the public agenda packet contains copies of all correspondence received by the Committee since its last public meeting in February 2015.

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

The Chair requested Consultant Wardell to report on a fact-finding visit to DCPD. Mr. Wardell reported on the April 21–22, fact-finding visit to DCPD with Dr. Lam. Mr. Wardell reviewed the items and topics reviewed with PG&E during that visit.

- Meeting with NRC Senior Resident Inspector—Mr. Wardell described the meeting as useful and including a discussion of issues concerning the emergency diesel generators (EDGs), the plant's severe weather policies and the recent seismic analyses by PG&E.
- EDG Status—the EDGs function as the ultimate power source for the plant when other power sources are lost. Each unit has three EDGs and each EDG is designed to start automatically upon loss of power. The system health for each unit ¹ is rated Yellow due to margin management, full load rejection and capability issues. Tests show that the EDGs are fully capable of performing their function but a License Amendment Request (LAR) has been submitted by DCPD to the NRC which is awaiting completion of review. Unit-1 (U-1) EDGs are expected to return to White health status by September and to Green by the end of 2015. Unit-2 (U-2) EDG health status is expected to return to White by June 2016 and to Green in due course. Mr. Wardell reported EDG 1-2 (U-1 Number 2 EDG) is close to exceeding its unavailability goal and EDG 2-3 is having reliability issues. **The EDGs are currently rated in Yellow health status and DCPD has developed actions to return them to White and subsequently to Green status. Mr. Wardell recommended the Committee continue to follow the health status of the EDGs.**
- Meteorological Information and Dose Assessment (MIDAS)—MIDAS is a computer-based analysis program that is used to predict the path and magnitude of a radioactive release during an accident at the plant. It is a program in use industry-wide and DCPD has upgraded MIDAS to its third edition or version which provides the capability of taking in several meteorological inputs from different locations and giving several discharge locations, with accordingly more accuracy and versatility than previous versions of MIDAS.
- Salt Deposition Rate Update—Mr. Wardell reported the fact-finding team reviewed this issue in terms of the proposal to replace once-through cooling with cooling towers which would employ evaporative saltwater which would increase salt deposition at the plant site and also in view of the fact that DCPD operates in proximity to the Pacific Ocean which Mr. Wardell observed provides excellent cooling water capabilities but results in a great deal of salt being transported in the air. **Dr. Peterson requested that data be provided on duration of sample collection and the rate of deposition in order to be better able to compare previous data on salt deposition.**
- Design Quality Status—Mr. Wardell reported that during the seventeenth refueling outage for U-1(1R17) DCPD experienced design quality problems with major plant modifications. A root cause evaluation was performed and corrective actions taken. During 1R18 the DCPD Engineering organization found the corrective actions effective but the Quality Verification organization did not entirely concur and required further monitoring. Engineering determined 92 percent of 64 projects were completed without design quality issues but the 8 percent which did have such issues was not an acceptable result and design quality performance will be reviewed during 1R19. **Mr. Wardell recommended a fact-finding following 1R19 to review the results of the effectiveness review. The programmatic health status of the Design Change Program is currently rated Green.**
- Spent Fuel Cooling System Review—Mr. Wardell reported there are two spent fuel pools at DCPD and each pool has its own cooling system consisting of two pumps and one heat

exchanger. The cooling systems are working well and the system health is rated Green for both. There is, however, a potential vulnerability due to the single heat exchanger for each and DCPD has purchased a portable cooling system capable of being moved from one unit to the other.

- Attend Plant Health Committee (PHC)—the PHC received a report describing an update on the 480 V System which was previously in White health status but which changed to Green by the time of the PHC meeting. Mr. Wardell reported the significant challenge to the 480 V System is due to the age of the breakers, which date from the original plant, and DCPD has both a replacement program and a preventive maintenance program for the 480 V System. The DCISC fact finding team found the PHC meeting to be run effectively and efficiently.
- FLEX Update—FLEX is a post-Fukushima program initiated by the U.S. nuclear industry to provide the ability for a flexible response to beyond design basis events (FLEX is not an acronym). Mr. Wardell reported procurement of FLEX equipment is on schedule as are the development of procedures and procedural training. In response to Dr. Budnitz' inquiry, Mr. Wardell reported that the FLEX program is on schedule.
- Licensing Basis Verification Program (LBVP) Update—Mr. Wardell described this as an extensive and thorough review of each and every system, component, program, etc., when compared to the DCPD Final Safety Analysis Report (FSAR). DCPD has committed to the NRC to complete the LBVP by the end of 2015. The fact-finding team received information on the seismic qualifications of the new reactor vessel heads and new steam generators. **The LBVP review discovered that due to a misinterpretation by the vendor equipment was not designed to the fullest extent for seismic and loss of coolant accident (LOCA) loads. A prompt operability assessment (POA) was completed which justified continued operation with the loading as calculated by the vendor and margins were judged to be sufficient until reanalysis is completed. That reanalysis is in progress and is due to be completed by mid-October 2015. Mr. Wardell stated this is a matter on which the DCISC should conduct follow up.**
- Winter Storm Experience—procedures were reviewed and there were no significant storms last winter.
- Operational Decision Making (ODM)—Mr. Wardell stated ODM is a systematic method used mainly by Operations to address degraded conditions including, but not limited to, Containment leakage, vibration, fuel defects, and aggregate chronic equipment deficiencies. The Corrective Action Program (CAP) is used with ODM and a multifunction decision team gathers data and testing results to reach a joint decision. The fact-finding team reviewed three ODM actions including for the pressurizer power operated relief valves, a reactor trip, and a Reactor Coolant System (RCS) unidentified leak. An effectiveness review is performed approximately six months following ODM actions and the fact-finding team reviewed three ODM effectiveness reviews. Mr. Wardell described the ODM review as satisfactory and the process as effective.
- Dr. Lam Meeting with DCPD Site Vice President—to discuss the items reviewed during the fact-finding.

Upon a motion by Dr. Budnitz, seconded by Dr. Peterson, the April 21–22, 2015 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.

Mr. Wardell continued his report with a summary description of the June 10–11, 2015, fact-finding visit to DCPD with Dr. Budnitz. A full report on this fact-finding visit will be presented during the October 2015 public meeting. Item reviewed during that visit include:

- Air Operated Valve Program—program health status was Green.
- Refueling Outage 1R19—Outage Safety Plan was not reviewed.
- Lunch with North American Young Generation in Nuclear—a volunteer internal organization to DCPD formed to network concerning plant issues and conduct outreach outside DCPD.
- EDG Update—reviewed issues regarding unavailability for EDG 1-2 and reliability issues with EDG 2-3.
- Institute of Nuclear Power Operations (INPO) Update—INPO evaluation is scheduled for August 2015.
- Control Room Simulator—Mr. Wardell stated the Simulator was a mock-up of the U-1 Control Room which can be used for transient analysis and provides a valuable tool for testing operators. DCISC representatives discussed how the Simulator plans to accommodate the use of FLEX equipment. Although there is no requirement by the NRC to incorporate FLEX equipment or procedures in the Simulator the plant does plan to incorporate the most important elements of FLEX including the emergency addition of water and emergency power hookups with Simulator exercises.
- Control Room Shift Turnover—Mr. Wardell reported the DCISC representatives visited the Control Room to observe a shift turnover.
- Integrated Risk Assessment Program—fact-finding team previously reviewed primarily on-line maintenance risk and the Program has now been expanded to perform integrated risk analysis of almost all evolutions and activities.
- Reactor Protection System Digital Upgrade Status—Mr. Wardell described this system as functioning to shut down a reactor if temperature, pressure, or neutron flux are out of the norm. The current digital system is to be replaced with a new digital system and DCPD has submitted a license amendment request (LAR) to the NRC for the upgrade and expects approval in early 2016.
- Meeting with DCPD Station Director.
- Meeting with NRC Senior Resident Inspector.

- Integrated Equipment Reliability—Mr. Wardell reported DCPD management has made a decision to make the Integrated Equipment Reliability Program a plant-wide program under a station director as opposed to its current engineering-centered focus. He reported that four items from a top ten priority list of items to be addressed have already been moved off that list and replaced by others.

The fact-finding team's plans to attend a meeting of the Plant Health Committee and receive a review of the Emergency Preparedness Program were cancelled.

The Chair requested Assistant Legal Counsel Rathie to report on administrative, regulatory and legal matters.

Mr. Rathie reported that Dr. Lam has been reappointed by the Chair of the CEC to a three-year term on the DCISC for the period July 1, 2015 to June 30, 2018. Mr. Rathie reported that on May 14, 2015, the DCISC approved at a public meeting, held in Berkeley, CA for that purpose, a contract with Structural Integrity Associates, Inc. for the services of Dr. Robert T. Sewell to conduct a review of the tsunami hazard at DCPD and its environs. He reported that California Senate Bill 657 introduced by Senator William Monning which, if approved, would continue the work of CPUC Independent Peer Review Panel until January 2025 to review enhanced seismic studies and surveys was presently before the Senate's Energy, Utility and Communications Committee. Mr. Rathie reported the public tour of DCPD scheduled in conjunction with this public meeting was fully subscribed and the reservations filled quickly. A notice was sent out soliciting persons now receiving notice of DCISC public meetings by U.S. mail to have the option of receiving notice by email. Mr. Rathie reported that for the first five months of 2015 the DCISC website has averaged 756 unique visitors every month coming principally from the U.S., Germany, Canada and the Ukraine with the top sites visited including the information on plant tours, agendas and notices for public meetings, and to download information from DCISC Annual Reports.

The Chair requested Consultant Linnen to report on the next fact-finding visit to DCPD. Mr. Linnen reported on the March 30-April 1, 2015, fact-finding visit to PG&E's San Francisco headquarters and to DCPD with Dr. Budnitz. Topics reviewed with PG&E during that visit included the following.

- PG&E Tsunami Risk Analysis—Mr. Linnen reported that during their visit to the PG&E corporate office in San Francisco, the fact-finding team received information on the tsunami analysis together with Dr. Robert T. Sewell who participated by telephone. Dr. Sewell prepared in 2003 a Tsunami Study of the site of DCPD for the NRC, which kept this study in draft form and until recently withheld from public disclosure. Dr. Sewell's 2003 tsunami study was recently released in response to a request under the Freedom of Information Act (FOIA) on behalf of the DCISC. Dr. Sewell is now under contract with the DCISC to perform further review of the tsunami hazard at DCPD. Mr. Linnen stated that as PG&E is presenting a report on external flooding risk at DCPD at this public meeting he would not cover this item further in his report.
- PG&E Seismic Study—Mr. Linnen stated that as PG&E is presenting a report on this topic at this public meeting he would not cover this item in this report.

- Probabilistic Risk Assessment (PRA) Program Status—the DCISC team discussed with DCPD representatives human error probabilities used in the seismic PRA and a recent LAR which has been submitted to the NRC for revising technical specifications based upon a generic issue pertaining to the impact of debris generated from a postulated LOCA that might accumulate on the Containment sump. Dr. Budnitz reported DCPD will be initiating in one year a full scope PRA for outage shut down conditions and is awaiting completion of a trial of methodology standards developed for this effort. The seismic PRA is also being updated.
- Fire Protection System and Program Health—overall the Program's health is rated as White status, representing good health but with issues to be addressed due to degradation observed in fire suppression piping for each unit. Plans are being developed to replace piping and issues continue to be addressed due to deficiencies with some fire doors which the DCISC has reviewed on several occasions. The program health is expected to return to Green status this year. Mr. Linnen commented that DCPD is one of only three nuclear power plants in the U.S. to have an on-site fire department.
- Spent Fuel Pools and Related Equipment—the fact-finding team toured the U-2 Spent Fuel Pool and found its condition to be good.
- Safety Injection Pumps—Mr. Linnen stated there are two pumps for each unit and the pumps are located in rooms in which flood levels due to external and internal flooding could have an impact. The flooding implications have been evaluated and determined not to exceed the height of the pump motors and associated instrumentation and therefore the pumps are judged to be immune to a design basis type of flooding event.
- Safety Conscious Work Environment (SCWE) & Human Performance Program—Mr. Linnen reported the SCWE topic is closely tied to human performance as SCWE focuses upon human behaviors and uses data obtained by observation to determine how well individuals are functioning and to identify and implement change as required. SCWE Program also uses coaching by supervisory and management personnel who make observations and receive feedback which is an important element of a SCWE. Mr. Linnen stated that while a substantial amount of data has been gathered the program is in an early stage but the DCISC representatives were impressed with the results achieved so far. Dr. Budnitz commented SCWE is a topic which is receiving attention both within the nuclear industry in the U.S. and around the world in the attempt to better understand what environments are conducive to and adverse to human performance. The NRC, INPO and the U.S. Department of Energy (DOE) are also engaged in these efforts. Dr. Budnitz observed that the issues are not engineering-related but rather management-related. Mr. Linnen stated there is a challenge in that workers can sometimes feel they are being critically evaluated as opposed to coached for success.
- System Engineering Program—system engineers are responsible for recommending plant actions to be taken in response to any health issues that arise with their systems. Mr. Linnen stated the DCISC team found the program to be well conceived and structured as an effective means to monitor the health of plant systems. The number of open items related to system issues has been reduced from more than 500 to less than 300. He reported the top two issues on the System Engineering Program's top ten list have to do with system health involving the

emergency diesel generators (EDGs). **Mr. Linnen stated the DCISC should follow up on the status of the System Engineering Program's top ten list within one year.**

- Compressed Air System—the DCISC team followed up on a review conducted in September 2014 during which the DCISC learned one of the station's three primary air compressors is located outdoors adjacent to the Turbine Building. Of the four back-up air compressors none had been operated in twenty years. Mr. Linnen stated this review found the air compressors to be in good condition, with the outside and inside compressors all found clean, painted and free of any rust. Plans are now in place to commence testing the four back-up air compressors.
- Meeting with NRC Resident Inspector—Dr. Budnitz stated the DCISC representatives met with NRC Resident Inspector John Reynoso. Mr. Reynoso has a background as a reactor operator at a plant comparable to DCPD before his service with the NRC and holds a Senior Reactor Operator license. Dr. Budnitz commented it was unusual and valuable for a resident inspector to have such a background. Dr. Lam reported the Senior Resident Inspector at DCPD, Mr. Thomas Hipschman, previously served as the Executive Assistant to the Chairman of the NRC and brings a great deal of policy and technical experience to his work at DCPD. Dr. Budnitz agreed and commented that DCPD and the NRC are both very well served by the competence of the two NRC resident inspectors.
- DCISC Member Budnitz meeting with Vice President Nuclear Services and Site Vice President.

Upon a motion by Dr. Budnitz, seconded by Dr. Peterson, the March 30-April 1, 2015 Fact Finding Report was approved and its transmittal to PG&E authorized.

The Chair requested Dr. Budnitz to preside over review of the next item and requested that Consultant Linnen continue his report with a report on the next fact-finding visit to DCPD. Mr. Linnen reported on the May 19–20, 2015, fact-finding visit to DCPD with Dr. Peterson. Topics reviewed with PG&E during that visit were reviewed as follows:

- Plant Health Committee (PHC) Meeting—Mr. Linnen reported the PHC reviewed the Reactor Coolant System's (RCS) health for both units which due to issues with system components has been rated deficient for approximately one year and is expected now to return to a healthy status for U-1 during refueling outage 1R19 and for U-2 during the first quarter of 2016. Mr. Linnen stated the PHC participants were well prepared and the meeting was conducted in a professional manner with participants engaged in providing input and asking questions. Actions were assigned and captured for future reference and the DCISC team was impressed by the conduct of the PHC meeting.
- Office Seismic Safety—the DCISC team toured the Administration Building fifth floor with the DCPD Director of Site Services and some cabinets and shelving were found not to be secured, although Mr. Linnen stated DCPD appears to have more of an appreciation due to the DCISC's continuing emphasis concerning this topic. He reported the DCPD Fire Chief will be including office seismic safety issues as part of periodic fire inspections.
- Seismically Induced System Interactions (SISI) Housekeeping Program—Mr. Linnen stated

that as PG&E is presenting a report on this topic at this public meeting he would not cover this item in this report.

- **Seismic Reviews of DCP's Replacement Steam Generators and New Reactor Vessel Heads—**Mr. Linnen remarked this was the team's first review of this topic and that PG&E is engaged in a seismic fragility probabilistic risk analysis intended to provide information on the likelihood of different plant damage which might be caused by earthquakes, such as a LOCA involving either the new steam generators or the new reactor vessel heads. **Dr. Peterson remarked the DCISC should schedule follow up investigation into the plans to add instrumentation within key structures and on key safety-related components within the plant to gather data about how the structures or components respond during earthquakes and how energy is transmitted through the soil around the site together with the response of the equipment.** Dr. Peterson observed this topic might potentially trigger a future recommendation by the DCISC. Dr. Budnitz commented experts believe that systems such as the steam generators generally have a good deal of extra margin but the DCISC will review PG&E's reevaluation of the plant's seismic capacity. Dr. Peterson observed that high pressure equipment and piping generally have a very robust design basis in order to be capable in terms of internal pressure and this results in corresponding margin relative to seismic loads.
- **Benchmarking Program—**Mr. Linnen reported this is a program used by all nuclear facilities to share good practices and occurs formally through visits to other plants and informally by telephone and through an exchange of correspondence, and by attendance at topical conferences. He stated DCP has maintained an active Benchmarking Program and provided examples in the areas of emergency operating procedures, severe accident management and extreme mitigation guidelines, and post Fukushima response support guidelines where the plant has shared and received valuable information with other nuclear facilities.
- **Operating Experience Program—**described by Mr. Linnen as another industry-wide program in which U.S. nuclear plants can share information regarding events and problems that have occurred. Mr. Linnen described the Operating Experience Program at DCP as active and engaged and the DCISC fact-finding team had no recommendations.
- **Potential for Chloride Stress Induced Corrosion Cracking (CSCC) of Multipurpose Canisters (MPCs) in the Independent Spent Fuel Storage Installation (ISFSI)—**Mr. Linnen reported that various types of stainless steel used for the MPC's have differing susceptibilities to CSCC. Each MPC is inserted into a high integrity storage module (HI-STORM) which allows air to flow around the MPC and in a salty air environment such as that at DCP there is potential for salt deposition on the outside of the MPC which could lead to corrosion and, in time, result in CSCC. Mr. Linnen reported the MPCs presently on site at DCP are on the lower end of resistance to CSCC but he reported that the corrosion rate is dependent upon temperature, with lower temperatures offering greater potential for a high rate of corrosion. In humid conditions salt can plate-out on the surface of the MPC but with lower temperature salt plating is likely to be of a softer form, termed deliquescence, meaning the salt has not hardened on the MPC and in that form the salt can be more aggressive as far as its corrosion rate. DCP and the industry are in the process of evaluating these issues. **Dr. Budnitz remarked that this is a concern the DCISC will want to make sure is understood and that**

there is no threat in the next few years. Mr. Linnen stated that the fact-finding team suggests that DCPD may find it valuable to periodically check and track the temperature on the surface of its MPCs as deliquescence can be prevented if the MPC surface temperature is maintained sufficiently high above the outside ambient air temperature. In response to Dr. Lam's observation, Dr. Budnitz replied that CSCC on the MPCs at DCPD does not appear to represent an imminent threat to safety but the matter is worthy of further inquiry.

- External Flooding Assessment—Mr. Linnen stated that as PG&E is presenting a report on this topic at this public meeting he would not cover this item in this report.
- Quarterly Station Performance Review Meeting.
- Discussion with NRC Senior Resident Inspector.
- Discussion with PG&E Chief Nuclear Officer.

Following Mr. Linnen's presentation, Mr. John Geesman, representing the A4NR was recognized. Mr. Geesman stated that his concern about CSCC is whether or not there is any ability currently to predict a trend that would assist in defining a relevant time horizon that one should be concerned with. He stated that given the time that spent fuel is expected to be on site at DCPD it would be useful to be able to predict a relevant time horizon. Mr. Geesman stated that media reports have stated PG&E initially conducted its review of the replacement steam generators and reactor vessel heads against the Hosgri Fault evaluation criteria and did not require analysis of a seismic event on the Hosgri Fault in conjunction with a LOCA event and he inquired whether during the fact-finding visit any explanation was given for not including the LOCA scenario in the initial analysis and review and whether that omission should be cause for concern. Mr. Geesman observed that as the DCISC has included recommendations about office seismic safety in its two most recent Annual Reports the fact that issues were discovered during the fact-finding reported by Mr. Linnen might suggest evidence of concern regarding PG&E's corporate culture as it may be that DCPD personnel simply do not accept the likelihood of such a scenario with sufficient probability to take corrective actions. Mr. Geesman observed that relative to CSCC the issue may be of lesser direct concern at DCPD than at the now decommissioned San Onofre Nuclear Generating Station (SONGS) in terms of the A4NR's view as to the proper size of the nuclear decommissioning trust for SONGS.

Dr. Budnitz, responding to Mr. Geesman's observations, stated that with reference to CSCC the community of experts now believe that it could take decades for CSCC of the MPCs to become a problem but there is not yet a time horizon developed through the ongoing analysis that is now occurring. Dr. Budnitz reported that the DCISC review during the fact-finding of the seismic qualifications of the new steam generators and new reactor vessel heads was not conducted as a review of whether those systems met their respective licensing criteria but rather was conducted in terms of the ultimate seismic capacity and ability to perform their safety functions for those systems and in that context, the LOCA scenario is not directly relevant.

Ms. Sherry Lewis, representing the group San Luis Obispo Mothers for Peace, was recognized. Ms. Lewis inquired how long the DCISC would remain in operation. Dr. Budnitz replied that, as the DCISC is charged with reviewing operational safety at DCPD, it is likely that the DCISC would continue operations as long as DCPD operates but that matter is subject to the determination of the CPUC

which created the DCISC. Ms. Lewis stated that given that residue from DCP's operations will remain at the site, this could be a problem for the local community.

Upon a motion by Dr. Lam, seconded by Dr. Budnitz, the May 20–21, 2015 Fact Finding Report was approved and its transmittal to PG&E authorized.

VIII Correspondence

Copies of correspondence sent and received at the office of the Committee's Legal Counsel since the last public meeting of the Committee in February 2015 were included with the public agenda packet for this meeting and previously called to the Committee's attention.

IX Adjourn Morning Meeting

The Chair adjourned the morning meeting of the DCISC at 12:20 P.M.

X Reconvene For Afternoon Meeting

Dr. Peterson reconvened the afternoon meeting of the DCISC at 1:30 P.M.

XI Committee Member Comments

There were no comments at this time from the Committee members.

XII Public Comments and Communications

Dr. Peterson invited any member of the public present to address comments to the Committee on topics not on the agenda.

Ms. Sherry Lewis representing Mothers for Peace was recognized. Ms. Lewis stated NRC Inspection Report ML 14349A485 included statements regarding the licensee's (PG&E) operability determination concerning the seismic study of the Shoreline Fault zone which indicate that the Shoreline Fault might be more capable than determined in a 2011 study, but the NRC concludes the deterministic response spectra developed in the Central Coastal California Seismic Imaging Program (CCSIP) are still bounded by those of the Hosgri Fault, and as analyzed in PG&E's Long Term Seismic Program (LTSP) described in DCP's current licensing basis and so the plant should be able to withstand any earthquake within its double design basis with an adequate reserve margin. Ms. Lewis stated there is a problem with this analysis as a more recent evaluation of the Hosgri Fault has shown it has capabilities considered greater than the double design basis and therefore the margin would not be as great as previously calculated. She stated Dr. Blakeslee, a geophysicist and former member of the California Assembly, authored Assembly Bill (AB) 1632 to require PG&E to conduct additional seismic studies. Ms. Lewis stated she was bothered by the statements in the NRC Inspection Report which indicate that the margin is adequate and that she believes Dr. Blakeslee would also question this conclusion. She commented that as more faults are identified in the vicinity of DCP, or found to be more dangerous than previously believed, the ground motion prediction equations are altered to make the end result to be always within the NRC's licensing

basis for DCPD and she stated this is not correct. She requested the Committee to review Dr. Blakeslee's statements on this issue and to get involved and address these issues in its public meetings.

Mr. John Geesman representing the A4NR was recognized. Mr. Geesman posed two questions to the Committee on behalf of the A4NR: (1) with respect to PG&E's determination as to the capability of the Shoreline Fault, whether PG&E has specifically evaluated the prospect of a joint rupture of the Shoreline, San Simeon, and the Hosgri Faults under the same assumption it used for its Shoreline Fault determination and why joint ruptures are not considered in all PG&E's deterministic assessments; and (2) with respect to Dr. Blakeslee's concerns shouldn't the variable ground motion prediction equations (GMPE) be isolated to determine what influence this variable has played in PG&E's previous assessments of the seismic risk at the plant? Mr. Geesman remarked there have been five or six different GMPEs developed since the plant received its original license and the same GMPE should be used to rerun each calculation to isolate the influence of the GMPE.

Mr. David Weisman of the A4NR was recognized. Mr. Weisman reported that California Senate Bill (SB) 657 passed out of the Senate Utilities and Communications Committee without opposition. He reported this bill would continue the CPUC Independent Peer Review Panel (IPRP), which is tasked with conducting independent review of PG&E's enhanced seismic studies and surveys, until January 1, 2025, the end of the plant's current licensing term. Mr. Weisman read quotes from SB 657's author Senator Monning and from San Luis Obispo County Supervisor Bruce Gibson who serves on the IPRP. SB 657 will now move from the Senate to the Assembly. Mr. Weisman also reported on AB 361 by Assembly Member Achadjian which would provide for extending funding from the CPUC for San Luis Obispo County's Office of Emergency Services and for emergency planning services from 2019 until 2025. Mr. Weisman stated that AB 361 has passed out of the Assembly and will now move on to the California Senate.

Mr. Randall Morton was recognized. Mr. Morton stated he worked as a junior engineer for Westinghouse in 1972-1973 and worked at DCPD during that time on the turbine, the generators and the plant's auxiliary equipment. Mr. Morton stated he was disappointed to see that there were so few persons present to support DCPD as it is the only operating nuclear power plant in California and it would be a tragedy if it were to close.

Ms. Elizabeth Brousse of Mothers for Peace was recognized. Ms. Brousse stated she enjoys the articles written by PG&E meteorologist John Lindsey and she stated Mr. Lindsey often ends those articles with a statement that DCPD is "Clean and green." She inquired what the Committee members would say about the use of the term "Clean and green" in reference to DCPD.

Ms. Linda Seeley of Mothers for Peace was recognized. Ms. Seeley stated that there are many tourists in the local area during this time of year and that there are four major development projects in planning stages in the Avila Beach area at the present time. Ms. Seeley stated there is but a single road with two lanes providing access to the Avila Beach area and if there was a release of radiation from DCPD there would be no reasonable way to evacuate the area effectively. Ms. Seeley stated that the emergency evacuation plans need to be reviewed with respect to the

significant increase in population in the areas around DCP.

Ms. Lester Goldfisher was recognized. Mr. Goldfisher stated that there have been several analyses of seismic issues in the vicinity of DCP and he questioned which of these analyses the public should credit as being the most accurate. He stated that with respect to analyses done by or on behalf of PG&E there is an economic factor involved in these analyses which might tend to influence their conclusions.

Dr. Peterson stated he appreciated Ms. Seeley's comments and the DCISC should take an action to review the effect of an increase in local population on emergency response planning at a future fact-finding. Dr. Peterson stated the DCISC is performing an independent assessment on tsunami risk at DCP which will include the areas of Avila Beach, Pismo Beach and Morro Bay. A principal focus of that assessment will be on the understanding of tsunamis which might be induced by submarine landslides and the impact on the need to maintain access to the plant and to maintain the ability to perform evacuations.

Dr. Budnitz remarked concerning Mr. Geesman's comments that when an earthquake occurs the seismic energy needs to go from the fault to the plant before it can harm the plant and it is how that seismic energy is transmitted that is described by the GMPEs which are very site specific, as the propagation of the motion includes both attenuation and changes in frequency as the energy moves through various media as well as amplification in some frequencies due to the nature of the soil. Dr. Budnitz reported that since the original analysis was done in the 1970's the seismic community has greatly increased its understanding of ground motion movement and this understanding is captured in modern GMPEs and this is the reason, along with more site-specific data, that PG&E has used different and more modern GMPEs in its analyses to result in improvements over previous analyses. Dr. Budnitz stated Dr. Blakeslee's complaint regarding PG&E's use of changing GMPEs is an invalid complaint. Dr. Budnitz stated he understood Mr. Geesman's request to use previous GMPEs in a reanalysis for comparison purposes but that process would not validate the older GMPEs. Dr. Budnitz stated the seismic community believes the modern GMPEs are more accurate but uncertainties still exist and review by a number of groups continues.

In response to Dr. Budnitz' remarks, Mr. Geesman stated that the latest GMPE could be used to compare the previous seismic source characterizations and he further remarked that the available data from the site, two earthquakes that populate the ground motion, may be conflated as data has also been included from around the world and both the NRC and the IPRP have been critical of PG&E concerning this data. Mr. Geesman remarked that he is disturbed by information in the IPRP's Report No. 9 which maintains that no matter which of the earlier spectra one chooses to use, that several of the scenarios are in excess of those criteria on which the plant's margin is based. In response to Dr. Budnitz comment that Dr. Budnitz' previous remarks were not in reference to criteria but to the strength of the plant, Mr. Geesman inquired as to how that strength is quantified and Dr. Budnitz stated that this was quantified years ago and it is now being requantified but it is important to recognize that the earlier quantification was of the hazard and not the margin.

Ms. Lewis was again recognized and stated she did not believe Dr. Budnitz statements and PG&E

did not acquire all the necessary data and what data PG&E has acquired is not sufficient. Ms. Lewis stated she disagreed with Dr. Budnitz use of the term “Complaint” in reference to Dr. Blakeslee’s observations.

Dr. Lam stated he wished to inject a healthy dose of skepticism to the discussion as he believes that seismic science is far from mature as it cannot determine how soon, how large or how near the next seismic event may be and public inquiry in this matter is valuable. **Dr. Lam stated with reference to Ms. Seeley’s comments that the adequacy of the existing federal and state rules may be grossly inadequate and that analysis should be the subject of further inquiry by the DCISC.** As to Ms. Brousse’s remarks, Dr. Lam stated he was not a proponent or an opponent of nuclear technology and has seen in his service as an NRC administrative judge the debates about the use of and penalties involved with the use of nuclear technology.

Dr. Budnitz stated that Dr. Lam should consider that a personal decision to fly on an airplane is taken in light of the fact that no one can predict when the next crash will occur and yet most people do not refuse to fly and consider air travel to be adequately safe on that basis. Dr. Budnitz stated that the proper inquiry concerns how frequent do these accidents occur. Dr. Budnitz observed that Dr. Lam’s posing of the questions as to how soon, how big or how near a seismic event may be is an invalid proposition and a judgment concerning whether DCPD is adequately safe from seismic events requires an understanding of how frequently these events might occur and this is the knowledge the seismic community seeks. Dr. Lam stated in response that if someone could tell him that a large seismic event would not occur in the next 50 years he would rest assured of DCPD’s safety.

Dr. Budnitz remarked, concerning the use of the term “Clean and green,” operation of a nuclear plant, in the absence of an accident, is environmentally benign and it is not normal operation which is a cause for concern but the accidents which can occur from that operation as well as generation of waste which is of concern to what is otherwise a “Clean and green” technology.

Mr. David Weisman of the A4NR was recognized. Mr. Weisman remarked the reason that most people accept the risks associated with air travel with confidence is that adequate data points exist due to the fact that aircraft are manufactured by the thousands using the same equipment and data on their operation is continually being acquired so that a safety basis is developed such that insurance companies are able to underwrite aircraft operations.

XIII Information Items Before the Committee

The Chair requested Mr. Cary Harbor, DCPD Director of Compliance, Alliance and Risk to introduce the first of the informational presentations requested by the Committee for this public meeting.

Mr. Harbor thanked Dr. Peterson on behalf of PG&E for the opportunity to present information to the Committee and introduced Mr. Tom Baldwin, DCPD Director of Site Services, and stated Mr. Baldwin has more than 30 years’ experience in the nuclear field and holds a Bachelor of Science

Degree in Mechanical Engineering and a Professional Engineer's License and has previously held leadership roles in Regulatory Compliance, and Engineering organizations at DCPD.

Review of NRC Performance Indicators, Licensee Event Reports and NRC Notices of Violations

Mr. Baldwin reported his presentation would cover the time between February 2015 and May 2015, particularly in the area of NRC oversight. He stated in summary all NRC performance indicators meet NRC green performance expectations. Five violations of very low safety significance were reported since the last DCISC meeting, one of which was identified by PG&E concerning correction of a procedure in its emergency response plan. He stated his presentation would cover more than four months of NRC inspections involving 1,000 hours by both on-site and specialized inspectors.

Mr. Baldwin reviewed two slides with a chart which summarized the NRC Performance Indicators that all nuclear stations report to every quarter. Mr. Baldwin stated that DCPD continues to meet all NRC performance indicator thresholds and sets more rigorous thresholds for the Performance Indicators than the thresholds set by the NRC, and then DCPD monitors those on a continuous basis in order to enter areas of declining performance into the Corrective Action Program to take prompt action before they can impact the performance on the NRC's indicators. 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. Baldwin reported on the two Licensee Event Report (LERs) initiated and issued by DCPD over the last several months as follows:

- LER 1-2014-004, issued March 30, 2015, for actuation of six emergency diesel generators (EDGs) due to loss of offsite power. This event occurred on October 31, 2014, during a moderate rainstorm which caused rainwater to mix with salt and dust contamination on electrical insulators in the 230 kV switchyard which resulted in a flashover. This actuated protective relays to isolate the 230 kV switchyard and the EDGs started automatically and remained in standby as they were not needed because power remained available from the 500 kV System. Mr. Baldwin stated the insulators in the switchyard have been replaced with insulators providing a greater capacity to resist such events.
- LER 2-2014-002, issued May 7, 2015, for U-2 plant shutdown required by Technical Specifications (TS). This event occurred in August 2014 during mechanical maintenance on EDG 2-2 when a cap screw holding a fuel injector on one cylinder was found to be cracked. The cap screw was replaced and all other EDGs were inspected with one other EDG found with a bolt that showed signs of degradation. Mr. Baldwin reported that the bolt was replaced. When performing a startup test of that EDG a fuel oil booster pump seal failed and leaked oil. As the EDG could not be repaired within the time allowed by TS, the plant was shut down.

Mr. Baldwin reported on five violations received from the NRC² as follows:

- NCV (Green)—for failure to implement Fire Protection Program (C-C Aspect H.5 Work Management). Discovered during U-2 refueling outage when the NRC observed a fire hose being used to drain a fire header in accordance with instructions. It was determined that during this time the hose was unavailable for fire protection. This was due to a weakness in work control processes and in the instructions on the control of fire houses which has now been corrected. Had a fire occurred the alarm would have sounded and the fire brigade would have responded and provided fire hoses.
- NCV (Green)—for failure to control access to a high radiation area with dose rates greater than 1 Rem/Hour (C-C Aspect H.12 Avoid Complacency). This occurred in October 2013 when a gate in a temporary barrier placed by radiation protection specialists around radioactive materials was found ajar due to a forklift having been operated in the area to shift a concrete block. No plant personnel received additional exposure and it was determined that the temporary barrier should have required a locking gate such that inadvertent exposure could not occur. Dr. Budnitz observed and Mr. Baldwin agreed this represented a lapse in safety culture.
- NCV (Green)—for failure to effectively implement risk management actions associated with safety-related EDGs (C-C Aspect H.11 Challenge the Unknown). This event was reported in December 2013 when a licensed operator caught his foot on an EDG fuel hose and broke a fitting rendering the EDG unfit for use. At that time another EDG was returning to service from a maintenance activity and during that time power remained available from off-site sources.
- NOV (SL III and White Finding)—for failure to obtain prior approval for a change which decreased the effectiveness of the Emergency Plan. PG&E in November 2013 identified a

concern, as a result of a visit to another power station, regarding instructions for communicating recommended protection actions to San Luis Obispo County with reference to protective actions in ocean areas. Instructions were deleted in 2005 which required advisement by PG&E after an accident relative to protective actions, including evacuation of boaters, required over ocean areas in the event of a release over water. This issue was addressed with the County in 2013 and the instructions were restored. Mr. Baldwin reported that requirements and processes were always in place whereby upon declaration of a general emergency, the lowest level alert that could result in a release to the environment, the U.S. Coast Guard would have automatically taken action to clear a six-mile perimeter off shore from DCP. Federal regulations, however, required those instructions be part of the procedures and Mr. Baldwin stated the event resulted in a violation and a detailed cause analysis was performed which will be reviewed by the NRC. In response to Dr. Lam's request, Mr. Baldwin described a White Finding as part of the NRC's Reactor Oversight Process which grades the potential significance of an event, usually using a risk-informed perspective. A White Finding indicates a moderate safety significance. However, that determination is not risk-informed in terms of probability and is made using a deterministic criterion. Mr. Baldwin and Mr. Harbor confirmed that DCP accepts full responsibility for this past omission and **in response performed a review of all emergency planning licensing basis issues which found and resulted in correction of a number of procedural discrepancies. A report will be published soon and Dr. Budnitz confirmed the DCISC will review it when it is made available.**

- NCV (Green)—for failure to provide adequate design review of EDG 2-3. This issue involving failure of a control wire that was discovered during a test run of EDG 2-3, which was installed as a sixth EDG during the mid-1990's after the installation of the other EDGs. EDG 2-3 is very similar to the other EDGs but Mr. Baldwin stated there are some differences. The control wire failed due to a cover which pushed against it. This cover was removed and the cover is not present on any of the other EDGs. The NRC determined that DCP should have removed the cover on EDG 2-3 when it was installed. The EDGs have been reviewed for other differences and no others were identified that have the potential to cause problems.

Mr. Baldwin summarized and reviewed the inspection reports issued during the period of his report:

- Emergency Preparedness Annual Report (2014-501, 1/17/15)
- Integrated Inspection Report (2014-005, 1/29/15)
- Emergency Preparedness Inspection Report (2015-502, 2/11/15)
- Annual Assessment Letter (2014-001, 3/4/15)
- Integrated Inspection Report (2015-001, 5/5/15)

In summary, Mr. Baldwin reported all NRC performance indicators continue to meet NRC green expectations. Cross-cutting performance is strong, with no cross-cutting themes or developing themes identified.

Ms. Linda Seeley of Mothers for Peace was recognized following Mr. Baldwin's presentation. Ms.

Seeley inquired concerning an issue with loading of the dry storage casks which was recently reported. She remarked it was her understanding that these casks were to be loaded with the higher temperature fuel in the center of the cask, with lower temperature fuel placed around the perimeter and it was found that 19 of the 34 casks that have been loaded since 2009 were loaded improperly and in violation of Technical Specifications (TS).

Mr. Baldwin replied to Ms. Seeley's remarks and stated that the TS require the fuel assemblies with the longest cooling time out of the reactor core be placed on the outside of the other fuel assemblies and this does not necessarily correlate with the lowest temperature or to the lowest heat load. However, the present TS requires the highest heat loads in the center of the casks and the lowest heat loads on the perimeter of the casks and DCPD determined that it had not complied with the TS in terms of observing the longest cooling times and ensuring the longest cooling time assemblies were on the perimeter of the casks. The licensing requirement and TS were developed in the early 2000's and additional analysis has since been performed and Mr. Baldwin observed the rest of the U.S. nuclear industry does not use the same TS basis as DCPD. Mr. Baldwin described the TS for DCPD as outdated but he confirmed the plant is required to follow its TS and a license amendment is required to change the TS. Mr. Baldwin stated that the manner of loading the casks at DCPD was in accordance with the intent of putting the highest temperature assemblies toward the center but it was not in compliance with the TS although he described the manner of loading as safe. He confirmed that DCPD will not make further cask loadings in violation of its TS and before changing to a fully compliant TS loading protocol the plant will have to process a license amendment request with the NRC. He stated that a root cause investigation is being performed on this issue.

Ms. Sherry Lewis was again recognized. She inquired whether high burn-up fuel is placed in the center of the casks.

Mr. John Geesman on behalf of the A4NR was recognized. Mr. Geesman observed the DCISC had recommended in an Annual Report that PG&E accelerate transfer of spent fuel from the spent fuel pools to dry cask and was told by PG&E that the primary constraint was the cask loading requirements. He reported the CPUC in its current PG&E General Rate Case adopted a requirement that before PG&E's next general rate case, scheduled for fall 2015, PG&E should submit a plan to accelerate transfer of spent fuel consistent with NRC requirements and recommendations of the CEC. Mr. Geesman stated the fact that PG&E could err on this magnitude concerning the loading of spent fuel, irrespective of any safety consequences, is indicative of a problem with safety culture at DCPD and this should be a top priority for the DCISC.

Dr. Peterson observed that he has worked extensively with issues of heat transfer and thermal management and he is **unsure of the logic of loading hot and cold assemblies in the center or on the perimeter of the casks and he stated he is not surprised that other plants have had their TS modified to remove similar requirements and the DCISC should commit to reviewing this issue and to asking PG&E to make a presentation at some point in the future.** Dr. Peterson also stated the discussion of deliquescence is an issue worthy of review, as the temperature difference between the ambient air and the canisters can make it impossible, even with salt on the outside of

the canister, to observe the condensation of salt. Dr. Peterson observed this was an important issue because, in order to induce stress corrosion cracking, deliquescence would be the most plausible mechanism by which salt could accumulate moisture and become corrosive and therefore to an understanding how the temperature of the casks evolves over time.

Mr. Harbor thanked the members of the public who spoke on the issue of cask loading and he stated DCP and PG&E take this issue very seriously and the issue is now undergoing a root cause analysis. Mr. Harbor stated DCP continues to work to improve safety culture and concentrates on ten core safety culture principles including problem identification and resolution and maintaining a questioning attitude. Mr. Harbor confirmed that concerning this issue the plant's TS were not met.

Mr. Geesman was again recognized and observed that he has a great respect for a questioning attitude but representations were made by PG&E to the CPUC which were clearly premised on a fundamental misunderstanding of what the NRC requirements actually were and to some extent this culpability spreads beyond the licensee to the manufacturer. He described this matter as a very significant oversight.

Mr. Harbor requested Mr. Baldwin to continue with the next informational presentation to the DCISC.

Status of Office Seismic Safety and the Seismically Induced System Interaction Housekeeping Program.

Mr. Baldwin introduced his presentation on office seismic safety, improved seismic preparedness, and past and present improvements. He reported the Seismically Induced Systems Interaction Program (SISIP) is a program in existence since the plant was built to protect plant equipment from being affected by the actions of transient equipment in the event of an earthquake. Carts, materials, and tools that are taken into the plant to perform routine operation and maintenance when not under direct control are examples of transient equipment. If an earthquake were to occur, the SISIP functions to insure transient equipment will not move and interact with important and necessary plant equipment. This is normally done by removing the transient equipment from the plant or securing it and managing it by work control processes as well as by monthly walkdowns by housekeeping area owners. Deviations are documented in the Corrective Action Program. SISIP program owners review monthly walkdown results and findings for early signs of deviation trends and take action to alert managers to heighten their focus for low level trend concerns. Results include a cleaner plant and deviations are infrequent, minor and promptly corrected. In response to Dr. Budnitz' inquiry Mr. Baldwin confirmed that the SISIP includes some installed, as opposed to transient, equipment such as handrails. Dr. Budnitz observed the NRC in 1980 developed generic issue A17 to address installed equipment which required a series of walkdowns to verify that installed equipment did not suffer from seismic interaction problems and he wondered why at that time the NRC did not address transient equipment as was done for transient fuel sources.

Mr. Baldwin reported the Office Seismic Safety Program is an initiative largely credited to Dr. Peterson to improve DCP office safety in the event of an earthquake by bracing office furniture,

file cabinets, book cases and storage racks. These actions are intended to protect personnel from injury and to ensure access and egress routes are not blocked by office furniture impacted by a seismic event. DCPD recently recognized additional improvement opportunities in personnel safety by sharing knowledge from the station fire chief and civil seismic engineers with plant staff. Mr. Baldwin stated the hazards are different from those addressed by the SISIP and there are some issues in the power plant affected by the Office Seismic Safety Program which were addressed in 2013 when questions were first raised by the DCISC although additional issues continue to be identified.

Mr. Baldwin stated that the Office Seismic Safety Program involves communication to station personnel of the Guidance Policy, a station-wide communication bulletin (quarterly), and identification of an annual office safety focus area. Area owners are assigned and walkdowns performed by housekeeping area managers with a tracking process established for resolution of items using the facilities management process and Corrective Action Program.

Mr. Baldwin reported all risk significant actions, such as those in the chemistry labs, were completed in 2013. Additional issues require correction by the end of July 2015. All improvements will be made by December 24, 2015. Mr. Baldwin reviewed with the Committee the improvements completed to date to improve office seismic safety including:

- Demolition of Support Building 201
- Removal of various temporary facilities
- Modernization of the Outage Coordination Center
- Modernization of 2nd, 4th and 6th floor offices
- Modernization of Security & Maintenance Services offices in Buildings 102, 116, 113

Improvements Scheduled in 2015 to Improve Office Seismic Safety include:

- Relocation of Integrated Site Services to new facility in Area 10
- Relocation of paint crew to new facilities

Mr. Baldwin displayed a photo of an office area before and after changes were made based upon the Office Seismic Safety Program and described the improvements made to enhance safety of personnel working in the area.

Dr. Lam observed that much credit for the improvements achieved by the Office Seismic Safety Program is due to Dr. Peterson and he described the program as a clear example of what the DCISC can do in contributing to reactor safety.

Mr. John Geesman of the A4NR was recognized. Mr. Geesman stated that from Mr. Baldwin's presentation it is clear that significant deficiencies continue to exist more than one year after the DCISC made office seismic safety a priority in its Annual Report. Mr. Geesman submitted his

hypothesis that a cultural problem is responsible for certain persons at DCPD having a level of denial that a real risk exists. PG&E has stated for many years that it has made sophisticated analyses of the seismic setting of DCPD but it is evident that cultural problems exist which are indicative of larger problems that affect much of PG&E's seismic analysis of the plant site.

Ms. Linda Seeley of Mothers for Peace was recognized. Ms. Seeley inquired about an issue with the heating, ventilation and air conditioning of the plant Control Room being properly installed and connected and she wondered if that problem had been resolved. Dr. Peterson replied that this problem was addressed by DCPD.

Mr. Harbor introduced Ms. Jacquie Hinds, DCPD Quality Verification Director and stated Ms. Hinds has more than 30 years nuclear experience, holds a Bachelor of Science Degree in Chemical Engineering and has held leadership roles in the Engineering, Regulatory Services organization and in providing support to PG&E's Chief Nuclear Officer.

Quality Verification Organization's Perspective on Station Performance: Strengths, Top Issues, and the Quality Performance Assessment Report.

Ms. Hinds reported that since graduation from U.C. Davis she has been a resident of the local San Luis Obispo community and raised her family in the area and she continues to look forward to residing in the local area.

Ms. Hinds stated Quality Verification's (QV) mission is to strive for excellence, identify gaps to excellence, ensure compliance with regulations and improve DCPD quality through critical and effective independent oversight. The QV organization provides a Site Status Report which identifies its top issues. The regulatory compliance role of QV stems from NRC requirements that all nuclear power plants have a Quality Assurance Plan based on Title 10 Code of Federal Regulations (CFR) Part 50 Appendix B. The DCPD Quality Assurance Plan is contained in the plant's Final Safety Analysis Report (FSAR). In accordance with these requirements, the QV organization performs audits and conducts assessments and inspections.

Ms. Hinds reviewed with the DCISC QV's current top three issues included in the Site Status Report which QV periodically shares with the DCISC, at Plant Performance Review meetings, and in meetings with senior plant leadership and with Mr. Ed Halpin, the Senior Vice President and Chief Nuclear Officer (SVP/CNO). These issues include:

- Equipment Reliability
- Long Term Preventive Maintenance Strategy
- Protected Equipment Postings

Ms. Hinds stated equipment reliability has challenged plant operations since the end of 2014 as demonstrated by forced loss rate and unplanned entries into Technical Specifications (TS). Identified Gaps included the lack of an integrated plan as a framework for improvement, plans lacking granularity to ensure appropriate actions were taken, no established governance process to

ensure accountability, and a lack of alignment on actions. She reported on the current state of equipment reliability as including creation of the Equipment Reliability Initiative based upon integrated plans with detailed actions, director responsibility for ensuring focused progress in addressing equipment reliability, a governance process established that ensures frequent review of results and actions, and a communication strategy to raise awareness and share results. She observed that plant performance in minimizing issues of equipment reliability during the first six months of 2015 shows improvement and is reflected in the NRC performance indicators and Ms. Hinds stated equipment reliability is expected to be removed from the QV top issues list by the end of 2015.

Concerning the Long Term Preventive Maintenance Strategy Ms. Hinds stated that station deferral of critical preventive maintenance tasks was high compared to the industry. The issues were reviewed at Plant Performance Review meetings. This issue was identified by the station in a mid-cycle assessment and QV issued a Finding. Identified gaps include deferral of critical tasks not being consistent with industry best practices and the need for a long term strategic plan to optimize the Preventive Maintenance Program. The current status includes no deferrals of preventive maintenance tasks for the upcoming refueling outage, completion of benchmarking, and development of an action plan to improve the Preventive Maintenance Program.

Regarding postings for protected equipment Ms. Hinds observed that protected equipment posting requirements are complex and challenging to implement. Protected equipment is equipment for which there is a need to raise awareness to employees when equipment similar to it may be taken out of service and there is a heightened need to protect remaining operable equipment. An identified gap at DCPD was revealed by QV's observations during the last refueling outage that requirements were contained in several procedures, making it difficult to implement and the issue was not being addressed as timely as QV required. To address the issue procedures have been revised and brought together with input from the operating crews. Observations will be made during the next refueling outage to provide feedback on the implementation and effectiveness of the revised procedure.

Ms. Hinds stated that the next Site Status Report will not include protected equipment posting or long term preventive maintenance strategy as top issues. In summarizing her presentation, Ms. Hinds stated DCPD continues to operate safely, the Quality Assurance Plan is effectively implemented, and DCPD remains responsive to issues raised by QV and to issues raised outside of QV which she terms as a good cultural trait.

In response to Dr. Lam's inquiry Ms. Hinds stated she reports directly to the SVP/CNO on not less than a monthly basis to review issues identified by QV and she stated she believes she has Mr. Halpin's full support although she has not had to rely on Mr. Halpin as she also has the full cooperation of her peers and the other directors at DCPD. Also by raising awareness and providing facts on the issues and using the tools QV has available to it, the response has been good. In response to a question from Consultant Linnen, Ms. Hinds stated that she was unaware of any case where obsolescence of equipment has been an issue with the equipment's reliability. Mr. Harbor stated that DCPD addresses issues of obsolescence through its capital enhancement program and

through reviews by engineering and obtains appropriate replacements when necessary for design changes through its supply chain. In response to Consultant Wardell's inquiry Ms. Hinds confirmed there is an escalation program available to her in her role as QV Director and that she used the escalation program for one issue last year. **In response to Consultant Linnen's inquiry as to what degree equipment reliability issues might be tied to issues of rework Ms. Hinds stated that she would need to review and would provide a specific response on another occasion.**

Ms. Sherry Lewis of Mothers for Peace was recognized and asked for an explanation of the meaning of an independent oversight function. Dr. Budnitz replied that NRC regulations require every plant to have a Quality Assurance office which reports directly to the plant's senior officer and in that function the Quality Assurance function is independent of the line organizations.

Mr. Harbor introduced Mr. Scott Maze to make the next informational presentation and stated Mr. Maze is the Supervisor of the DCPD Fukushima Project and has been in the nuclear industry for more than 25 years, holds a Bachelor of Science Degree in Civil Engineering and is a registered Professional Engineer.

Results of Post-Fukushima Study of DCPD External Flooding Hazards

Mr. Maze stated he is the engineering supervisor for the Fukushima Project and was assigned the task of performing the flooding reanalysis. He remarked he, like Ms. Hinds, is a graduate of U.C. Davis and he has resided in the local area with his family since his graduation 26 years ago. He reported his presentation would address a new and extensive flooding reevaluation performed at the NRC's direction which continues to show the plant can safely withstand tsunamis and flooding. PG&E's tsunami hazard update involved the use of site-specific information, the latest models, techniques and methodologies and independent expertise. The results of this study show the current tsunami design level for Diablo Canyon is still appropriate and provides for safety at the plant. He reported that one area identified for further assessment is ensuring the plant is fully prepared for an extremely rare, but potentially intense localized storm. PG&E has already implemented additional measures to ensure DCPD is prepared, such as pre-staging sand bags during such a storm, and is investigating additional measures to curb water away from these areas. He stated his presentation would cover:

- NRC Correspondence
- NRC Guidance and Methodology
- Overview of Analyses
- Probable Max. Precipitation (PMP)
- Probable Max. Flood (PMF)
- Local Intense Precipitation (LIP)
- Interim Actions
- Tsunami

- Storm Wave

Mr. Maze reviewed the NRC correspondence issued regarding the flooding reanalysis which included the NRC's March 12, 2012 Letter requesting information issued by the NRC pursuant to 10 CFR 50.54(f) requiring that DCPD reevaluate site seismic and flooding hazards using updated flooding information and present-day regulatory guidance and methodologies. PG&E's Letter DCL-12-059 was the company's 90-Day Response to Flooding Aspects of 10 CFR 50.54(f). Per the NRC's direction, plants were to submit flooding hazards reevaluation to the NRC by March 12, 2015, for which PG&E submitted its Letter DCL-15-0345 on March 11, 2015 as its final report to the NRC, and will submit new evaluations to address additional NRC- required post Fukushima requirements by March 2017. Dr. Budnitz stated that he served as a consultant to the NRC staff issuance of guidance concerning flooding reanalysis and as a consultant to the NRC on reviewing submittals from nuclear power plants but Dr. Budnitz has recused himself in that role from consideration of anything having to do with DCPD.

Mr. Maze reported NRC guidance and methodology requires new evaluations to consider beyond design basis events for seismic and flooding; that is, events that are beyond what DCPD's current license requires these issues need to be treated as if the plant were being built at the present time using current codes, methodology and current standards. In essence a reevaluation is performed using NUREG o800 which is the standard review plan for building a new nuclear power plant.

Mr. Maze described and discussed an overview of calculations required by the analyses:

- Flooding Hazard Analyses

- PMP: Computes all-season general storm probable maximum precipitation (PMP), seasonal general storm PMP, and local storm PMP values using California information.
- Probable maximum flood (PMF): Calculates PMF values along Diablo Creek through the DCPD site (based on PMP results) coincident with wind/wave activity, i.e., maximum Water Surface Elevations (WSE).
- Local Intense Precipitation (LIP): A "Microburst" (6-hr) PMP. Calculates maximum LIP WSE over the entire site drainage basin.

- Tsunami/Ocean Analyses

- Tsunami: Calculate distant and near source tsunamis (both seismic & offshore landslide) with updated hydrostatic & hydrodynamic forces, debris and water-borne projectiles, and sedimentation/erosion.
- Storm Surge: Performs an evaluation of local wave data to develop storm surge and storm wave parameters.

Mr. Maze confirmed Dr. Budnitz' observation that flooding and tsunami hazard analyses were done when the plant was first licensed, and the requirement from the NRC was that these analyses be updated based upon modern understanding which provides more detail. In response to Dr. Lam,

Mr. Maze confirmed the analyses are beyond design licensing requirements as they are not within the plant's current license framework. Dr. Budnitz observed that for many plants there has not been a need to revisit these issues unless a dam was constructed or a levee built in the area.

Mr. Maze provided a site overview of DCPD including the 500 kV switchyard under which Diablo Creek flows through a ten foot culvert under 230 kV and 500 kV lines. He reviewed the PMP analysis and stated it was computed for all-season general storm PMP, seasonal general storm PMP, and local storm PMP values. DCPD has a drainage basis of approximately 5.2 square miles which he reported is much less than some plants located in the mid-west that have drainage basis on 1,000,000 square miles. This data was then utilized as input to the PMF analysis. The data utilized Hydrometeorological Reports (HMRs) 58 & 59 published by the National Ocean and Atmospheric Administration (NOAA).

Mr. Maze reported the PMF analysis was calculated using PMF values, i.e., maximum water surface elevation along Diablo Creek through the DCPD site and conservatively assumed 100 percent blockage of all storm drains. Additionally the PMF analysis was evaluated for wind waves. The analysis found WSE and flow rates are less than those in the plant's current license due to a change in the HMRs and the availability of more sophisticated computer modeling methods and there is no impact from the reanalysis to safety-related plant systems, structures or components (SSCs). In response to Dr. Budnitz' inquiry, Mr. Maze confirmed that there is increased confidence in the data as it is his belief that HMRs 58 and 59 are conservative and DCPD was allowed to, but in fact did not, utilize a site-specific PMP which includes more detail, and he noted that local weather conditions within an area of California can be very different from another area.

Mr. Maze discussed the LIP which he stated involves analysis of extremely rare but potentially intense local storm activity directly over the plant site, representing 5.9 inches of rainfall in a 6-hour period with 2 ½ inches of rain falling within the first 15 minute period. He reported new techniques and software provide detailed water levels around the site and utilize a site-specific PMP and more recent storm data and area-specific data than in HMRs 58 & 59. He reported this effort was not first-of-a-kind and represented a typical industry approach. The return period for the LIP analysis was one event every 129,000,000 years. Mr. Maze reported the most rain ever received at DCPD in a 24-hour period was 8.5 inches in 1995.

For the LIP analysis Mr. Maze reported walkdowns were performed to identify potential entry points to safety-related structures and to determine maximum WSE resulting from the effects of LIP at the DCPD power block area. The analysis assumed all drainage systems non-functional and identified and implemented actions that would be taken to mitigate inundation at potential entry points. DCPD did not use the method employed by some plants to assert that the LIP analysis was bounded by the plant's internal pipe break analyses. LIP mitigation actions included interim actions to pre-stage sandbags, a process in place for the shift foreman to monitor weather forecasting, warning, and alert systems, and evaluation of sandbags to withstand the LIP event in which they will be needed. Procedures were revised to direct installation, including appropriate triggers to activate response, and training was conducted for Operations and necessary personnel. Reasonable simulations were performed per the Nuclear Energy Institute's guidance to ensure the

sandbags can be installed in the planned time frame.

Mr. Maze reported actions for long-term resolution include and will be addressed in an Integrated Assessment Report due to the NRC in March 2017, by investigation of permanent modifications to prevent effects of LIP, and by evaluating the result of inundation and other potential mitigating actions.

Mr. Maze reported that analysis has been performed for internal pipe break events that would flood a building and that a time-dependent study could be done based upon and compared to those analyses. In response to Dr. Peterson's comment, Mr. Maze confirmed these issues also involve the FLEX response, and flooding is an issue that is dealt with by a FLEX response upon the occurrence of the loss of the emergency diesel generators and the loss of all off-site AC power which he reported is the starting point for a FLEX-based response. In response to Dr. Budnitz observation, Mr. Maze confirmed the reanalysis benefited from the use of better data.

Dr. Budnitz observed the American Nuclear Society (ANS) developed Standard 2.8 which governs how this type of analysis is done, and Mr. Maze confirmed DCPD was initially following the ANS standard as part of the Fukushima Near Term Task Force efforts with the NEI. Dr. Budnitz reported that he is a member of the ANS standards board and within the next six to twelve months the ANS is expected to issue a new standard, and Mr. Maze observed and Dr. Budnitz confirmed that the new ANS standard will be factored into the responses required to the NRC's tier two and tier three directives.

Dr. Budnitz observed that for many sites in other parts of the country flooding is the principal hazard but for a site such as DCPD seismic is the principal hazard to be addressed. Dr. Budnitz reported the new ANS standard takes a probabilistic approach to the various LIP phenomena and represents a more inclusive approach.

Dr. Peterson inquired about the impact of potential highly intense precipitation events causing flooding and the resulting impact on emergency access and egress, and he observed that such flash flooding can disable access and is a very serious event. Mr. Maze stated the analysis work was done solely to look at the protection of safety-related SSCs to verify that the safe shut down capacity of the plant was maintained and the impact of a flash flooding scenario likely falls within the purview of the Emergency Planning organization. Mr. Harbor confirmed Mr. Maze's observation and stated DCPD has a stranded plant procedure along with its FLEX strategies to address the conditions referred to by Dr. Peterson. Dr. Peterson commented that there is benefit in the process to review more broadly for hazards items and issues that, while they may not impact plant safety, they may be important for public health and safety and may therefore be identified. Mr. Maze agreed and commented that this is part of the FLEX initiative.

In response to Dr. Budnitz question Mr. Maze stated the geographical area for the LIP is a one-square mile moving storm and the PMP is also a local event of 52.2 miles in area. In response to Consultant Linnen's inquiry about extending the scale of an event, Dr. Budnitz observed it is not the probability of an event during any one year but rather the size of the watershed, which remains

constant, that is important. Dr. Budnitz remarked the NRC's prescribed guidance provides how the analysis is to be done at a certain level of precision but there is a certain inaccuracy in the data. Mr. Maze replied that the data from NOAA is accurate as to the inputs from the HMRs. In response to Dr. Budnitz' question Mr. Maze stated that it was possible such large precipitation events would result in the disruption of offsite power.

Concluding his presentation, Mr. Maze stated the flooding re analysis shows DCPD is safe and revealed no issues with PMP and PMF. One area was identified for mitigation, that being an extremely rare localized storm event and mitigating measures are in place to protect DCPD safety-related structures, systems, and components. Dr. Budnitz remarked that PG&E's submittal to the NRC will be reviewed by staff and either more information and questions will remain to be addressed or the submittal will be accepted by the NRC. Mr. Maze stated DCPD has already supplied additional data requested by the NRC and expects to receive a response from the NRC by 2016.

Ms. Linda Seeley of Mothers for Peace was recognized. Ms. Seeley stated she wondered why such severe weather events, with a frequency of every 129,000,000 years, were used for the reanalysis rather than a continuous rain event lasting several days. She also inquired as to how high the water level would be at the plant from these events. Dr. Budnitz observed that the batteries at the plant would be no less than 30 feet above the highest water levels projected and that this was an important fact. Ms. Seeley closed her remarks by stating that due to the presence of 13 earthquake faults in the area a nuclear power plant would not be allowed to be built today at the site of DCPD.

Dr. Gene Nelson was recognized and stated he serves on the physical sciences faculty at Cuesta College. Dr. Nelson stated that having an earthquake fault in proximity to a structure does not mean that the fault poses a risk to the structure and he stated Ms. Seeley's comments were alarmist in nature. Dr. Nelson encouraged the DCISC to listen to scientific and engineering analysis instead of alarmist comments.

Mr. Maze and Dr. Budnitz confirmed Dr. Peterson's observation that the reanalysis includes certain assumptions concerning rainfall which are required by the codes including the assumption that the ground is fully saturated and that 100 percent of the rainfall impacts the site in terms of runoff. In response to Dr. Peterson's question about the effect of the storms of 1995, Mr. Maze stated he was present and on-site at DCPD during 1995 and has no recollection of water ever entering the plant nor is there any evidence that it did so although this evidence is anecdotal as there is no record of the water levels reached during 1995. In response to Dr. Budnitz' comment about the NOAA data and the effect of intense precipitation Mr. Maze confirmed that intense precipitation for short periods can produce more flooding than a rain event lasting several days as there is more runoff of water. Mr. Maze observed that the concern with a long rain event is with Diablo Creek and the re analysis establishes there is at least eight feet of margin between the creek and plant levels including accounting for wind-driven waves.

XV Adjourn Afternoon Meeting

The Chair adjourned the afternoon meeting of the Committee at 4:35 P.M.

XVI Reconvene for Evening Meeting

Dr. Peterson convened the evening meeting of the DCISC at 5:30 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

XVII Committee Member Comments

There were no comments by Committee members at this time.

XVIII Public Comments and Communications

Dr. Peterson inquired whether any member of the public wished to comment or address the Committee on matters not appearing on its agenda for this meeting. There were no comments by members of the public at this time. There was no response to Dr. Peterson's invitation.

XIX Information Items Before the Committee (Cont'd.)

The Chair requested Mr. Cary Harbor, Director of Compliance, Alliance and Risk at DCP, to continue with the informational presentations by PG&E. Mr. Harbor introduced Mr. Scott Maze to continue with the informational presentations.

Presentation on Results of PG&E's Tsunami Studies

Mr. Maze stated he is the supervising engineer on the DCP Fukushima Project and has been in the nuclear industry with PG&E for 26 years and resides in the local San Luis Obispo area. Mr. Maze stated that along with personal and industrial safety, nuclear safety is a key priority for DCP. PG&E performed an extensive flooding reevaluation of DCP, at the NRC's direction, that continues to show the plant can safely withstand tsunamis and flooding. This tsunami hazard update involved the use of site-specific information, off shore bathymetry data, the latest models, techniques and methodologies, and independent expertise. The results of this study show the current tsunami design level for Diablo Canyon is still appropriate and provides for safety at the plant.

Mr. Maze reviewed the NRC guidance and methodology stating the overall approach, similar to the flooding analysis he discussed earlier in this public meeting, was to reevaluate seismic and tsunami hazards using updated seismic and flooding hazard information and present-day regulatory guidance and methodologies as if the plant were a new plant to be reviewed under the following:

- NRC Regulation (NUREG) 0800, the Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants;
- Regulatory Guide 1.70: Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants;

Regulatory Guide 1.59: Design Basis Floods for Nuclear Power Plants NUREG/CR-7046:

- Design-Basis Flood Estimation for Site Characterization at Nuclear Power Plants in the U.S.;
- NUREG/CR-6966: Tsunami Hazard Assessment at Nuclear Power Plant Sites in the United States of America—Final Report; and JLD-ISG-2012-06: Guidance for Performing a Tsunami, Surge, and Seiche Flooding Safety Analysis.

Dr. Budnitz observed the “JLD” designation stands for the Japan Lessons learned Directorate and “ISG” stands for Interim Staff Guidance and that he served as a consultant to the NRC staff for JLD-ISG 2012-06. Dr. Budnitz remarked that his recommendation, which was not adopted, would have required a probabilistic analysis by each nuclear power plant.

Mr. Maze provided an overview of the tsunami analysis which included selecting seismic sources for tsunamis located near and far from the plant site, analyzing submarine landslides and considering insights from the draft Sewell study of 2003. Mr. Maze observed there is a need to consider submarine landslides and for more detailed modeling in these efforts. Dr. Budnitz reported that the DCISC has recently engaged Dr. Robert T. Sewell as a consultant to perform additional review of the tsunami hazard at DCP and its environs and the Committee expects that Dr. Sewell may make a public presentation at the DCISC’s public meeting in October 20-21, 2015.

Mr. Maze reported distant and near-source seismically generated tsunamis were selected using the Final Safety Analysis Report (FSAR), historical tide gauge data to compare against historical tsunamis, current geoscience activities for Recommendation 2.1 Seismic Reanalysis, and recent California studies, including the USGS study (SAFRR, 2013) and previous PG&E studies (2006-2010).

The tsunami analysis of submarine mass failure (SMF) included analyzing submarine landslides using the detailed bathymetry effort undertaken in 2006 for PG&E’s report to determine sea floor topography, detailed geophysics and geology analysis performed to characterize potential slides which formed input for current modeling, and bounding landslide characteristics from the Big Sur Slide representing a slide along the Santa Lucia Escarpment, and the Goleta Slide representing a slide in the Santa Maria Slope Break. In response to Dr. Peterson’s inquiry, Mr. Maze stated DCP has up to one meter resolution for bathymetry data around the plant site and for areas of the sea floor located further out from the coast. NOAA data from 2006 was used.

Mr. Maze displayed and discussed a map depicting historically recorded tsunami run-ups and various modeled results with the proxies for the Big Sur and Goleta Slides shown on the map, with the Big Sur Slide proxy, a slide of approximately 5 kilometers by 3 kilometers in size, placed in proximity to DCP which produced a postulated 7.15 meter height for a tsunami based on the Big Sur Slide. The Goleta Slide proxy, based on a proxy of three separate slides in the Goleta area which in total was smaller in size than the Big Sur Slide, was placed in very close proximity to the plant site. Mr. Brendan Dooher reported the Goleta Slide data includes information from the Gaviota mudslide of 1812. This Goleta Slide proxy produced a postulated run-up from a tsunami at between 2 and 3 meters in height which Mr. Dooher remarked was in keeping with historical records. In response to Dr. Lam’s inquiry Mr. Maze responded the size of the proxy slides was selected based on geologic

review of bathymetry data and he confirmed that slides of other sizes might have potentially been selected by other reviewers. Mr. Maze stated the slides selected were the largest possible slides postulated to ever occur along the coastline of California and the model is sensitive to the size of the selection of sources for run-up and volume, or as Dr. Budnitz remarked that the model is therefore sensitive to a differing assignments of parameters in a probabilistic sense. Dr. Budnitz reported that along with Consultant Linnen he received a presentation from PG&E and Dr. Stephan Grilli on this topic during a fact-finding visit to PG&E's San Francisco headquarters in March 2015.

Mr. Maze reported the tsunami analysis approach included creating a 3-D hydrodynamic model for bottom motion of the sea floor, analyzing tsunami source propagation using NRC-recognized programs NHWAVE and FUNWAVE, and participation by a leading independent expert, Dr. Grilli of University of Rhode Island. This method was benchmarked for Diablo Canyon with data from the 2011 Tohoku event in Japan which closely matched observed effects and the model also evaluated seismically initiated submarine landslides including an event on the Hosgri Fault, including a potentially degraded breakwater condition. The wave run-up data was then input to new analyses for hydrostatic and hydrodynamic forces, debris, water-borne projectiles, and sedimentation and erosion.

Mr. Maze displayed a graph and cutaway depiction of the tsunami analysis results which showed the configuration at an assumed high tide, with a long-term sea level rise factored in, which resulted in a maximum run-up at the DCPPI Intake structure of 29.9 feet above mean sea level elevation. Mr. Maze stated that it was important to verify that the snorkels for the Auxiliary Saltwater System (ASW), which is a safety-related system, remain protected. The data was also checked for erosion issues for the protective installations over the ASW piping, such as concrete pads and the gabion mattress, to verify the ASW System remains functional. Dr. Peterson observed that a tsunami would also be expected to deposit debris and this debris disabled many of the plants on the Japanese coast during the March 2011 tsunami event resulting in loss of ASW for an extended period of days. Mr. Maze confirmed Dr. Peterson's observation and reported there was a study of Diablo Cove performed which looked at bathymetry data down to one meter as well as the rocks and boulders and the breakwater itself as potentially becoming part of the debris. **Dr. Peterson observed that the portable pumps for the ASW System have yet to be fully tested and therefore it is an open issue as to how long that portable system would function before its suction plugs with debris.** Mr. Maze stated sedimentation and filtration screening is being included in the design of the FLEX ASW Systems and Dr. Peterson observed there is a need to get the ASW pumps tested under realistic conditions as soon as possible. Dr. Budnitz observed that a tsunami event results in an initial drawdown of water and when that drawdown occurs there are huge hydrodynamic forces created and those forces return and impact the shoreline when a tsunami strikes the coast. Dr. Budnitz stated that for a tsunami event near Alaska or Chile there would very likely be adequate warning but for a near shore tsunami there would be no or little practical warning to shut down the plant.

Mr. Maze reported the results of the analysis included no adverse impact to any safety related SSCs, water levels two feet lower than licensing basis levels, and no adverse impacts from run-up to the safety related ASW System. The hydrostatic/dynamic loading, and projectile calculations

showed lower values than those evaluated in the licensing basis. The drawdown effect would have no adverse impacts to safety related ASW systems. Dr. Lam remarked the study by Dr. Sewell indicated very different magnitudes for postulated tsunamis than Mr. Maze discussed in his presentation and he inquired what PG&E had done differently than Dr. Sewell. Mr. Maze replied stating that PG&E used more recent and updated modeling data in its analysis and he remarked the Sewell report used very large sources for the input on the size of the submarine landslides.

Mr. Maze stated the Storm Wave Analysis used the area from Monterey to Point Arguello and was modeled using current methodology and detailed bathymetry. The results included Intake Cove water levels lower than tsunami water levels and indicated that the storm waves are bounded by the tsunami analysis.

In summarizing his presentation Mr. Maze reported the new and extensive flooding reevaluation performed at the NRC's direction continued to show the plant can safely withstand tsunamis and flooding. PG&E's tsunami hazard update involved the use of site-specific information and the latest models, techniques, methodologies and input from an independent expert. The results of this study show the current tsunami design level for Diablo Canyon is still appropriate and provides for safety at the plant.

In response to Dr. Budnitz inquiry concerning how probable a tsunami of the magnitude described by Mr. Maze might be, Mr. Maze replied that the analysis utilized a much more deterministic approach and he did not believe there was sufficient data available, as there is really no information on an offshore tsunami in the area that is known to have occurred, to obtain a realistic probabilistic estimate. PG&E's analysis used run-up data which were assumed to have occurred due to submarine landslides. Dr. Budnitz stated that even so, and as there is some albeit limited data available, the PG&E team should as a matter of principle consider an estimate or best judgment of its state of knowledge of what the probability is per year even with necessarily wide uncertainty bands, akin to the center-body-range concept used with SSHAC methodology. PG&E Nuclear Projects Director for DCP, Mr. Jearl Strickland, observed that it is a somewhat different situation from that employed by SSHAC because proxies are used but he stated DCP will take the challenge to go back and look at how the data might be extrapolated from proxies even though no discrete evidence exists of similar type landslides occurring along the coast within the proximity to DCP used for the present analyses. Dr. Budnitz observed that the result might be data on a level of uncertainty for something half the size which is more likely although not so extreme and this could be valuable insight. Dr. Peterson commented that the DCISC's principal interest would be in any landslide-induced tsunami which might have the potential to exceed a run-up of 85 feet and potentially cause station blackout and use of FLEX. Dr. Peterson remarked the United States Geological Survey (USGS) has conducted studies to identify paleo geologic evidence of previous tsunamis in the local area and a tsunami exceeding 85 feet would be likely to leave such evidence as it would be a catastrophic event, exceeding the tsunami at Fukushima by a factor of two. If such an event were to have a return frequency of concern then such evidence should be available and the USGS' work should be followed very closely. Dr. Budnitz remarked that in such an effort cycles of glaciation and inter glaciation must be considered and Dr. Peterson observed that the principal threat of interest would have likely occurred during inter glaciation periods and posing a return

frequency of less than one million years, there should be some evidence and it would be worthwhile to check. Dr. Budnitz cautioned that the scientific community should be careful about analogs in time that would be useful to apply to the current tsunami analyses. Dr. Peterson stated it was his assumption that the amount of sediment which would need to be accumulated to generate a tsunami exceeding 85 feet would have to be accumulated over many cycles and the risk and number of cycles required would be comparable to what it is during the current glaciation cycle.

Dr. Lam suggested that DCPD consider making a point-by-point comparison of the results of its present analyses with those from Dr. Sewell's 2003 draft study in order to educate members of the public on the differences. Mr. Maze stated he was not prepared to undertake that effort during this presentation and that he looks forward to reviewing the report from Dr. Sewell which has been commissioned by the DCISC.

Mr. John Geesman on behalf of the A4NR was recognized. Mr. Geesman remarked that Dr. Budnitz' point concerning a request for a probabilistic estimate based upon the result of PG&E's tsunami analyses called to mind Dr. Budnitz comment about the uncertainties of the 129,000,000 year estimate offered for the flooding analyses and a recent estimate concerning financial markets by a noted probabilist in the range of one in three billion which was widely regarded as rhetorical nonsense.

Dr. Gene Nelson, who serves on the Cuesta College physical sciences faculty, was recognized. Dr. Nelson remarked he was aware of recent concerns focused upon a tsunami related to transpressional subsurface zones offshore from areas near Los Angeles but bathymetric studies were not completed due to lack of federal funding. He remarked that a technique in assessing paleo geologic evidence for tsunamis is to inspect in shore lagoons for unusual sediments. He stated a preliminary calculation on the odds of a large asteroid striking close enough to DCPD to cause a large tsunami from the impact found that the annual risk was 10^{-11} .

Ms. Linda Seeley of Mothers for Peace was recognized. Ms. Seeley inquired why for the evaluation of a tsunami on DCPD the analyses were not done using a joint rupture scenario involving the Hosgri and Shoreline Faults and she stated this seemed like cherry picking the analysis to ensure the results work to the advantage of PG&E and DCPD. She also inquired whether the status of the Sewell study would be changed from "Draft" to "Final." and remarked that while the earth is going through the cycles of glaciation described by Drs. Budnitz and Peterson, nuclear waste would still be present at the site of DCPD.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis stated she did not understand the map used by Mr. Maze and would like to see a version of the cutaway depiction combined with the map. Ms. Lewis inquired and Dr. Budnitz confirmed that use of the term run-up describes the height reached by water as it moves inland after a tsunami wave strikes the coast and with reference to the Goleta proxy discussed by Mr. Maze that height would be 26-27 feet. Ms. Lewis stated she is not a proponent of the probabilistic methodology. Dr. Budnitz stated his comment was simply to ask PG&E to explain their state of knowledge and Ms. Lewis remarked her concern was that even with such limited knowledge as described by Dr. Budnitz, that information might be used

for decision making.

Ms. Jane Swanson, a spokesperson along with Ms. Seeley for Mothers for Peace, was recognized. Ms. Swanson read from an abstract of a paper presented to the Association of Environmental and Engineering Geologists on July 26, 2010, by Eugene LeBlanc which discussed an earthquake which occurred near Japan in 1907 during high tide on the U.S. west coast and which resulted in a 100 foot tsunami which damaged a pier in Ventura, CA and the local Avila Oil Port pier as reported in the San Luis Obispo Tribune. Ms. Swanson also requested that PG&E consider using other than blue colored text for its slides to make them easier to read. Dr. Peterson observed that there are binders available in the meeting room to the public with copies of the power points used for the PG&E presentations to the DCISC.

Dr. Budnitz responded to Mr. Geesman's comment and stated he does not believe the 129,000,000 year number has any significance beyond the first significant figure and he stated he does not believe PG&E places a different level of confidence in that number. He observed PG&E is using a methodology prescribed by the NRC but in Dr. Budnitz' view the underlying data does not have the necessary precision and he stated he is sure PG&E would also agree. Dr. Budnitz commented in response to Dr. Nelson's statement regarding an asteroid strike in the vicinity of DCPD that he found the only relevance to be that it is possible to calculate very, very, low probabilities. In response to Ms. Seeley, Dr. Budnitz replied that the Sewell study was submitted in draft to the NRC who refused to publish it and he believes that on that basis Dr. Sewell considers it to be complete and when Dr. Sewell makes his presentation to the DCISC and the public we may learn the basis on which he selected the large sources he chose for that study.

Dr. Lam commented the DCISC has been informed that Dr. Sewell is currently employed as a consultant for compensation by PG&E for work on a project entirely different than the work he did for the NRC in 2003 on the tsunami hazard in the vicinity of DCPD and from his current engagement by the DCISC. Dr. Sewell has provided his assurance that he can and will remain impartial and not be influenced by any work for PG&E. **Dr. Lam stated that if there is historical data on a tsunami with a magnitude of 100 feet having occurred in the local area the DCISC needs to investigate and verify that information. Dr. Budnitz stated that PG&E considered the historical evidence referred to by Ms. Swanson and the description of the event Ms. Swanson referred to has not been found to be accurate. Dr. Peterson stated the DCISC will follow up on this issue to better understand that specific event.**

In response to Dr. Peterson's invitation, Mr. Maze reported the geoscience activities undertaken in response to Near Term Task Force Recommendation 2.1 concerning the seismic reanalysis were undertaken with regard to linkage between the Shoreline and Hosgri Faults and a joint rupture of the Shoreline and Hosgri Faults was evaluated concerning a tsunami, but because both faults are characterized as strike-slip faults there is not much potential that they might produce a tsunami and the greater potential for maximum run-ups at DCPD comes from a submarine landslide. **In response to Dr. Lam's request, Mr. Maze reported that PG&E has been unable to find a record of an earthquake in Japan in 1907 which produced a tsunami and that the report and record Ms. Swanson referred to has been basically invalidated and he confirmed it was assessed in**

conjunction with PG&E's analysis work. Dr. Peterson stated it would be good for the Committee to understand more about this specific record and Ms. Swanson promised to provide information and photographs to the DCISC concerning this event.

Mr. Maze stated PG&E is following a deterministic process as required by NRC regulatory guidance and has attempted to determine the maximum tsunami or the maximum landslide levels using both the Big Sur and Goleta actual slide events as proxies. Both those locations had different lobes of slides which were believed to have slid at different times as much as 2,000 years apart. All three lobes were conservatively combined and a margin was added as a safety factor and the slide location was then placed by the models to be directly in front of DCPD where it could do the most damage.

Dr. Gene Nelson was recognized and stated that his comments he made will be included in the record of the April 28, 2015, meeting between the NRC and PG&E during which he stated he serves as government liaison for Californians for Green Nuclear Power and it is his belief that DCPD has favorable site conditions producing attenuation or dissipation of earthquake energy over relatively short distances and therefore primary earthquake forces at DCPD are dominated by nearby earthquake forces, including a small section of earthquake rupture closest to the plant. It is Dr. Nelson's belief that, based upon information presented at the April 28 meeting and in view of the overall plant ruggedness and the seismic hazard insights discussed, DCPD will continue to operate safely with generous safety margins during anticipated earthquakes. He stated he would provide copies of his remarks to the DCISC.

Mr. Harbor introduced Dr. Norm Abrahamson and reported Dr. Abrahamson has a Ph.D. in Geophysics and has worked in the nuclear industry evaluating seismic activities for more than thirty years. Dr. Abrahamson is also an adjunct professor at U.C. Berkeley and U.C. Davis in the field of seismic hazard analysis.

Presentation on PG&E's Seismic Studies

Dr. Abrahamson reported during his presentation he would summarize information presented at the NRC's public meeting on April 28, 2015, including new issues in source characterization, ground motion studies, seismic hazard results, site response including work with the partially non ergodic approach, interim evaluations, and actions moving forward to reduce uncertainties in seismic hazard. Dr. Abrahamson stated with reference to the Senior Seismic Hazard Analysis Committee (SSHAC), the committee was formed in the 1990's to provide guidelines and a set of procedures or approaches for estimating seismic hazard but the committee no longer exists as a body and references to "SSHAC" are therefore to the implementation of the process proposed by that committee.

Dr. Abrahamson displayed a map of the California coastline in the vicinity of DCPD which showed its tectonic setting including the Hosgri Fault which he described as the main offshore fault controlling the strike-slip horizontal motion producing seismic hazard for DCPD. He stated the other tectonic feature controlling the seismic hazard at DCPD is the uplift of the Irish Hills and this effect can be

measured. Dr. Abrahamson stated the uplift of the Irish Hills is generally caused by thrust faults on one side or the other or on both sides of the Irish Hills. He commented any tectonic model must be consistent with causing or explaining the right lateral strike-slip behavior of the Hosgri Fault and the uplift of the Irish Hills.

Dr. Abrahamson reported the SSHAC procedures provide a set of guidelines focused on capturing the state of knowledge, in a center, body, range configuration, the resulting uncertainty, and determination of the limitations of the current state of the science. Dr. Abrahamson described the three SSHAC workshops held recently to evaluate in the first workshop the data models and methods available, in the second workshop to have the models reviewed and be explained by their proponents and to ask questions, and in the third workshop to review evaluations of the alternative models including their credibility and the impact on the hazards to focus the evaluation on the issues that matter to safety at DCPP. He provided lists of the resource and proponent experts for the source characterization workshops and those involved with the ground motion workshops.

Dr. Abrahamson reviewed the highlights of what he termed as new in the source characterization models which include a large set of geophysical data collected as part of the AB 1632 work. This includes off shore seismic data, on shore seismic data and updated geologic mapping. On shore reflection data was evaluated by the USGS and off shore bathymetry, out to the Hosgri Fault, was collected in 2009–2010 time period. Dr. Abrahamson commented that many of the submarine landslides on which the Committee received information during Mr. Maze's presentation are located farther offshore on the continental shelf and that this area was not covered in the detailed survey. Geodetic global positioning system (GPS) data was updated which shows short term deformation going on over tens of years to determine and assess consistency with geologic estimates. Dr. Abrahamson stated geodetic data is more difficult to acquire for slow moving faults such as the Shoreline Fault which take decades to move due to its very low slip rate.

Dr. Abrahamson stated for all of California there is a new seismic source characterization model developed by the USGS, the California Geological Survey, and the Southern California Earthquake Center, termed UCERF₃, which is a model of earthquake recurrence for sizes, locations and rates of earthquakes for the entire state which was available and incorporated extensively into PG&E's seismic source characterization model for DCPP. There was also a new approach used to model slip rates on the Hosgri Fault, to identify rupture sources, that is how do multiple fault segments break together in earthquakes and how often does that happen? The fault geometry model correlated geometric uncertainty. In response to Consultant Linnen's inquiry, Dr. Abrahamson stated observed data was used as an input to the model which was acquired from around the world where multiple earthquakes occur at a site to review how much the slip varies, as slip is related to magnitude this can reveal how much the magnitudes can vary. Dr. Budnitz observed and Dr. Abrahamson agreed that ergodic assumptions in this context may not be fully correct. Time-dependent behavior and uncertainties were also captured in the standard model which is used in seismic hazard analysis which is not dependent upon the time of occurrence of the last earthquake, as earthquake occurrence is random. Dr. Abrahamson observed, however, when data is analyzed most regions violate the principle of randomness and there is a temporal variation in the rate of earthquakes and previously the approach he described has only been used on faults with lots of information such as

the San Andreas Fault and that less information means less certainty and relative to the Hosgri Fault, where less information is available, the potential is there at either the higher or lower rate for earthquake occurrence.

Dr. Abrahamson stated virtual faults in the area of DCPD were incorporated in the models to describe earthquakes that could happen in the Irish Hills on faults that were not identified, and these virtual faults were used in seismic source characterization models. He displayed a graphic with a map of those virtual (i.e., assumed) faults with dips ranging from vertical to 45 degrees in both directions with a rate assigned equivalent to approximately 0.2 millimeters per year on any one of the virtual faults.

Dr. Abrahamson reviewed the Hosgri Fault slip rate analysis and observed the area on shore where the Hosgri and San Simeon Faults intersect provides a location where geologists have been able to examine the faults and estimate slip rates. Three additional data points were used in the seismic source characterization model and these were located, running from north to south, at Estero Point, South Estero Bay, and at Point Sal. He remarked paleo stream channels were identified using offshore geophysical data from when the sea level was lower and a Hosgri Fault slip rate was able to be estimated at those three locations. He confirmed Dr. Budnitz' observation that the largest uncertainty in this effort is age dating but Dr. Abrahamson stated geodetic data was integrated and shows how much horizontal slip can be happening. Dr. Abrahamson stated this new approach used off shore geophysical data integrated with the original on shore estimates and developed a distribution of what the slip rate could be, and these distributions were assigned subjective weight based upon the quality of the data and a composite distribution of their weighted average was made. This resulted in revising previous estimated slip rates for the Hosgri Fault from a broad range of 0.5 to 6.0 millimeters per year to a narrower range of between 0.5 to 3.0 millimeters per year in terms of what the slip rate could be and still be consistent with observations, with 1.7 millimeters being the median value of the center of that range. Dr. Abrahamson stated more is now known than before and the 6.0 millimeter per year slip rate has proven not to be a credible model. In response to Dr. Budnitz observation, Dr. Abrahamson stated the fact the slip rate is lower at the southern end of the fault is because as you move south on the Hosgri Fault the slip rate is reduced as it is distributed into different portions of the fault system. For this seismic source characterization work PG&E has used the average slip rate that applies to the 170 kilometer length of the Hosgri and San Simeon Faults together. Dr. Budnitz observed that as DCPD is located approximately in the middle of the 170 kilometer length the slip rate of the Hosgri Fault at the plant site is likely to be in the middle of the range identified by Dr. Abrahamson.

Dr. Abrahamson discussed how the uplift of the Irish Hills is accounted for by discussing three principal thrust fault mechanisms and displayed a diagram of each mechanism describing the compression effects of the Los Osos or San Luis Bay Faults, or both thrust faults working in conjunction on the uplift of the Irish Hills. Dr. Abrahamson stated that it is not possible to tell which of the three mechanisms is primarily responsible for the uplift. He described the Los Osos Fault as the most well-developed of these features with the San Luis Bay Fault as likely being shallow. Dr. Abrahamson confirmed Dr. Budnitz statement if Dr. Abrahamson had 200 years of geodetic data, with the current precision more could be determined as to the mechanism resulting in the uplift in

the Irish Hills. Dr. Abrahamson confirmed that one of the models he discussed is similar to that with inferred offshore faults proposed by Dr. Douglas Hamilton but Dr. Abrahamson commented that Dr. Hamilton's concept would need to be adjusted somewhat to be consistent with the latest data.

Dr. Abrahamson showed a map of the Hosgri Fault and stated it may be rupturing in earthquakes approximately in the 6.5 to 7.5 magnitude but another possibility is that the Hosgri Fault links up to the San Andreas Fault and a rupture could extend all the way to Cape Mendocino which could result in a magnitude 8.5 earthquake and he confirmed Dr. Budnitz statement that the order of magnitude does not make a significant difference because only the local motion matters for ground motion, but he stated that larger magnitudes are created with larger slips and that this affects the long period energy but not the high frequencies to the same degree and it is the high frequencies which are the most important for nuclear structures.

Dr. Abrahamson displayed graphs of the magnitude density functions and commented with this new data there is an exponential tail to higher magnitudes that allows for earthquakes to rupture together and PG&E is using data from site data collection efforts around the world on variability of slip seen along faults to infer what range of magnitude could occur.

Dr. Abrahamson reviewed what he termed a seismic source characterization equivalent, the Poisson process rates and he remarked that the Poisson process is one in which there is no memory in the system and there is a chance of an earthquake happening at any point in time. This is achieved with an exponential distribution of recurrence times and the Poisson process model is contrasted with a method which uses a systematic repeatable or semi periodic behavior of the fault with a wide range. PG&E has assumed an exponential Poisson model for all faults for which it does not have significant information, which translates to more uncertainty and a broad range of how long it might have been since the last earthquake.

Dr. Abrahamson then discussed the ground motion model work done by PG&E. He stated the reference rock ground motion model predicts a median or an average ground motion for a given magnitude and distance away and also predicts the aleatory variability, that is, how much the ground motion can randomly vary from one earthquake to another. Dr. Abrahamson stated wave propagation through the earth's crust is more complex than just the distance away from the source and site response is much more complex than shear wave velocity. He remarked that because PG&E used a very simple description of the earthquake source and wave propagation process in the median, the penalty is large variability which he described as the aleatory variability term which affects the shape of the hazard curve. He reported site amplification is also controlling as to ground motion and is analyzed by assessing how the ground motion at the defined control point differs from the reference motion model which is built from world-wide data. Dr. Abrahamson remarked that the epistemic uncertainties need to be captured in this effort and to do that, in response to Consultant Linnen's question on the relationship of the modeling effort and the data, Dr. Abrahamson stated that the model, consistent with the SSHAC procedures, is pushed to the limits of the available data, that is as far as possible, so that the data that is available is not violated. Dr. Budnitz observed that as the data are limited there are numerous models that are consistent with the data.

Dr. Abrahamson reviewed the new ground motion component data, methods and models including that of the Pacific Earthquake Engineering Research Center (PEER) at Berkeley, CA, developed using empirical data sets of ground motion models and what is called the NGA-W2 Ground Motion Data Set consisting of 20,000 records from earthquakes around the world. European data sets were reviewed but Dr. Abrahamson who stated these tend to be of smaller magnitudes. Numerical simulations were also reviewed and used.

Dr. Abrahamson reported on the classes of models available which are used to determine the ground motion prediction equation (GMPE) and remarked they consist of much more than empirical models but have physics built into them to allow them to be pushed to extrapolate the model in any direction. He remarked that finite-fault simulations are an important constraint on the modeling behaviors to get realizations of different earthquakes as opposed to the limited number of earthquakes in the empirical data set. He confirmed Dr. Budnitz' observation that the reason the GMPEs for DCPD are different is because of the fact there is more usable data available due to more instrumentation having been deployed from the days of the initiation of the Long Term Seismic Program with 300 recordings, to the 1990's with 800 recordings, to the early 2000's with 3,000 records to today's data with approximately 20,000 records. Dr. Abrahamson stated that the earlier GMPEs also had physical model behaviors imbedded which allowed them to work as well as they have. In response to Dr. Lam's inquiry, Dr. Abrahamson stated that the first strong motion recordings were made in the 1930's and the recordings that were used for the most recent PG&E analysis continued up to 2012. He reported that there are now 90,000 recordings from subduction earthquakes. Worldwide average models will be in accordance with ergodic assumptions which will result in large uncertainties but they will be credible for use in California. In response to Dr. Budnitz' inquiry, Dr. Abrahamson stated the best earthquake data in the area of DCPD was recorded during the San Simeon earthquake and this data will be combined with data from around the world to get an average that captures larger standard deviation or larger variables that influence the hazard calculation. In response to Consultant Linnen's inquiry, Dr. Abrahamson stated the Kobe earthquake in Japan was an earthquake similar to what would have occurred in California had the earthquake taken place there. Other regions such as the eastern portion of the United States are more stable continental regions and there are other areas which are located in subduction regions. As the data sets get larger, differences between regions are seen and behaviors, particularly the manner of attenuation with distance, are being identified. Ground motion modeling is moving toward region-specificity and as more data is accumulated the models will shift for the various regions and the variability within the region will get smaller which will lead to steeper hazard curves. In discussing the aleatory model, Dr. Abrahamson stated the issue of concern is not the average earthquake but the rare earthquake and with the data sets now available analysis can go out to four standard deviations to understand what is happening at the tail of the distribution curve, and what Dr. Abrahamson described as a mixture model is being implemented to analyze the tail of the curve.

Dr. Abrahamson reported that a key feature of the new hazard analysis tools uses what he termed a Sammons Map approach to address the evolution of peer review reports and the resulting increase in uncertainties. He stated the Sammons Map approach requires pushing and broadening the

models created to the maximum of their credible range. This results in an additional epistemic uncertainty being added to all the models. The models are then evaluated against empirical data, particularly California data, and against theoretical finite fault simulations developed for particular areas such as the Hosgri Fault and the Central California Coastal Range. What Dr. Abrahamson described as the Single Station Sigma approach is also used which moves the analysis away from lumping all the data from around the world together, as sufficient data exists to estimate how much one station differs from another, with the uncertainty addressed in context of the Single Station Sigma approach by the epistemic uncertainty of the site response.

Dr. Abrahamson displayed and discussed graphics with the mean hazard curves and a Sammons Map calculation and the hazard results and response spectrum for a control point located at an elevation of 85 feet north of the plant. He commented the curves are not flat but have peaks which represent observations at the site which show a site resonance at about 2.5 Hertz (Hz) with more attenuation in the high frequency range. He stated this shows how the analysis is moving to a partially non ergodic model as it is accounting for how DCPD behaves differently than an average site around the world in the same category. He reported the Ground Motion Response Spectrum (GMRS) for Diablo Canyon is very close to 10^{-4} uniform hazard spectrum.

Dr. Abrahamson provided data from the Parkfield earthquake and the recordings of that earthquake from Diablo Canyon, which he described as lower than the average of the compared observed data and he stated an important part of the analysis is the use of the other recordings so that the average difference in that earthquake, the average difference in the wave propagation, can be taken out, which leaves the site effects portion of the data. He reported that for DCPD there are two earthquakes for which this data is available, the San Simeon earthquake with eight recordings and the Parkfield earthquake with 16 recordings. This results in a standard error for the San Simeon earthquake being 0.25 and for the Parkfield earthquake 0.14. He showed a graphic with the results of the averages for the San Simeon and Parkfield events and stated the results show the two earthquakes have very similar behaviors relative to site response at DCPD. He reported that for lower frequencies the data becomes less consistent and he confirmed Dr. Peterson's comment that it appears that the high frequency energy is attenuated more than the ergodic model would suggest and it does not appear to be strongly direction dependent in terms of the two earthquakes and therefore concerns about directionality are not as important for higher frequencies as they would be for lower frequencies. Dr. Abrahamson confirmed Dr. Peterson's observation that the plant tends to be sensitive at somewhat high frequencies and reported that 3 to 5 Hz is the main frequency ranges for DCPD. Dr. Peterson observed this is the range where there is concern about fragility and it appears that at those frequencies energy does not propagate as much as the ergodic model would indicate. Dr. Abrahamson replied that at 3 Hz the energy does propagate which is the same or somewhat higher than the ergodic model and at 8 Hz it is lower and he remarked it is important to keep in mind there is still uncertainty in how well the average site term is estimated.

Dr. Abrahamson reported the surveys done for geophysical characteristics at DCPD are useful to understand the geometry beneath the plant and represent a unique data set as there is no other location in the world with this kind of information including 3-D velocity models estimated with tomography which provides velocities on about a 20' x 20' square horizontal area and a 5' vertical

grid under the plant site. He displayed a 1-D velocity profile which showed the range in the DCP units, U-1 and U-2, and in the Turbine Building. He commented the differences will be accounted for using the 3-D wave propagation model using the control point north of the plant and translating that laterally to the other structures.

Dr. Lam stated he has a great deal of deference to the complex technical information presented by Dr. Abrahamson as it provides a level of comfort concerning seismic reactor safety but he stated his belief that this science has yet to reach its maturity as it cannot predict when, where, and how big the next earthquake to occur will be. Dr. Abrahamson stated he could not make such a prediction but he could say that those earthquakes which he described in his presentation will happen eventually as the faults involved have to move a certain amount over thousands of years to stay in equilibrium and this can allow models to be built based on the rate of occurrence average. For the size of an earthquake, science uses behaviors observed from earthquakes around the world and that data is used in conjunction with the ground motion model. Dr. Abrahamson, in response to Dr. Lam's inquiry, stated that he believes that when, where and how big the next earthquake will be is an incorrect inquiry. Dr. Lam observed that in licensing DCP and other nuclear power plants the NRC assigned a seismic design basis and this indicated to Dr. Lam that someone addressed and answered that inquiry. Dr. Abrahamson stated the seismic design basis was addressed by a different line of inquiry that being a design which will cover the entire range of seismic events and the NRC is addressing the question based upon whether the risk probability for ground shaking from a seismic event is acceptably low. Dr. Abrahamson stated there has never been a concept that a certain magnitude event will occur and that there exists a bounding value which has no chance of being exceeded. The concept has always been if you design for a postulated event it will give an acceptable and adequate level of safety. Dr. Peterson observed this is the same concept used in designing most types of civil infrastructure. In response to Dr. Lam's inquiry concerning the possibility of a larger event than the design basis, Dr. Abrahamson replied that this is why the probabilistic risk analysis is done. Dr. Peterson remarked that one of the DCISC's objectives in reviewing the FLEX initiative is to understand what types of structural and equipment failures can happen during earthquakes as even weak earthquakes tend to focus energy in a certain frequency range that may cause damage and there needs to be assurance that the plant has the capability, equipment, personnel, resources and authority to restore basic safety functions.

Dr. Budnitz stated the work described by Dr. Abrahamson is attempting to enable a description of the state of knowledge for seismic events and this includes more than the magnitude of an event but also what frequencies will be produced and for what durations. It is the role of another body to use that information to design a facility for which a third evaluation will determine the risk. Dr. Budnitz commented this process has evolved from the earliest days of the design of nuclear facilities when the standard types of judgments for how structures are designed to resist earthquakes were commonly employed. He stated these judgments are now better understood.

Mr. Nozar Jahangir addressed the DCISC. Mr. Jahangir is a member of the Seismic Engineering group at DCP and he stated he would discuss the interim evaluation and plans for follow-up action by PG&E. Mr. Jahangir stated that the information provided by Dr. Abrahamson relative to the ground motion at a designated control point north of the plant site is to be used to do the risk

evaluation discussed by Dr. Budnitz. He described this as an interim evaluation to show that DCPD is safe. He reviewed the seismic design and licensing basis history for the plant which he stated is well documented and has been studied throughout the last 40 years. After discovery of the Hosgri Fault in the 1970's the plant's design was reevaluated and retrofitted. In 1984 the NRC included a condition to the plant's license that requires additional and continuing studies to demonstrate seismic margin, resulting in the Long Term Seismic Program (LTSP) which Mr. Jahangir stated is similar to what was required of all nuclear power plants after the accident at Fukushima.

Mr. Jahangir displayed graphics showing seismic design bases curves for risk evaluation comparisons including the design basis, the double design basis and he stated these were referred to in terms of gravitational acceleration (g) as 0.2 g and 0.4 g peak ground acceleration, together with the Hosgri design basis at 0.75 g and the LTSP seismic margin, equivalent to the new calculation for GMRS, at 0.83 g. In response to Dr. Budnitz' inquiry, Mr. Jahangir stated that a new plant at the site of DCPD, to meet the NRC's current requirements, would have to be designed against the GMRS which is a probabilistic evaluation. Mr. Jahangir stated that the lowest margin for DCPD components as evaluated against the LTSP is 35 percent more than the spectral frequency that they were evaluated for, which means that all the components required for safe shut down of the plant have at least that margin of safety with some having higher margins. He confirmed Dr. Budnitz' observation that this represents the inherent capacity of the system to provide that level of margin over the LTSP. Dr. Budnitz stated he has in the past expressed his belief that there was no component important for safety at DCPD whose seismic capacity, i.e., strength, was not stronger than the LTSP and Mr. Jahangir has quantified that statement by his presentation this evening and Dr. Budnitz stated further that the plant's components are also thereby shown to be stronger than the GMRS which represents today's best understanding. Mr. Jahangir stated by doing the interim evaluation PG&E has shown that DCPD has a reasonable assurance of safety while the seismic risk continues to be updated for new hazards.

Mr. Jahangir reported PG&E is proceeding with its Seismic Probabilistic Risk Assessment (SPRA) including updating and building models, updating the soil structure and interactions (SSI) models and developing the foundation input response spectra (FIRS) models. A fragility evaluation will be done as part of the SPRA update. He reported the next actions will include the determination in accordance with the risk evaluation prioritization which the NRC recently provided, placing DCPD in a group one category which requires the evaluation be completed by June 2017. To meet this requirement PG&E will need the NRC's agreement with the GMRS hazard evaluation before proceeding with SPRA modeling. Dr. Budnitz observed and Mr. Jahangir agreed that the FIRS modeling involves assessing motion at various elevations within the plant to evaluate the impact on and response of particular equipment and this accordingly is conditional on the SSI models. Dr. Budnitz remarked and Mr. Jahangir agreed this is similar to what was done in the LTSP analysis in the 1980's and Mr. Jahangir stated the current effort is upgrading to the new standards for the SPRA using 3-D finite element models and this effort is also being done as part of DCPD's commitment to the LTSP.

Dr. Abrahamson discussed the efforts and methods used to reduce uncertainties and reviewed a Tornado Diagram comparison of 2011 and 2014 hazard significant parameter uncertainties. He

observed the Tornado Diagram summarizes seismic hazard parameters and the impact of a parameter uncertainty on the total hazard uncertainty. Parameters whose uncertainties contribute more to total hazard uncertainty are shown at the top of the diagram. He reported for low probabilities used for nuclear power plants, DCPD at 10^{-4} is on the steep portion of the hazard curve he displayed but because the hazard curve is steep the ground motion doesn't really change that much. He reported the Tornado Diagrams reveal how much the "Y" axis value on the curve changes at a particular number, with essentially the ground motion corresponding to 10^{-4} hazard and by changing the ground motion model, the "Y" axis is affected more than by changing the source characterization model. He reviewed and discussed certain of the entries on the Tornado Diagram including the time-dependent model, the models used for the standard deviation including the single sigma model, the site amplification model and the median GMP from the Sammons Map approach. Dr. Abrahamson stated the global models are moving more to region-specific models but mainly at larger distances, and from 50 to 100 to 200 kilometers demonstrate a difference between California and Japan, but in close there is not enough data to distinguish the two models. He stated that data to calibrate the models and more use of 3-D modeling of the crust and propagation of the waves through the 3-D model are needed and that the 3-D model needs to be calibrated against actual data. To constrain the path terms, that is, how waves propagate from the Hosgri Fault to DCPD compared to an average fault five kilometers away, the data will be from mostly small earthquakes but Dr. Abrahamson observed that this data is useful as the crust is primarily linear and the scale can be amplified to assess wave propagation. He stated that in order to improve the analysis, the density of the station coverage by instrumentation, both transitional seismic stations and alternatives for mass deployment, must be increased. Dr. Abrahamson reported this has been done with a 3-D crustal model by the Southern California Earthquake Center in Los Angeles which has built what he described as a huge model of what is occurring in terms of how the ground motion is affected by complex crustal behavior and Dr. Abrahamson stated numerical simulations are the way to get dense coverage and to increase understanding but DCPD needs more data for validation and calibration of the 3-D velocity model currently being built although there is adequate data to commence this effort. He remarked that much of this can be done with micro tremors to obtain data to constrain large scale crustal structures. Dr. Abrahamson stated that as the speed of computer simulations has improved, with approximately one-month run times for this data, science is now ready to move forward with this type of application but enough seismic stations will be required to test and constrain the model and this is an area where advances are being made although it may take up to five years until the results start to be usable and to reach the application stage. Dr. Abrahamson stated that this represents the future of seismic hazard analysis, to account for local features and how ground motion works in a particular area and in response to Dr. Budnitz' inquiry he stated that the seismic community largely understands the approach he described.

In response to Dr. Lam's further inquiry on when, where and how big an earthquake may be, Dr. Abrahamson replied that he can determine the probability of a magnitude 7 or larger earthquake happening on the Hosgri Fault in the next ten years and he can provide the range of what that estimate is, but no one can determine when the next earthquake will occur. He stated the task of seismic science in this context is to design not for a particular future earthquake but to design for the ability to withstand a range of possible future earthquakes. He stated that a program able to predict when the next earthquake will happen would be a much more ambitious undertaking.

Dr. Peterson thanked Dr. Abrahamson for his presentation.

Dr. Gene Nelson of the Cuesta College faculty, present in the audience, was recognized. Dr. Nelson stated an important aspect of Dr. Abrahamson's presentation was the fact that it is not necessary to set off charges of dynamite to obtain seismic information and that valuable information to assess how energy propagates can be obtained from naturally occurring earthquakes.

Ms. Gina Mori, a member of the public, was recognized. Ms. Mori commented that while science cannot predict earthquakes, the aftermath of earthquakes can be predicted such as the Bay Bridge collapse or extensive damage to buildings in Napa and that nature is going to do what it is going to do. She remarked that she was concerned that there was no mention in Dr. Abrahamson's presentation of the spent fuel pools, dry cask storage, or the recently discovered Shoreline Fault. She stated that as a site in Bodega Bay was rejected because of earthquake faults, she questions whether DCPD should have been built at all, given the information now known about 13 earthquake faults in the area.

Mr. John Geesman on behalf of the A4NR was recognized. Mr. Geesman stated he wanted to endorse Dr. Abrahamson's remarks about the utility of gathering data from small earthquakes at the site of DCPD. However, he stated that this is also why PG&E's program at DCPD has been such a disappointment. He reported that the CPUC authorized in 2010 a program to place four seismometers on the ocean bottom which was entirely noncontroversial and if PG&E were appropriately committed to gathering data on small earthquakes near the site of DCPD this would have been done immediately after the CPUC approval was received. However, he stated PG&E waited several years and the instruments which were placed on the ocean bottom are still not working properly. Mr. Geesman remarked that the fact PG&E is using only two earthquakes was criticized by the NRC in 2012 and by the CPUC Independent Peer Review Panel (IPRP) in 2013. He commented the IPRP has been harshly critical of PG&E's ground motion modeling and the site response characteristic efforts. In response he stated PG&E proceeded to cut-off contact with the IPRP and did not meet with the IPRP for nine or ten months and did not hold a public meeting with the IPRP for fifteen months. He remarked the graphs in the IPRP's Report No. 9 (included with the public agenda packet) were alarming. Mr. Geesman stated this seismic investigation program is funded by PG&E's ratepayers and it is the most expensive seismic reevaluation in history, costing \$64,250,000 of which PG&E has expended \$51,000,000 to date. He stated that the Tornado Diagram displayed by Dr. Abrahamson indicates that in this effort PG&E has not paid attention to the most significant aspects of hazard uncertainty itself and has simply looked in the wrong areas and prioritized its expenditures on the wrong subjects while ignoring the IPRP and being called to account for having done so. Mr. Geesman closed his comments by referring to information his client, the A4NR, received from retired NRC regional administrator Mr. Art Howe describing comments by Mr. Howe's predecessor, Mr. Elmo Collins, who is now a consultant to PG&E advising PG&E not to pursue a re licensing for DCPD for reasons having to do with seismic issues. Mr. Geesman stated the DCISC has an obligation to use its contacts at the NRC to attempt to determine what Mr. Collins was talking about and the relevance of his comments to the Committee's evaluation of PG&E's seismic assessment. Mr. Geesman stated such a review would likely find

\$64,000,000 misspent and that work had been delayed. He stated he was encouraged by Dr. Abrahamson's statement that perhaps five years would be required for completion of work as Dr. Abrahamson previously advised the IPRP that ten years would be necessary and Mr. Geesman opined the plant would be closed in ten years. In concluding his remarks Mr. Geesman stated he can understand the motivation to participate in the most advanced science concerning seismic modeling or ground motion modeling but the DCISC's remit is specific to DCPD and the \$64,000,000 in ratepayer funds was not intended to fund a worldwide seismic assessment but to evaluation DCPD.

Mr. David Weisman of the A4NR was recognized. Mr. Weisman stated that in addition to the scientific aspect discussed by Dr. Abrahamson there is a social science component to the peer review process mandated by the SSHAC process which needs to be considered as it is the members of that community who make decisions as to what is included and excluded. Mr. Weisman stated his belief that this process is akin to building on fill and not solid rock. He played a video in which persons participating in a meeting exchange hats in recognition of the various roles they might play in participating in a SSHAC peer review process.

Ms. Rochelle Becker of the A4NR was recognized. Ms. Becker stated her organization was founded in 2005 to discuss reliance on an aging nuclear plant beyond its current license. She stated the A4NR argued for the seismic studies and advocated for funding for them. A4NR representatives have attended all of the IPRP meetings. Ms. Becker stated she is tired of paying for what is being offered and \$64,000,000 does not come close to meeting PG&E's requests but its ratepayers have reached the maximum.

Dr. Gene Nelson was recognized. Dr. Nelson again called the DCISC's attention to the statement he provided to the NRC which is part of the record. He remarked the statements made and video shown are but a charade as they are not representative of critical thinking or scientific or engineering principles but are instead propaganda.

Ms. Kathy Oliver was recognized and described herself as a San Luis Obispo County PG&E ratepayer. She stated she was appalled to hear that \$64,000,000 is to be spent studying what she described as an outdated technology as those funds could have provided solar or some type of renewable energy for the whole county.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis commented on the graph used by Dr. Abrahamson during his presentation to display hazard curves from various seismic events and stated the licensing basis for DCPD requires the design earthquake, which she described as the largest feasible earthquake on a fault at Diablo Canyon, and the double design earthquake which is twice that. She stated the evaluation of the Hosgri Fault did not use the double design category as it should have. She questioned whether the data displayed by Dr. Abrahamson represented the same ground motion variable and she remarked the double design equivalent must be applied to all the known faults and, to date it has not been applied to the Hosgri Fault which is treated as an exception. When the Shoreline Fault was found PG&E wanted to include it under that same exception and this was allowed simply because the Shoreline Fault is considered to be smaller than

the Hosgri Fault. She stated, however, that the double design aspect is still part of DCP's license and the plant is not within that regulation and should be shut down. She stated that while she found Dr. Abrahamson's presentation fascinating it was difficult to understand. She closed her remarks by stating she would like to ask Dr. Abrahamson's opinion of Senator Blakeslee's report on PG&E's seismic studies as Senator Blakeslee played an important role in initiating those efforts by his introduction of AB 1632.

XI Adjourn Evening Meeting

Dr. Peterson stated that the comments and questions from the members of the public will be entered into the record of the Committee and the DCISC will be responsive to them. The Chair commented the Committee has scheduled a public tour of DCP for the following morning and the public meeting of the Committee will reconvene at 12:30 P.M. tomorrow. Dr. Peterson then adjourned the evening meeting of the Committee at 8:50 P.M.

Public Tour of Diablo Canyon Power Plant

The three members of the DCISC accompanied by 25 members of the public, PG&E tour guide Mr. John Lindsey and the Committee's Consultants and Assistant Legal Counsel, conducted a tour of certain accessible areas of the Diablo Canyon Power Plant (DCPP). The members of the public responded to the DCISC advertisement concerning the public tour placed in a local area newspaper and on the DCISC's website. The group met at the PG&E Energy Education Center for an introduction to the Committee members and consultants and a short presentation on the background and role of the Committee. Mr. Lindsey provided a brief overview of DCP including its history, operation, the nuclear fuel cycle, spent fuel storage and plant security. PG&E discussed how the plant's cooling systems work, with the ocean water two physical barriers away from the reactors. The group was issued visitor badges and then departed for DCP.

After entering the plant through the Avila gate, the members of the public and visited the Control Room Simulator Facility and viewed the ocean water Intake and Outfall Facilities where DCP pulls in and expels seawater used for cooling. The bus then drove by the site of the Independent Spent Fuel Storage Installation (ISFSI) for a description of its purpose and features and then stopped at the plant overlook site and the group received a briefing from PG&E representatives on the various external features and buildings. The tour did not enter the controlled areas of the plant.

Questions & Comments From the Public

During the ride back to the Energy Education Center the group received information on radiation protection and members of the public took the opportunity to ask questions of Committee members and consultants.

Conclude Public Tour

XXI Reconvene For Afternoon Meeting

The June 17, 2015, afternoon public meeting of the Diablo Canyon Independent Safety Committee was called to order by its Chair, Dr. Per Peterson, at 12:30 P.M. Dr. Peterson welcomed those present and attending remotely by live streaming video to the meeting. He reported the Committee conducted a tour of the plant during the morning which was well received.

XXII Committee Member Comments

There were no comments by members at this time.

XXIII Public Comments and Communication

The Chair invited any comments from members of the public.

Mr. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis stated that while she did not understand all of the information presented last evening by Dr. Abrahamson she appreciated and understood the discussion concerning reducing the uncertainty of seismic knowledge concerning DCP. She observed that Dr. Abrahamson reported that there is simply not enough known about the seismic conditions and that it might take five to ten years to acquire the additional knowledge from micro-seismic activity. She stated her opinion that the nuclear industry and regulators present information to the public in a way that makes it appear they know more than they do and that there is a gap between the science and the nuclear industry and its regulators. She stated the industry is interested in the fact DCP is already built and is trying to make it as safe as possible but that may not be quite safe enough to those in the local area, in the vicinity of many earthquake faults and she stated her belief that the plant would never have been built had more been known and it should be shut down as it is dangerous and the risks are too great. She likened operating DCP to traveling on the Titanic in iceberg infested areas.

Ms. Rochelle Becker of A4NR was recognized. Ms. Becker reported on May 27, 2015, the CPUC sent a letter to PG&E identifying 18 specific issues to be addressed before the CPUC would consider providing funding for a license extension for DCP. She observed these issues include seismic studies, liability insurance, lessons learned from Fukushima and the recommendations of the IPRP. As the DCISC was not copied on the letter Ms. Becker offered to provide a copy to the Committee.

Dr. Peterson remarked he appreciated Ms. Lewis' comments and stated the Committee will continue to review these issues and he looks forward to receiving the CPUC letter mentioned by Ms. Becker. Dr. Lam stated receiving the letter from Ms. Becker would be helpful and he inquired whether the Committee would otherwise have received a copy. Assistant Legal Counsel Rathie replied that a copy would likely be provided only if there was a service list for the matter which included the Committee or if it was provided by PG&E as part of the monthly document transmittal.

Dr. Peterson asked Dr. Budnitz to make the next presentation.

Informational Presentation By the Committee

Report on Its Activities Related to Understanding the Seismic Hazard and Tsunami Risk at the Plant

Site and Environs.

Concerning the DCISC investigation of the tsunami risk to DCP, Dr. Budnitz remarked that understanding the hazard was only part of understanding the risk. He reported PG&E submitted its tsunami analysis to the NRC on March 12, 2015. Dr. Budnitz stated this analysis represents a summary of an extensive body of work. On March 30, 2015, Dr. Budnitz and Consultant Linnen met with PG&E in San Francisco and received an extensive briefing on the tsunami hazard work. The DCISC had the benefit of participation by Dr. Robert T. Sewell, a recognized expert in the area of tsunami analysis, who has been engaged as a consultant to the DCISC to perform an independent analysis of PG&E's analysis. Dr. Budnitz remarked a great deal of technical information has been assembled by PG&E to support its tsunami analysis and the DCISC with Dr. Sewell will study and review this information and the Committee hopes to be in a position to provide a report by Dr. Sewell at its October 2015 public meeting. Dr. Budnitz stated that the NRC will conduct a separate review and while he serves as a consultant to the NRC staff on the external flooding submittals from other nuclear power plants he has recused himself in that role from any review of the PG&E submission for DCP. Dr. Budnitz stated that the results of the NRC review are not expected to be available for approximately one year, as there are many nuclear power plants located in the east and in the mid-west where external flooding is more of a threat than at DCP. The PG&E tsunami analysis will also be reviewed by the community of experts who do this work and the DCISC, PG&E and the NRC will have the benefit of this review. Dr. Budnitz stated that the principal consultant used by PG&E for the tsunami analysis, Dr. Stephen Grilli of the University of Rhode Island, is an acknowledged expert and the work done for PG&E is excellent. The DCISC will closely monitor this review process to understand what is learned.

Dr. Budnitz commented that the DCISC review will include assessing whether flooding might affect plant safety by its impact on any plant equipment or interaction with plant systems. He reported there is a standard established by the American Society of Mechanical Engineers (ASME) and the American Nuclear Society (ANS) which governs how to do external flooding analysis. Dr. Budnitz reported this standard is now under revision by a committee he chairs and a working group of that committee is chaired by Dr. Sewell.

Dr. Lam stated he is appreciative of Dr. Budnitz taking a leading role for the Committee in the tsunami and seismic risk study. He stated he is hopeful these efforts will shed light on reconciling the differences in the magnitude of certain parameters used in the 2003 study by Dr. Sewell and those used in PG&E's analysis. Dr. Lam also reported for the record that Dr. Sewell is serving in a consultant capacity on an unrelated project contracted for by PG&E. Dr. Lam also stated he hoped Dr. Budnitz' efforts might shed some light on certain controversial material provided to the Committee by Mr. Weisman about CPUC current legal proceedings regarding electronic communication between PG&E as the DCP licensee and other technical personnel.

Dr. Peterson remarked that the DCISC's particular effort will be focused on tsunami data which indicate a tsunami run-up could exceed 85 feet and to understand the nature of that risk and what the impact on the plant from such an event might be. Integral to this investigation would be review of paleo geologic data for tsunamis that have occurred in the past with a return frequency

sufficiently high to be of concern relative to the plant's design basis.

Dr. Gene Nelson, on the physical science faculty at Cuesta College and government liaison for Californians for Green Nuclear Power was recognized. Dr. Nelson stated he submitted voluminous information of scientific and engineering studies regarding DCPD to the DCISC. He remarked that opponents of DCPD continue to exaggerate the tsunami risk as earthquakes in the region are produced by strike slip faulting which does not tend to generate large tsunamis. Critical plant safety systems are located 85 feet or more above sea level. He reviewed the effects of two large earthquakes which took place in the recent past in Japan and Chile. He stated he was grateful the DCISC is composed of experienced and knowledgeable scientists and engineers who practice critical thinking when evaluating evidence presented by experts and the public.

Ms. Sherry Lewis of Mothers for Peace was recognized. In response to her inquiry concerning the nature of the work which Dr. Sewell is performing for PG&E Dr. Peterson replied the work is being done under a contract with a consulting company with which Dr. Sewell is associated and, while this engagement is believed to be related in some way to DCPD, it is not related in any way to the study of tsunamis.

Mr. David Weisman of the A4NR was recognized. Mr. Weisman remarked that once again social science is at work on the issue of the tsunami analysis for DCPD and he stated his interest may not lie with the specific details of the results but rather with a federal agency suppressing information. He stated that the NRC did not subject the 2003 Sewell tsunami study to an external peer review process but instead put the study in a drawer without any objective reason to decide it wasn't needed or didn't meet the merits of scientific criteria. Mr. Weisman noted that an 85 foot wave would submerge Avila Beach and the NRC sat on information that such an event might be possible and did not choose to share that information with the California Coastal Commission which has responsibility for producing wave run-up maps. Mr. Weisman stated this serves from a process point of view as a cautionary tale of a lack of transparency and it is the public and the state who are being ill served. Mr. Weisman displayed an exhibit created for an art show tracing public statements, internal emails obtained by FOIA requests, and the information that was previously redacted. He stated this represents an exercise not in science but in democracy and that it is important to realize that science meets public policy at some point and public policy needs to remain open and transparent.

Dr. Budnitz reviewed the PG&E submission of its seismic study for DCPD to the NRC on March 12, 2015, and he stated the NRC staff is now engaged in reviewing PG&E's submittal on a high priority basis as DCPD is the highest priority plant in the country for the NRC relative to seismic safety. Dr. Budnitz, in his role as a consultant to the NRC staff, has, as he has done with the external flooding analysis, recused himself from any involvement in the NRC's review of seismic information submitted with PG&E's March 12, 2015, submission. Dr. Budnitz reported that Dr. Abrahamson has recently participated in seeking to have the methodology used for the PG&E seismic studies critically reviewed by outside experts and there is great interest in the seismic community as the work described earlier by Dr. Abrahamson is far advanced and the controversy over the seismic hazard at the plant has been ongoing for more than 30 years. The DCISC will continue to follow this

process. Dr. Budnitz stated he estimates that the NRC review may be complete and available for review by the DCISC and others within six months, that is, by the end of 2015. The DCISC will also follow critiques of the methodology from other seismic experts and by the IPRP.

Dr. Budnitz stated the NRC developed a standardized methodology, known as Appendix A Part 100, which was adopted after DCP's first seismic licensing work and which established the design earthquake (DE), which he described as a function of frequency. Some plant components being sensitive at frequencies of 3 Hz some at 12 Hz, with structures tending to be sensitive at 1-2 Hz and equipment tending to be sensitive between 3-10 Hz or between 15-30 Hz. Upon discovery of the Hosgri Fault the plant was required to design to and use the double design earthquake (DDE) until a more thorough investigation of the Hosgri Fault was completed. Subsequently it was determined that the Hosgri Fault earthquake should control the plant design (HE). Dr. Budnitz observed that some concrete had already been poured and equipment designed prior to the establishment of the HE as controlling the design and these components while not designed to the HE standards were evaluated against them. When evaluated against the HE, which would have been the design of everything had it been known at the start of construction, most components were found to have sufficient margin but some required replacement or were upgraded.

Dr. Budnitz reported that subsequently the NRC required PG&E to undertake the Long Term Seismic Program which produced a spectrum (LTS) against which the plant was reanalyzed and redesigned in the 1988-1989 period. This was followed by PG&E's most recent efforts which produced a spectrum, known as the ground motion response spectrum (GMRS) that if the plant were to be designed today would be controlling per Appendix A Part 100. Dr. Budnitz observed that GMRS is the new reference for what the NRC previously referred to as the safe shut down earthquake. If data produced to date by PG&E shows that the GMRS is accurate then it should not be necessary to redesign anything as the plant actually has more margin, as everything was previously qualified to the HE curve. Dr. Budnitz confirmed that the DCISC will review the continuing analysis of PG&E's work and will follow the review and possible endorsement or lack thereof by the seismic community including as data is compiled over the next five to ten years.

Dr. Budnitz displayed a graphic used by Dr. Abrahamson of the various hazard curves and reported that the other element of the DCISC's review will include reviewing the seismic input from earthquakes in terms of the design of equipment which needs to be designed to the whole spectrum. He reported when equipment was evaluated in 1988-1989, the weakest components were determined to have sufficient margin to exceed that required by the LTS hazard curve which has provided the basis for Dr. Budnitz' opinion to date on the seismic strength of DCP. The DCISC will continue to follow whether the most recent reanalysis by PG&E will be confirmed, but so far Dr. Budnitz reported that PG&E has found no components to be weaker than previously believed but this work is continuing and will be peer reviewed within the seismic community, reviewed by the NRC and by the DCISC before an opinion can be formed about the current safety of the plant. Dr. Budnitz reported that there have been changes in load bearing to the Turbine Deck which will result in different impacts from those analyzed during 1988-1989, and motion must be understood at various levels of that building with reference to the seismic capability of each installed component. Dr. Budnitz stated that this work is expected to take at least one year and he commented that any

discovery or finding that a component is weaker than previously determined must be reported immediately to the NRC or DCCP would risks receiving a violation under 10 CFR Part 21. In response to Consultant Linnen's question Dr. Budnitz stated equipment can be evaluated for its seismic capacity through the use of shaker tables, by use of scale models, and by industry experience documented at other facilities during earthquakes. In response to Consultant Linnen's question Dr. Budnitz stated the LTSP, the state of knowledge after the development of the HE, represented an understanding of the seismic motion.

Mr. John Geesman of the A4NR was recognized. Mr. Geesman observed that the LTSP review and redesign came at a cost of \$4.2 billion and he remarked the DCISC's concerns are narrower due to its remit from the CPUC than those of the A4NR. Dr. Budnitz responded to confirm that PG&E's current reanalysis includes NRC safety-classified as well as other components as such components may play important roles following an earthquake. Mr. Geesman noted that the DCISC is a state-appointed panel and the State of California has concerns broader than those of the DCISC relative to plant safety including the potential cost of retrofit. Mr. Geesman observed from Dr. Budnitz' presentation it appears that the DCISC's analysis will for the most part be reactive to what others discover about PG&E's seismic assessment and he suggested that the DCISC pay careful attention and consider of serious consequence the work done by the IPRP, which includes representatives from the CPUC and the California Coastal Commission. Mr. Geesman observed the graphics produced by the IPRP in its report arrive at starkly different conclusions than those in PG&E's presentation and as used by Dr. Budnitz in making his comments and the IPRP will have a significant say in any decision to relicense DCCP. Mr. Geesman remarked that the hazard model and the site response model discussed by Dr. Budnitz were not subjected to the same review using the SSHAC process as were the seismic source characteristic or the ground motion characteristic models and he questioned how a level of comfort can be derived that the site response and hazard impact, two critical inputs, are going to get the adequate level of scrutiny which the NUREG documents require for the seismic source characteristic and ground motion models. In closing his comments Mr. Geesman suggested that in its review the DCISC be concerned with and look particularly at the 3-D tomographic models used to characterize the soil conditions under the plant. He remarked that the presentation made to the IPRP, and references in the CCCSIP, indicate that the model at least recently had extraordinary difficulty in imaging the subsurface in the first 30-40 meters beneath the plant.

Dr. Gene Nelson, a member of the Cuesta College physical sciences faculty and government liaison for Californians for Green Nuclear Power was recognized. Dr. Nelson stated the opponents of DCCP exaggerate the earthquake risk and the key point is that each earthquake safety analysis shows a substantial seismic margin for the plant for any credible earthquake in the area and the plant's construction is very robust. He stated that an excellent paleo geologic record of lateral stream displacement from strike slip earthquakes is located on the Carrizo Plain in San Luis Obispo County where the San Andreas Fault crosses Wallace Creek.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis commented that Dr. Budnitz reported that components are sensitive at differing frequencies. She understood that when the Hosgri Fault was discovered the double design earthquake (DDE) was developed to provide extra margin until the Hosgri Fault was fully evaluated. Dr. Budnitz confirmed in response to Ms. Lewis

comments that not all the Hosgri evaluation (HE) fits under the DDE and Ms. Lewis stated this was an important point and no one could afford to retrofit for a double design basis based upon the Hosgri Fault. Dr. Budnitz commented there was insufficient time to fully explore the historical development of the seismic bases established for DCPD over the years of its construction and operation and his presentation was necessarily focused upon the DCISC's activities in the future. In response to Ms. Lewis observation Dr. Budnitz replied that it did not matter to him that it appears that the DDE concept is being dropped as the DCISC is not dealing with licensing issues, NRC regulations, or what criteria a particular component was designed to meet but rather his concerns are focused upon the strength and capacity of plant components and what are the inputs used to develop and calculate their strengths and capacities. Dr. Lam stated that Dr. Budnitz' comments represented Dr. Budnitz' personal views and Dr. Lam stated that he was concerned that the plant meet NRC regulations and Dr. Budnitz expressed his concurrence with Dr. Lam's statement regarding NRC regulations.

Ms. Jane Swanson of Mothers for Peace was recognized. Ms. Swanson was granted leave by the Chair at this time to pose questions to the Committee on an item not on the agenda for the public meeting. Ms. Swanson inquired relative to issues of DCPD's noncompliance with NRC technical specification requirements in loading dry storage casks for an explanation of the function of the control rods that may be inside the casks, who designed the technical specifications directing the loading of the casks, who made the decision or judgment, the Holtec firm or PG&E, to use a different loading method than required by the technical specifications, and finally when did the noncompliant loading method begin and how long has it been going on. Dr. Peterson responded that it is likely control rods were placed within the storage canisters and that the principal reason for doing so is likely that it provides a method for their disposition. **He stated that the DCISC, having recently learned of the loading issue with dry storage casks will need to conduct future fact-finding related to the issue of the loading of the dry storage casks and the questions posed by Ms. Swanson will be answered during the fact-finding and reported to the public in due course during a public meeting of the DCISC.**

Dr. Budnitz, in response to Mr. Geesman's earlier observation concerning the lack of a SSHAC process for the hazard and site response models, stated that the reason the SSHAC process was developed was that there were multiple models consistent with the data for seismic source characterization and ground motion modeling and there was a need to assimilate a common understanding with a full range of uncertainty. Dr. Budnitz stated that was not the case for the hazard and site response models where there are only one or two models which are almost equivalent and are widely accepted and understood by the seismic community and accordingly there is very little controversy on how to do a hazard or site response analysis and there is no need for a SSHAC process in that context.

Ms. Elizabeth Brousse of Mothers for Peace was recognized. Ms. Brousse referred to an article in the San Luis Obispo Tribune appearing in October 2013 which reported on the numbers of low level and high level violations by nuclear power plants. She observed DCPD was found to have a large number of low level violations but no high level violations. She inquired whether the loading of the dry storage casks in violation of technical specifications would constitute a high or a low level

violation? Dr. Peterson stated that issue was yet to be determined and as the DCISC recently learned of this issue he could not comment further.

XXIV Information Items Before the Committee (Cont'd.)

Dr. Peterson requested Mr. Cary Harbor, Director of Compliance, Alliance and Risk at DCPD to continue with the information presentations. Mr. Harbor introduced Mr. Matthew Shepherd, an engineer in the DCPD Probabilistic Risk Assessment (PRA) group to make the next presentation and reported Mr. Shepherd has a Master's Degree in Physics and eight years of experience in the nuclear industry.

Presentation on PG&E's Assessment of DCPD Internal Flooding Probabilistic Risk Assessment.

Mr. Shepherd stated he resides with his family in Paso Robles, CA and in his position at DCPD he acts as a subject matter expert in the area of external flooding PRA modeling.

Mr. Shepherd stated the internal flooding PRA model represents a strong commitment to public safety at DCPD. He remarked risk insights are important and the PRA model is a living model which requires that designs and procedure information be updated. The PRA model looks at the impact of tank or fluid rupture on shut down or on safety-related or mitigating equipment. The internal flooding model does not address tsunamis or seismically-induced pipe ruptures. Mr. Shepherd reported the PRA model demonstrates that the frequency and impact of the ruptures which are analyzed by the internal flooding PRA model contribute approximately 7 percent to the risk profile for DCPD. The internal flooding PRA model is probabilistic in that it looks at a range of breaks, rather than deterministic which would be limited to assessing the impact of a single break or failure. The goal of the internal flooding PRA model is to provide a detailed and realistic analysis and the model examines events and goes beyond the plant's design basis probabilities. Mr. Shepherd stated that all design and licensing requirements are already met for internal flooding.

Mr. Shepherd reported the DCPD internal flooding PRA model was originally developed in response to NRC Generic Letter 88-20. In recent years, the requirements for a technically acceptable internal flooding PRA have been provided in Regulatory Guide (RG) 1.200, Revision 2 and in the American Society of Mechanical Engineers (ASME)/ American Nuclear Society (ANS) standard for PRA for nuclear power plant applications. In 2012 the internal flooding PRA model was updated to RG 1.200, Revision 2 and the corresponding ASME/ANS Standard.

Mr. Shepherd reported that in December 2012 an independent peer review was performed with respect to RG 1.200, Revision 2. The peer review team was comprised of experienced industry members and expert consultants in internal flooding PRA. The team's findings and observations were documented by the peer review team. This internal flooding PRA model has been incorporated in the Diablo Canyon PRA model of record.

Mr. Shepherd reviewed two hypothetical internal flooding scenarios and confirmed Dr. Budnitz' observation that they are hypothetical in that they have never been experienced at DCPD. These

scenarios include flooding in the Auxiliary Feedwater (AFW) pump rooms and in the Turbine Building. Regarding the internal flooding scenario for the AFW pump rooms Mr. Shepherd stated the AFW System provides secondary cooling after a plant trip. There are two AFW pump rooms and a fire water piping rupture could affect both as they are connected by a fire damper. He reported that backup systems to the AFW pumps are available and maintenance risks for internal flooding are low but risk management actions are taken when performing maintenance. Concerning internal flooding scenarios in the Turbine Building Mr. Shepherd reported the identified sources for internal flooding result from flows from the Circulating Water System or as a result of a fire water piping rupture. Flooding in the Turbine Building could affect off site power as there is a potential to affect the emergency diesel generators (EDGs). He reviewed the actions and systems available to mitigate these scenarios including the presence of auto-trip sensors or operator action to trip the circulating water pumps and the ability to manually isolate the fire water system. Mr. Shepherd concurred with Dr. Peterson's observation that internal flooding of the Turbine Building does not assume full flow, as the circulating water pumps can be stopped to limit the flow and Mr. Shepherd reported that the flood rate is broken down to intervals to account for this.

In concluding his presentation, Mr. Shepherd observed that the risk from hypothetical internal flooding is a small portion of the overall risk. DCP's design, conformance with standards, procedures and practices provide assurance that these hypothetical flooding scenarios are very unlikely to occur and robust backup safety systems are in place to mitigate such events. Risk insights from the internal flooding PRA model will be used to further enhance safety at DCP.

In response to Dr. Budnitz' question, Mr. Shepherd confirmed the internal flooding PRA model meets ASME standards and relies on internal event modeling. In response to Dr. Budnitz inquiry about other sources with the potential to create internal flooding Mr. Shepherd stated that there are other sources which contribute less than the AFW and Turbine Building internal flooding scenarios and those lesser sources are not screened out by the PRA. In response to Dr. Budnitz question Mr. Shepherd stated operator actions are an important contributor to flooding from the raw water reservoirs. Mr. Shepherd confirmed Dr. Budnitz comment that in accordance with standard practice, some plant-specific data were incorporated for the AFW and Turbine Building flooding scenarios which was obtained through review of entries in the Corrective Action Program for pipe leaks and spraying events but this plant-specific data did not contribute appreciably to the results. In response to Dr. Lam's inquiry, Mr. Shepherd replied that the PRA model incorporates some, but does not take full credit for, operator actions and that approximately 60 total scenarios were used in developing the internal flooding PRA model. In response to Dr. Peterson's inquiry about the percentage assigned by the model for flooding of the EDGs Mr. Shepherd replied that the frequency of such flooding was very low as a number of failures would be required to have occurred to flood the Turbine Building. In response to Dr. Budnitz' question as to whether there were any recommended changes identified as a result of the PRA, Mr. Shepherd noted that the fire water piping was already being replaced to address corrosion issues and he stated the principal benefit from the internal flooding PRA model is to online risk management and there were no insights identified for shut down planning. Dr. Peterson observed that the AFW and the Turbine Building were the major contributors to the 7 percent risk percentage and Mr. Shepherd confirmed there were different levels of contribution for these scenarios between U-1 and U-2. He confirmed

Dr. Peterson's comment that plant risk in this context means core damage frequency.

Dr. Peterson remarked that the DCISC during its review of the proposal to replace closed loop cooling with cooling towers received a good deal of negative feedback regarding the Committee's concern that doing so could increase the risk or require additional mitigation measures.

Dr. Gene Nelson of Californians for Green Nuclear Power was recognized. Dr. Nelson stated he submitted comments regarding his concern that to substitute salt water cooling towers for the present once-through plant cooling system would result in 18,000,000 gallons of conductive seawater becoming located at the 110' level. He stated his opinion that this would result in a very substantial increase in the safety risk and could cause a man-made Fukushima without the need for an earthquake. Dr. Peterson remarked that redundancy and diversity would allow the plant to cope with a loss of electricity, as would employment of the strategies developed as part of the FLEX initiative to pump water to remove heat.

Dr. Budnitz observed that all nuclear power plants conducted a similar review in 1988 and a sizeable number of plants identified and addressed internal flooding issues at that time. He observed that in this new effort there had not been very many additional issues identified and the reason and value for conducting the additional review is to receive reassurance that this is not an area of great concern.

Dr. Peterson remarked that due to the high elevation of cooling towers, a closed cooling system would substantially increase the pressure in the Circulating Water System and result in water being located above the Turbine Building. Dr. Peterson observed that proper engineering could likely manage the change but EDGs are located within the perimeter of the Turbine Building. He reported that the comment of the Friends of the Earth to the DCISC's concern regarding these issues was that the DCISC was being frivolous. In response to Dr. Peterson's question Mr. Shepherd confirmed that the PRA model for the internal flooding hazard would change if cooling towers were used to supply plant cooling. Dr. Peterson stated that he believed that the safety impacts of flooding in the Turbine Building should be manageable even with a closed cooling system.

Mr. Harbor introduced DCP Station Director Jan Nimick and stated Mr. Nimick has more than 20 years' experience in the nuclear industry including leadership roles in Operations and Maintenance organizations, holds a Senior Reactor Operator License and a Bachelor of Arts Degree in Mechanical Engineering. Mr. Harbor reported Mr. Nimick was promoted to Station Director on January 1, 2015. Dr. Lam congratulated Mr. Nimick on that promotion.

Presentation on the State of the Plant Including Key Events, Highlights and Station Activities.

Mr. Nimick stated his presentation would include an update on the station's status and upcoming key station activities. He reported the plant is currently operating both U-1 and U-2 in Mode 1 at 100 percent power with Probabilistic Risk Assessments (PRAs) of Green. All NRC Performance Indicators (PI's) are Green. He reviewed the 2015 Generation Capacity Factor (year to date):

U-1 = 99.1%

- U- 2 = 101.44%
- Total Plant = 100.27%

Mr. Nimick reported that since 2012 there have been four flashover events brought about by drought conditions causing salt and dirt buildup on insulators which when exposed to wet conditions causes salt to dissolve and creates a conductive path. In March 2015, PG&E's Transmission organization, as part of an integrated off site power program with DCP, used a helicopter to hot wash line insulators on the 500 kV towers from Units 1 and 2 to the 500 kV substations. Hot wash of the 500 kV Turbine Building insulators is scheduled for August 2015. Mr. Nimick reported the 500 kV Turbine Building insulators will be replaced during refueling outages 1R19 and 2R19 with the new insulators having 72% more creepage distance and capable of a five-year wash cycle although he commented DCP plans to wash these insulators during each subsequent refueling outage. The current wash cycle for the insulators requires they be washed approximately every six weeks.

Mr. Nimick stated that the same insulators as DCP will be installing during 1R19 and 2R19 are currently being tested and used at the Koeberg Nuclear Power Plant located on the coast of South Africa. He remarked the Koeberg plant has environmental conditions similar to DCP in that it is in a hot, dry, coastal environment. In response to Dr. Budnitz' question Mr. Nimick replied that good vendor support is being provided and in response to Consultant Linnen's inquiry he confirmed that the Koeberg plant experienced similar operating experience issue with its insulators as has DCP.

Mr. Nimick displayed a map showing the locations of the 230 kV Mesa and Morro Bay Substations and the 500 kV Gates and Midway Substations located near Fresno and Bakersfield in California's Central Valley. He reported that the resistive glaze 165 insulators that affect off site power to DCP are in the process of being replaced for the 230 kV System. To date 154 of 649 of these insulators have been replaced including all of the insulators at DCP. Mr. Nimick reviewed the offsite power system available to each DCP vital bus which provides power available from not only the turbine generators but also from the 230 kV Switchyard, the 500 kV Switchyard and from the emergency diesel generators as backup power sources.

Mr. Nimick reported DCP is not connected to any regional water system and PG&E has always produced all the water necessary for Diablo Canyon for the last 30 years through the use of a desalination plant located on site. Currently that system has excess production capacity of over an acre foot per day, approximately sixty percent of the system's capacity. In response to the current drought conditions PG&E and San Luis Obispo County entered into contract for emergency water to be used for fire-fighting purposes. Over the next 120 days a countywide drought task force and PG&E will be studying interconnection feasibility for water use for municipal purposes, with the County reviewing the permitting process and PG&E reviewing the technical and operational issues. In response to Dr. Budnitz' inquiry Mr. Nimick stated PG&E's current cost for the water it produces is approximately \$3.45 per 1,000 gallons. The desalination system filters seawater and uses ultraviolet light and then pumps the water through reverse osmosis membranes to remove the salt.

The water is then pumped to the reservoirs and treated again before being used in the plant. The brine produced by this process is discharged to the ocean.

Mr. Nimick reviewed recent and upcoming station activities including:

- PG&E Hiring Fair held on June 12 to introduce opportunities for full and part time work. Mr. Nimick stated he first worked at DCPD in 1996, while studying at Cal Poly, as a temporary outage worker in the Radiation Protection organization. During refueling outages the plant hires approximately 1,000 individuals as temporary outage workers. In response to Dr. Lam's inquiry he reported PG&E is looking for entry level employees in the DCPD Operations and Maintenance organizations and has been hiring 20-30 persons each year in recent years and Mr. Nimick observed hiring may accelerate given changing demographics. The hiring fairs also serve the purpose of providing information on how to be a better candidate.
- NRC Public Meeting June 24. Dr. Budnitz remarked he discussed with the NRC Senior Resident Inspector for DCPD the possibility of the NRC scheduling one of its public meetings at the same time as a scheduled public meeting of the DCISC.
- NRC Biennial Emergency Planning Program & Performance—summer
- 1R19 Outage—fall 2015

This concluded the informational presentations requested by the Committee from PG&E for this public meeting.

Following Mr. Nimick's presentation, Dr. Gene Nelson, a member of the Cuesta College physical sciences faculty and government liaison for Californians for Green Nuclear Power was recognized. Dr. Nelson stated he wished to call attention to his comments of February 4, 2015, wherein he expressed concern about saltwater supplies which might be located above the plant and with calculated salt drift, even with the use of low drift cooling towers which he stated are estimated to produce approximately 1.7 million pounds of salt each year which would be deposited on high voltage insulators and pose an additional safety risk to the plant.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis inquired and Dr. Budnitz confirmed that a desalination plant could be run by use of solar power. Dr. Budnitz responded all that was required was electricity to operate a desalination plant.

XXIV Concluding Remarks & Discussion by Committee Members Of Future DCISC Activities

Dr. Peterson again expressed the thanks of the Committee to PG&E and particular to Mr. Harbor and Ms. Zawalick for their assistance with the informational presentations for this public meeting and to the technicians of AGP Video who recorded and live-streamed the meeting to the internet. Dr. Peterson also expressed the thanks of the Committee to the members of the public who attended and provided their comments to the members. Dr. Peterson observed that approximately one-third to one-half of the items the Committee has identified for fact-finding were identified from comments made by the public.

XXV Adjournment Of Eighty-First Public Meeting

There being no further business, the eighty-first public meeting of the Diablo Canyon Independent Safety Committee was adjourned by its Chair, Dr. Per Peterson, at 2:40 P.M.

[25th Annual Report](#), [Volume 1](#), Section 4.23, License Renewal

4.23.1 Overview and Previous Activities

The purpose of the section is to describe the DCISC’s review of DCPD License Renewal.

On April 10, 2011, PG&E submitted a request to the NRC to defer its issuance of the DCPD license renewal until certain seismic reviews are completed in 2015. Therefore, the DCPD License Renewal Project was on hold during the July 1, 2014 through June 30, 2015 reporting period.

4.23.2 Current Period Activities

As discussed in the above Section, on April 10, 2011 PG&E submitted a request to the NRC to defer its issuance of the DCPD license renewal until certain seismic reviews are completed in 2015. These seismic reviews were completed and submitted to NRC during the first quarter of 2015, and in April 2015, and the DCISC understands that NRC has restarted its review.

4.23.3 Conclusions and Recommendations

Conclusions:

In 2011 DCPD had requested that NRC pause its review of license extension pending completion and submittal of its seismic evaluations. These evaluations were completed and submitted in March and April 2015. The DCISC understands that NRC has restarted its licensing review of DCPD licensing extension.

Recommendations:

None

[25th Annual Report, Volume 1, Exhibit 8.1, Telephone Calls and E-mails Received by the DCISC](#)

Telephone calls and emails have been received by the DCISC Legal Counsel's office with questions, concerns and requests for information. During this reporting period, 53 calls and 77 emails were received from individuals. The breakdown of these calls and emails is as follows:

Number of Calls	Number of E-mails	Reason for Contact
0	63	DCPP issues or nuclear information requests
53	14	Other (administrative, document requests, media, tour requests and miscellaneous)

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 describing the Committee and its function (see Volume II, [Exhibit I](#)). The Pamphlet is provided to attendees at DCISC public meetings and plant tours.

[25th Annual Report, Volume 1, Exhibit 8.2, DCISC Internet–Worldwide Web Page Activity](#)

The DCISC maintains a frequently updated web page on the worldwide web. The DCISC established its web page and presence on the internet 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 the 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 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. During the DCISC’s October 14—15, 2014 public meeting, the live-streaming video of the meetings was accessed by visitors 20 times. The live streaming video feed of the DCISC’s February 4—5, 2015 public meeting was similarly accessed 58 times. During the DCISC’s public meeting on June 16—17, 2015, visitors accessed the live stream video 149 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. “page views”). 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.

The most meaningful statistics provided for July 1, 2014 through June 30, 2015 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:

Month	Visits
July 2014	674
August 2014	797
September 2014	709
October 2014	847
November 2014	822
December 2014	797
January 2015	882
February 2015	732
March 2015	782
April 2015	695
May 2015	689
June 2015	765

Top ten countries from which visitors accessed the site, in order of “hits”, were: United States, Ukraine, China, Finland, Russian Federation, Great Britain, Turkey, France, European Union, and Romania.

Among the most common “key phrases” typed into internet search engines, such as MS Internet Explorer, Google Chrome, Firefox, Mozilla, Safari, Opera, Minefield, Android browser and Samsung were: “diablocanyonindependentsafetycommittee”, “dcisc”, “Dcisc.org”, “diablo canyon nuclear power plant tours”, “diablo canyon nuclear power plant”.

The top ten downloads were:

22nd-pdf.pdf

23rd-pdf.pdf

21st-pdf.pdf

2014-10-17-final-assessment.pdf

annual-report 24-2013–2014/24th-exhibit-a-list-documents-submit...

draft-addendum-to-bechtel-assessment.pdf

annual-report-23-2012-2013/23rd exhibit—g2-3-correspondence.pdf
annual-report-23-2012-2013/23rd exhibit—g2-1-correspondence.pdf
annual-report-23-2012-2013/23rd exhibit—g2-2-correspondence.pdf
addendum-to-bechtel=assessment.pdf

The most visited pages were:

/index.php
/contact.php
/about/committee/member-lam.php
/public-tour.php
/agenda.php
/glossary.php
/about/general-information.php
/notice.php
/references/alphabet/p-q.php
/about/consultants/consultant-wardell.php

[25th Annual Report, Volume 1, Exhibit 8.3, Comments Received at DCISC public meetings](#)

During this period (July 1, 2014—June 30, 2015), the Diablo Canyon Independent Safety Committee (DCISC) held four public meetings in the vicinity of Diablo Canyon Nuclear Power Plant (DCPP) and one in Berkeley, CA. 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, 2014—June 30, 2015, twenty-nine different individuals spoke a total of one hundred times. Twenty-one individuals appeared and spoke at the August 8, 2014, meeting; fifty-four individuals appeared and spoke at the October 14–15, 2014, meeting; twenty-three individuals appeared and spoke at the February 4–5, 2015, meeting; one individual spoke at the May 14, 2015, meeting; and thirteen individuals appeared and spoke at the June 16–17, 2015 meeting. Thirteen persons addressed the Committee during more than one of its public meetings.

These 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](#), [B.12](#) and [B.15](#).

25th Annual Report, Volume 1, Exhibit 8.4, DCISC Public Tours of DCP

The DCISC 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. Commencing with the February 2015 tour the DCISC tours are now, when conditions permit, allowed to visit within the controlled areas of the plant. These tours are described below.

8.4.1 October 15, 2014 Public Tour

The three members of the DCISC accompanied by 17 members of the public, PG&E tour guide Mr. John Lindsey and the Committee's consultants, conducted a tour of certain accessible areas of the Diablo Canyon Power Plant (DCPP). The group met at the PG&E Energy Education Center for an introduction to the Committee members and consultants and a short presentation on the background and role of the Committee. Mr. Lindsey provided a brief overview of DCP including its history, operation, the nuclear fuel cycle, spent fuel storage and plant security. PG&E discussed how the plant's cooling systems work, with the ocean water two physical barriers away from the reactors. The group was issued visitor badges and then departed for DCP.

After entering the plant through the Avila gate, the members of the public were then divided into two groups, each accompanied by at least one DCISC member and consultant, and each group visited in turn the Control Room Simulator Facility and the lobby of the Security Building for a demonstration of screening of personnel entering the protected areas of the plant and viewed the ocean water Intake and Outfall Facilities where DCP pulls in and expels seawater used for cooling. The bus then drove by the site of the Independent Spent Fuel Storage Installation (ISFSI) for a description of its purpose and features and then stopped at the plant overlook site and the group received a briefing from PG&E representatives on the various external features and buildings.

8.4.2 February 4, 2015 Public Tour

The DCISC and 15 members of the public participated in a tour of Diablo Canyon Power Plant (DCPP). The group started off in the PG&E Energy Education Center for a brief introduction of the DCISC and its Members and Consultants. Afterward DCP representatives made an information presentation about the plant. The group then boarded a bus for the plant, and on the way to the plant DCP representatives discussed the history of the plant. Upon arriving at the plant, DCP representatives took the group on a narrated drive-by of the Independent Spent Fuel Storage Installation (ISFSI), also known as the dry cask spent fuel storage facility.

At the plant proper the group split into two sub-groups, each with a DCP escort and DCISC member/consultant accompaniment. Each group was processed through security and went into the

controlled area of the plant. Wearing personal protective equipment (hard hats, hearing protection and safety glasses) and radio communications equipment, the groups took a narrated tour of the main turbine deck and window view of the control room. The two groups visited the Control Room Simulator, a true operating mock-up of the Unit 1 Control Room, separately for a discussion of how the plant operates, control room operators, and operator training.

8.4.3 June 17, 2015 Public Tour

The three members of the DCISC accompanied by 25 members of the public, PG&E tour guide Mr. John Lindsey and the Committee's Consultants and Assistant Legal Counsel, conducted a tour of certain accessible areas of the Diablo Canyon Power Plant (DCPP). The members of the public responded to the DCISC advertisement concerning the public tour placed in a local area newspaper and on the DCISC's website. The group met at the PG&E Energy Education Center for an introduction to the Committee members and consultants and a short presentation on the background and role of the Committee. Mr. Lindsey provided a brief overview of DCPP including its history, operation, the nuclear fuel cycle, spent fuel storage and plant security. PG&E discussed how the plant's cooling systems work, with the ocean water two physical barriers away from the reactors. The group was issued visitor badges and then departed for DCPP.

After entering the plant through the Avila gate, the members of the public and visited the Control Room Simulator Facility and viewed the ocean water Intake and Outfall Facilities where DCPP pulls in and expels seawater used for cooling. The bus then drove by the site of the Independent Spent Fuel Storage Installation (ISFSI) for a description of its purpose and features and then stopped at the plant overlook site and the group received a briefing from PG&E representatives on the various external features and buildings. The tour did not enter the controlled area of the plant

25th Annual Report, Volume 1, Exhibit 8.5, DCISC Evaluation

The DCISC has been successful in implementing its Public Outreach Program as demonstrated by the descriptions above. The public tours of DCPD have continued to be popular with members of the public within the local area. The website, email and telephone channels are used frequently as indicated above. The public meetings during this period were attended by between seven to twenty people attending and also addressing remarks or questions to the Committee, including several representatives of Californians for Green Nuclear Power, a group promoting the use of nuclear power in California, as well as representatives of Friends of the Earth, the San Luis Obispo Mothers for Peace and the Alliance for Nuclear Responsibility, non-profit organizations concerned with the local and nationwide dangers involving DCPD and with the dangers of nuclear power, weapons and radioactive waste on national and global levels.

25th Annual Report, Volume 2, Exhibit A, Documents Received By the DCISC

July 2014 NSOC/DCISC
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
7/16/14	2014-009	DDP1000024983, Revise SI Load Sequence TI

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
7/21/14	DCL-14-060	ASME Section Inservice Inspection Program Request for Alternative REP-SI: Proposed Alternative to Requirements for Repair/Replacement Activities for Certain Safety Injection Pump Welded Attachments
7/28/14	DCL-14-066, DIL-14-012	Emergency Plan Implementing Document Update
7/28/14	DCL-14-067	Revision to Regulatory Commitment- Generator Circuit Breakers License Amendment Request Submittal Date
7/28/14	DCL-14-058	License Amendment Request 14-03, License Amendment Request for Adoption of Technical Specification Task Force Traveler TSTF-432, Revision 1, "Change in Technical Specification End States (WCAP-16294)"
7/30/14	DCL-14-065	Response to NRC Regulatory Issue Summary 2014-05, Preparation and Scheduling of Operator Licensing Examinations

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
7/3/14	Summary of June 5, 2014, Conference Call to Discuss the Status of the License Renewal Application Review of the Diablo Canyon Nuclear Power Plant, Units 1 and 2
7/17/14	Diablo Canyon Power Plant, Units 1 and 2 – NRC Emergency Preparedness Annual Inspection Report 05000275/2013502 and 05000323/2013502
7/21/14	Diablo Canyon Power Plant, Unit No. 2 – Request for Additional Information Re: Relief Request SWOL-REP-1 U2, Alternative Acceptance Criteria for Flaws in Pressurizer Nozzle Welds (TAC No. MF3891)
7/22/14	Summary of July 9, 2014, Teleconference Meeting with Pacific Gas and Electric Company on Digital Replacement of the Process Protection System Portion of the Reactor Trip System and Engineered Safety Features Actuation System at Diablo Canyon Power Plant, Unit Nos. 1 and 2 (TAC Nos. ME7522 and ME7523)
7/25/14	Diablo Canyon Power Plant – NRC Integrated Inspection Report 05000275/2013005 and 05000323/2013005 Errata
7/28/14	Diablo Canyon Power Plant, Units 1 and 2 – Reassignment of U.S. Nuclear Regulatory Commission Branch Chief
7/29/14	Diablo Canyon Nuclear Power Plant – NRC Initial Operator Licensing Examination Approval 05000275/2014301; 05000323/2014301

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July 2014 NSOC/DCISC
List of Documents Transmitted Electronically

7/29/14	Diablo Canyon Power Plant Units 1 and 2 – Notification of Inspection of Licensee Event Report (LER) 2012007-01 and Request for Information
7/31/14	Diablo Canyon Power Plant, Units 1 and 2 – Request for Additional Information Re: License Amendment Request to Adopt National Fire Protection Association Standard 805 (TAC Nos. MF2333 and MF2334)

D. PSRC Documents

Date	Doc. No.	Title
PSRC Minutes		
7/8/14	2014-019	- Licensee Event Report 2-2014-001-01 - DDP1000024983, Revise SI Load Sequence TI
7/22/14	2014-020	- LAR 14-03 - NFPA 805 Sub-committee

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCAs		No RCAs for this month.
ACE	50623168	DA-2014 NLO SA Finding 3-1 Task List Rev
	50627792	DA-QAAF-In storage maintenance breakdown
	50633513	DA-2014 SAI – Security Core Change
	50634990	DA-NRC CS Milestone 2 Missed CDAs
Eff. Eval		No Evals for this month.

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
		No QPAR for this month.
		No Audit Reports for this month.
8/1/14		DCPP Site Status Report
		No new Schedule for this month.
6/12/14	SFA 141600005	Design Change Process
7/3/14	SFA 141610042	Comparison of 2R17 and 1R18 Department Level Events
7/23/14	SFA 142030035	Polisher Watch Station Turnover
7/22/14	TA 140860013	Technical Assessment of Test Plan PGE-019-PI-001, "Test Plan for Diablo Canyon Power Plant Small-Scale Fibrous Debris Penetration Testing"

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July 2014 NSOC/DCISC
List of Documents Transmitted Electronically

7/23/14	TA 141950006	ISFSI Pad 3 to 7 Expansion Construction On-Site and Vendor Activities

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
		No updated Quick Hit Self-Assessment (QHSA) Schedule for this month.
		No Formal Benchmarking and Self-Assessments Schedule for this month.
7/2/14	SPAN 50637214	EPRI SGMP TAG Meeting Benchmark/Trip Report
7/14/14	SAPN 50638629	AUDIT ASSIST FOR ENTERGY'S MATERIALS AND PROCUREMENT PROCESS
7/14/14	SAPN 50638461	2014 Procedure Professionals Association (PPA) Symposium
7/1/14	SAPN 50629782	Quick Hit Self-Assessment of Radiological Environmental Monitoring Program
7/2/14	SAPN 50629782	NRC Inspection 71124.05 – Radiation Monitoring Instrumentation Quick Hit Self-Assessment
7/2/14	SAPN 50629782	Material Control and Accountability Quick Hit Self-Assessment
7/3/14	SAPN 50629782	Quick Hit Self-Assessment of Radioactive Gaseous and Liquid Effluent Treatment
7/9/14	SAPN 50655325	Security Training Quick Hit Self-Assessment
7/9/14	SAPN 50629785	NFPA 805 License Amd Request Audit
	SAPN 50629782	2014 NRC IP 71124.08, Radioactive Solid Waste Processing and Radioactive Material Handling, Storage and Transportation
7/22/14	SAPN 50638913	EPRI Alpha Monitoring and Control Guidelines for Operating Nuclear Power Stations, Revision 2 – Readiness for Implementation
7/28/14	SAPN 50630247	Quick Hit Self-Assessment – Safety Conscious Work Environment Self-Assessment
7/29/14	SAPN 50640955	Quick Hit Self-Assessment – Document Services Processing of Records Received
7/29/14	SAPN 50641015	June 2014 EPRI CHECWORKS User Group (CHUG) Meeting

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July 2014 NSOC/DCISC
List of Documents Transmitted Electronically

H. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/28/14		Operating Plan 2014 – 2018, No new updates this month.
7/17/14	PPIR	Plant Performance Improvement Report (June)
Station Initiative		
		Reduction in Admin Impacts Action Plan
7/7/14		2014 Achieve a better work-life balance
7/9/14		Strategic Performance Improvement Plan
7/12/14		Outage Planning and Execution Summary
7/16/14		Use of Performance Tools
7/17/14		Human Performance Excellence Action Plan 2014
7/31/14		Outage Planning and Execution Action Plan

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		No ODMs for this month.
POA	50301167	LTCA CDBI: Unanalyzed Condition 230 kV
	50636744	DA-TB HELB Analysis on 4kV SWGR

J. Miscellaneous

Date	Title
7/8/14	PG&E @ Work – The Bulletin
7/15/14	PG&E @ Work – The Bulletin
7/22/14	PG&E @ Work – The Bulletin
7/29/14	PG&E @ Work – The Bulletin

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1429	T+1/T-0 Critique
	Week 1430	T+1/T-0 Critique
	Week 1431	T+1/T-0 Critique
	Week 1432	T+1/T-0 Critique

L. Documents Previously Transmitted during the Month

Date	Title
7/1/14 – 7/30/14	QV Real Time Report

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August 2014 DCISC
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
		No LBIES for this month.

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
8/4/14	DCL-14-069	Supplemental Licensee Event Report 1-2014-003-01 Unanalyzed Condition Affecting Unit 1 and 2 Emergency Diesel Generators. Tornado Missiles
8/5/14	DCL-14-068	Response to NRC Request for Additional Information Regarding Relief Request SWOL-REP-1 U2
8/7/14	DCL-14-070	10 CFR 50.46 Annual Report of Emergency Core Cooling System Evaluation Model Changes for Peak Cladding Temperature for 2013
8/12/14	DCL-14-072	Relief Request NDE-SFW-13: Correction to the List of Docket Numbers
8/13/14	DCL-14-073	Request Waiver Fee as Pilot Plant for Simplified Risk-Informed Approach for Closure of GSI-191
8/18/14	DCL-14-074	ASME Section XI Inservice Inspection Program Request for Alternative RPV-U 1-Extension to Allow Use of Alternate Reactor Inspection Interval Requirements
8/19/14	DCL-14-078	Request for Enforcement Discretion Regarding Compliance with Technical Specification 3.8.1, "AC Sources - Operating"
8/21/14	DCL-14-076	Pacific Gas and Electric Company's Third Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)
8/21/14	DCL-14-077	Pacific Gas and Electric Company's Third Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)
8/28/14	DCL-14-079	Alert and Notification Design Report

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
8/4/14	Diablo Canyon Power Plant, Unit 1 - Request for Relief from Appendix IX of ASME Code, Section XI, Alternate Repair of a Vent Valve Line of Main Steam Piping (TAC No. MF3711)
8/6/14	Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Project Manager Assignment
8/8/14	Diablo Canyon Power Plant - NRC Integrated Inspection Report 05000275/2014003 and 05000323/2014003

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August 2014 DCISC
List of Documents Transmitted Electronically

8/11/14	Acceptance Review - American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Section XI Inservice Inspection Request for Alternative REP-SI (TAC MF4476 and MF4477)
8/21/14	Notice of Enforcement Discretion for Pacific Gas and Electric Company (TAC No. MF4645, NOED No. 14-4-001)

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
PSRC Minutes		
8/15/14	2014-021	Notification of Enforcement Discretion (NOED) for Tech Spec 3.8.1 Condition H
8/19/14	2014-022	AD7.ID16, Tool Pouch and Minor Maintenance Program

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCAs		No RCAs for this month.
ACE	SAPN 50633542	DA-2014 M&T Comp SA Neg Comment-Plant M
	SAPN 50634979	DA-M&T SA - Repeating Issue Analysis
	SAPN 50635008	DA-Potential SGI Reported in Notification
	SAPN 50636318	DA-E-101 ASW 1-2 Vault Fan Bad Megger Re
	SAPN 50636998	DA-EWS 0848 Inadvertent Actuation
	SAPN 50637928	DA-NCV: Lack of Seismic Config Control
Eff. Eval		No Evals for this month.

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
		No QPAR for this month.
9/5/14		DCPP Site Status Report
7/31/14	SFA 142050019	Performance Improvement Report Effectiveness
8/8/14	FileNet 142060013	QV Assessment of ISFSI Activities for July 2014

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August 2014 DCISC
List of Documents Transmitted Electronically

8/18/14	FileNet 142190033	Observation and Assessment of Valley Scale Calibration Services for the ISFSI Pad Expansion Project
8/21/14	FileNet 140760009	2014 Training and Qualifications Audit
		No new Schedule for this month.

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
		No updated Quick Hit Self-Assessment (QHSA) Schedule for this month.
		No Formal Benchmarking and Self-Assessments Schedule for this month.
7/15/14	SAPN 50618188	Maintenance and Technical Training Programs Comprehensive Self-Assessment Report
6/3/14	SAPN 50632275	NAYGN National Conference Trip Report
7/30/14	SAPN 50642658	INPO North Anna FPRV Benchmark/Trip Report
8/19/14	SAPN 50652240	Informal Benchmark - 2014 Summer WestTrain Technical/ESP Training Meeting
9/2/14	SAPN 50656081	Trip Report--Pressurized Water Reactor Owners Group (PWROG) Procedure Subcommittee (PSC) Meeting, Las Vegas NV
9/3/14	SAPN 50655911	Electronic Benchmark of the use of SRO Certifications
7/24/14	SAPN 50633364	Quick Hit Self-Assessment for PI&R Prep

H. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/28/14		Operating Plan 2014 - 2018, No new updates this month.
8/26/14	PPIR	Plant Performance Improvement Report (July)
Station Initiative		
8/13/14	SAPN 50639767	Supplemental Personnel Oversight - 3Q2014 Nuclear Safety Oversight Committee (NSOC) Visit
9/6/14		Reduction in Admin Impacts
9/18/14		Outage Planning and Execution Summary

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August 2014 DCISC
List of Documents Transmitted Electronically

8/20/14		Use of Human Performance Tools
8/27/14	SAPN 50613308	Outage Planning and Execution
8/8/14		Human Performance Excellence Action Plan/2014

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		No ODMs for this month.
POA		No POAs for this month.

J. Miscellaneous

Date	Title
8/5/14	PG&E @ Work - The Bulletin
8/19/14	PG&E @ Work - The Bulletin
8/26/14	PG&E @ Work - The Bulletin

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1433	T+1/T-0 Critique
	Week 1434	T+1/T-0 Critique
	Week 1435	T+1/T-0 Critique
	Week 1436	T+1/T-0 Critique

L. Documents Previously Transmitted during the Month

Date	Title
7/31/14 - 8/15/14	QV Real Time Report

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September 2014 DCISC
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
9/29/14	2014-010	Fire Detector Servicing

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
9/10/14	DCL-14-081	Central Coastal California Seismic Imaging Project, Shoreline Fault Commitment
9/11/14	DCL-14-082 DIL-14-013	Emergency Plan Implementing Document Update
9/25/14	DCL-14-086	Relief Request SWOL-REP-1 U2: Submittal of Westinghouse Letter LTR-RC-14-45, "Proprietary Information Clarification Request Response"
9/29/14	DCL-14-085	Sixty-day Response to NRC Request for Additional Information - National Fire Protection Association Standard 805

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
8/7/14	Forthcoming Meeting with Pacific Gas and Electric Company Regarding the Digital Replacement of the Process Protection System (TAC Nos. ME7522 and ME7523)
9/1/14	Notification of Inspection and Request for Information Diablo Canyon Power Plant NRC Inspection Report 05000323/2014005
9/2/14	Mid-Cycle Assessment Letter for Diablo Canyon Power Plant, Units 1 and 2 (Report 05000275/2014006 and 05000323/2014006)
9/9/14	Acceptance of Application - License Amendment Request 14-03 for Adoption of Technical Specification Task Force Traveler TSTF-432 for Diablo Canyon Power Plant, Units 1 and 2 (TAC Nos. MF4521 and MF4522)
9/9/14	Alternate Reactor Inspection Interval Requirements (TAC No. MF4678)
9/16/14	Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Request for Alternative NDE-SFW-13, Associated with the Third 10-Year Inservice Inspection Interval, Regarding Reactor Vessel Shell-to-Flange Weld Examinations (TAC Nos. MF3284 and MF3285)
9/23/14	Request for Additional Information (RAI) - License Amendment Request (LAR) 13-03 to Adopt NFPA 805 (TAC Nos. MF2333 and MF2334)
9/23/14	Diablo Canyon Power Plant, Units 1 and 2 - Reassignment of U.S. Nuclear Regulatory Commission Branch Chief
9/24/14	Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Project Manager Assignment

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September 2014 DCISC
List of Documents Transmitted Electronically

9/21/14	SAPN 50633357	Mid-Cycle Assessment
9/8/14	SAPN 50656284	NRC Inspection 71124-01 - Radiological Hazard Assessment and Exposure Controls
9/15/14	SAPN 50657669	NRC Inspection 71151-OR01 Quick Hit Assessment

H. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/29/14		Operating Plan 2014 - 2018, No new updates this month.
9/23/14	PPIR	Plant Performance Improvement Report (August)
		Station Initiative
9/6/14		Reduction in Admin Impacts
9/15/14		Outage Planning and Execution
9/17/14		Use of Human Performance Tools
9/25/14	SAPN 50639767	Supplemental Personnel Oversight 3Q2014 Nuclear Safety Oversight Committee (NSOC) Visit
9/30/14	SAPN 50613308	Outage Planning and Execution

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		No ODMs for this month.
POA		No POAs for this month.

J. Miscellaneous

Date	Title
9/3/14	PG&E @ Work - The Bulletin
9/9/14	PG&E @ Work - The Bulletin
9/16/14	PG&E @ Work - The Bulletin
9/23/14	PG&E @ Work - The Bulletin
9/30/14	PG&E @ Work - The Bulletin

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1437	T+1/T-0 Critique
	Week 1438	T+1/T-0 Critique
	Week 1440	T+1/T-0 Critique
	Week 1441	T+1/T-0 Critique

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List of Documents Transmitted Electronically

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
PSRC Minutes		
9/2/14	2014-023	• FHARE 118, Fire Detector Servicing • Outage Safety Plan
9/15/14	2014-024	Tornado POA Update
9/30/14	2014-026	License Amendment Request 14-04

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCAs		No RCAs for this month.
ACE	SAPN 50633506	DA-2014 SAI - Tac Course Coaching
	SAPN 50633516	DA-2014 SAI - X-Ray PM & Test Device Iss
	SAPN 50633543	DA-2014 M&T Comp SA Neg Comnt-Retrain T
	SAPN 50639940	DA-1C18-D-07-008 scope more than require
	SAPN 50640338	DA-RCS-1-RV-8010C As Found Lift High
Eff Eval		No Effectiveness Evals for this month.

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
8/31/14		Quality Performance Assessment Report (QPAR) - Second Period 2014; May 1, 2014 through August 31, 2014
		No Audit Reports for this month.
		No new Schedule for this month.

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
		No updated Quick Hit Self-Assessment (QHSA) Schedule for this month.
		No Formal Benchmarking and Self-Assessments Schedule for this month.

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L. Documents Previously Transmitted during the Month

Date	Title
8/16-14 - 9/30/14	QV Real Time Report

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A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
		No LBIES for this month.

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
10/14/14	DCL-14-090	Licensee Event Report 2014-002-00, Unit 2 Plant Shutdown Required by Technical Specifications
10/17/14	DCL-14-091	Material Status Report for the Period Ending August 31, 2014
10/14/14	DCL-14-089	Withdrawal of Request for Fee Waiver as Pilot Plant for Simplified Risk-Informed Approach for Closure of GSI-191
10/21/14	DCL-14-092	Diablo Canyon Units 1 and 2 – 3Q2014 – PI Data Elements (QR)
10/27/14	DCL-14-093	Revision to Response Date for NRC Request for Additional Information – Fire Modeling 3 – National Fire Protection Association Standard 805
10/29/14	DCL-14-098	Ninety-Day Response to NRC Request for Additional Information – National Fire Protection Association Standard 805
10/30/14	DCL-14-095/ DIL-14-014	Emergency Plan Implementing Document Update

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
10/14/14	Diablo Canyon Power Plant, Unit 2 – Inservice Inspection Program Relief Request SWOL-REP-1 U2 for Approval of an Alternative to the American Society of Mechanical Engineers Code, Section XI, for Preemptive Full Structural Weld Overlays (TAC No. MF3891)
10/15/14	Diablo Canyon Power Plant, Unit No. 2 – Request for Withholding Information from Public Disclosure (TAC No. MF3891)
10/15/14	Diablo Canyon Power Plant, Unit No. 2 – Request for Withholding Information from Public Disclosure (TAC No. MF3891)
10/22/14	Diablo Canyon Power Plant – NRC Problem Identification and Resolution Inspection Report 05000275/2014007 and 05000323/2014007
10/27/14	Diablo Canyon Power Plant – NRC Integrated Inspection Report 05000275/2014004 and 05000323/2014004

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
9/25/14	2014-025	NFPA 805, 90-Day Requests for Additional Information (RAIS)

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10/14/14	2014-027	MA1.ID14, Revision 23, "Plant Crane Operating Restrictions" E-Plan Appendix A Revision E-Plan Table of Contents Revision LAR 14-05 – "License Amendment Request for Revision to the Cyber Security Plan Implementation Schedule Completion Date"
10/28/14	2014-028	E-Plan, E-Plan Section 8, Revision 4.12
10/30/14	2014-029	Readiness for Restart OP1.ID1

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCAs	SAPN 50652094	DA-DEG 2-2 broken bolt
ACE	SAPN 50637196	DA-NCV: Failure to Implement SISIP Reqs
	SAPN 50639912	DA-Perform common cause analysis of safe
	SAPN 50642964	DA-Longstanding degraded/non-conforming
	SAPN 50652048	LTCA: DA-DG 2-3 Fuel Oil Booster PP Leak
	SAPN 50652322	DA-N-32 did not automatically de-energiz
Eff. Eval	SAPN 505232609	DA-MS Training Focused SA Finding 1/TPE

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
		No QPAR for this month.
		No Audit Reports for this month.
		No new Schedule for this month.
10/20/14	TA # 141760021	Technical Assessment of Calculations N-042 (Rev. 19) and N-051 (Rev. 16)
10/28/14	TA # 142860004	Technical Assessment of Calculation N-073 (Rev. 3)
9/18/14	SFA # 142730042	Short Form Assessment – TMOD Install N2 Cover Gas System on ICW Head Tank

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9/30/14	SFA # 142730049	Short Form Assessment – Review of OE Screening Process

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
7/15/14	SAPN 50618188	Maintenance and Technical Training Programs Comprehensive Self-Assessment Report
8/21/14		Diablo Canyon 2014 Mid-Cycle Assessment
9/22/14	SAPN 50658735	Preventative Maintenance Working Group Informal Benchmark/Trip Report
10/13/14	SAPN 50662760	Kontek/McGuire Gun Port Benchmarking Trip Report
10/13/14	SAPN 50663402	Equipment Reliability Working Group and STARS ERWG Team Meeting
7/15/14	SAPN 50618188	Maintenance and Technical Training Programs Comprehensive Self-Assessment Report
10/21/14	SAPN 50665917	Trip Report – Training Manager Working Meeting – INPO/STARS October 13-15, 2014
10/29/14	SAPN 50633691	Conservative Decision Making (CDM) Station Program
10/31/14	SAPN 50635312-3	Training Committee QHSA 2014
10/31/14	SAPN 50641012	Reactivity Management Quick Hit Self-Assessment

H. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/28/14		Operating Plan 2014 – 2018, No new updates this month.
11/19/14	PPIR	Plant Performance Improvement Report (October)
Station Initiative		
11/10/14	SAPN 50613308	Outage Planning and Execution
11/12/14		Use of Human Performance Tools
11/14/14		Outage Planning and Execution
11/16/14		Reinvigorating Employee Engagement
11/17/14		Diablo Canyon Power Plant Strategic Performance Improvement Plan, Rev. 1
11/17/14	SAPN 50639767	Supplemental Personnel Oversight 3Q2014 Nuclear Safety Oversight Committee (NSOC) Visit

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11/17/14		Action Plan – Reduction in Admin Impacts

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		No ODMs for this month.
POA		No POAs for this month.

J. Miscellaneous

Date	Title
10/7/14	PG&E @ Work – The Bulletin
10/14/14	PG&E @ Work – The Bulletin
10/21/14	PG&E @ Work – The Bulletin
10/28/14	PG&E @ Work – The Bulletin

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1442	T+1/T-0 Critique
	Week 1443	T+1/T-0 Critique
	Week 1444	T+1/T-0 Critique
	Week 1445	T+1/T-0 Critique
	Week 1446	T+1/T-0 Critique
	Week 1447	T+1/T-0 Critique

L. Documents Previously Transmitted during the Month

Date	Title
10/1/14 – 11/3/14	QV Real Time Report

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A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
11/5/14	2014-011	E-Plan Section 8, Maintaining Emergency Prep
11/21/14	2014-015	Install RCP Shutdown Seal
11/24/14	2014-016	RCP Shutdown Seal DCP
11/21/14	2014-012	E-Plan, Section 1: Definitions and Abbreviations
11/21/14	2014-013	E-Plan, Section 2: Scope and Applicability
11/21/14	2014-014	E-Plan, Section 7: Facilities and Equipment

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
11/3/14	DCL-14-100	Expected Submittal Date for Licensee Event Report 1-2014-003 Supplement 2
11/10/14	DCL-14-101	Core Operating Limits Report for Unit 2 Cycle 19
11/13/14	DCL-14-105	Annual Review of the Emergency Action Levels
11/13/14	DCL-14-106	Annual Review of the Emergency Action Levels
11/19/14	DCL-14-107	Diablo Canyon Power Plant Licensing Basis Verification Project Change in Commitment Regarding Component Design Basis Reviews
11/26/14	DCL-14-110	One-Hundred-Twenty-Day Response to NRC Request for Additional Information – National Fire Protection Association Standard 805

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
11/12/14	Diablo Canyon Power Plant, Unit Nos. 1 and 2 – Request for Withholding Information From Public Disclosure (TAC Nos. MF4988 and MF4989)
11/17/14	Summary of September 24, 2014, Teleconference Meeting with Pacific Gas and Electric Company on Digital Replacement of the Process Protection System Portion of the Reactor Trip System and Engineered Safety Features Actuation System at Diablo Canyon Power Plant, Unit Nos. 1 and 2 (TAC Nos. ME7522 and ME7523)
11/18/14	Letter to Debbie Arnold Re: Tsunami Hazard
11/19/14	Diablo Canyon Power Plant, Units 1 and 2 – Reassignment of U.S. Nuclear Regulatory Commission Branch Chief
11/20/14	Diablo Canyon Proposed Amendment Using TSTF-505, Rev. 1
11/21/14	Diablo Canyon Power Plant, Unit Nos. 1 and 2 – Project Manager Assignment
11/25/14	Forthcoming Meeting with Pacific Gas and Electric Company Regarding Pre-Submittal Discussion on License Amendment Request for Diablo Canyon Power Plant, Units 1 and 2 (TAC Nos. MF5301 and MF5302)

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		No Formal Benchmarking and Self-Assessments Schedule for this month.
11/6/14	SAPN 50669207	Fukushima FLEX and Spent Fuel Pool Instrumentation Quick Hit Self-Assessment Report

H. Performance Information (PIIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/28/14		Operating Plan 2014 – 2018, No new updates this month.
		PIIR
		No PIIR this month.
		Station Initiative
12/1/14	SAPN 50613308	Outage Planning and Execution

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		No ODMs for this month.
POA		No POAs for this month.

J. Miscellaneous

Date	Title
11/4/14	PG&E @ Work – The Bulletin
11/10/14	PG&E @ Work – The Bulletin
11/18/14	PG&E @ Work – The Bulletin
11/25/14	PG&E @ Work – The Bulletin

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1448	T-1/T-0 Critique
	Week 1449	T-1/T-0 Critique

L. Documents Previously Transmitted during the Month

Date	Doc. No.	Title
		No documents previously transmitted during this month.

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List of Documents Transmitted Electronically

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
PSRC Minutes		
11/10/14	2014-031	E-Plan, Section 1, Rev. 4.07 E-Plan, Section 2, Rev. 4.04 E-Plan, Section 7, Rev. 4.19
11/18/14	2014-032	DDP 1000000495 – Install RCP Shutdown Seal LBIEs 2014-015, 2014-016

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCA	50656762	DA-Improper Change for Ocean PAR process
ACE	50657636	DA-2014 PIR: Green NCV Untimely CAs
	50659473	DA-PCD – Potentially Adverse Trend
	50660606	DA-CFCU 1-2 Failed to STOP
Eff. Eval		No Effectiveness Evals for this month

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
		No QPAR for this month.
10/15/14	FileNet # 141750013	2014 DCPD and ISFSI Security Programs Audit
11/13/14		DCPP Site Status Report
		No new Schedule for this month
9/9/14	QVA # 142060014	QV Assessment of ISFSI Activities for August, 2014
10/29/14	QVA # 142060015	QV Assessment of ISFSI activities for September, 2014
11/5/14	SFA 143090069	Quality Verification Short Form Assessment # 143090069 2R18 Clearance Issues
11/26/14	QVA # 142060016	QV Assessment of ISFSI Activities for October, 2014

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
		No updated Quick Hit Self-Assessment (QHSA) Schedule for this month.

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List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
12/9/14	2014-018	DCP M-49665/M-50665: LP Rotor Replace – Missile
12/9/14	2014-020	E-Plan Section 5: Organizational Control
12/9/14	2014-021	E-Plan Appendix F: ERO On-Shift Staffing
12/18/14	2014-023	E-Plan Appendix G: PAR Strategy Bases
12/18/15	2014-024	E-Plan Section 4: Emergency Conditions
12/18/15	2014-025	E-Plan Section 8: Emergency Conditions
12/24/14	2014-026	DDP 1000025084: Unit 1 SI Load Sequence Timers

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
12/2/14	DCL-14-111	American Society of Mechanical Engineers Section XI Inservice Inspection Program Relief Request NDE-RCS-SE-2R19 - Use of Alternate Sizing Qualification Criteria Through a Protective Clad Laver
12/8/14	DCL-14-112	Petition to Amend Cyber Security Requirements: Request for Comments (Federal Register Vol. 79, 56525, dated September 22, 2014)
12/8/14	DCL-14-113	Pacific Gas and Electric Company Request for Regulatory Conference (EA-14-01 0)
12/16/14	DCL-14-117, DIL-14-015	Updates to Emergency Plan Section 8
12/22/14	DCL-14-103	10 CFR 54.21(b) Annual Update to the Diablo Canyon Power Plant License Renewal Application (LRA), Amendment 48 and LRA Appendix E, Applicant's Environmental Report – Operating License Renewal Stage, Amendment 1
12/22/14	DCL-14-118	Supplement to Response to NRC Request for Additional Information Regarding Response to NRC Bulletin 2012-01
12/29/14	DCL-14-120	Diablo Canyon Power Plant Emergency Preparedness Licensing Basis Verification
12/29/14	DCL-14-121	Cancellation of Licensee Event Report 1-2014-001
12/30/14	DCL-14-122	Licensee Event Report 1-2014-004-00, Actuation of Six Emergency Diesel Generators due to Loss of Offsite Power
12/31/14	DCL-14-123	Radiation Response to NRC Request for Additional Information – National Fire Protection Association Standard 805

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
11/13/14	Diablo Canyon Proposed Amendment Using TSTF-505, Rev. 1
12/1/14	Diablo Canyon Power Plant – NRC Emergency Preparedness Inspection Report 05000275/2014502 and 05000323/2014502, Preliminary White

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List of Documents Transmitted Electronically

Date	Doc. No.	Title
12/5/14		Finding and Apparent Violation
12/10/14		Target Date for Response to the RAI re, Proposed Amendment Using TSTF-505, Rev. 1 (TAC MF3240 and MF3241)
12/10/14		Supplemental Information Related to Development of Seismic Risk Evaluations Regarding Therequest for Information Issued Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Relating to Seismic Hazard Reevaluations for Recommendation 2.1 of the Fukushima Dai-ichi Accident
12/10/14		Summary of December 18, 2013, Teleconference Meeting with Pacific Gas and Electric Company on Digital Replacement of the Process Protection System Portion of the Reactor Trip System and Engineered Safety Features Actuation System at Diablo Canyon Power Plant, Unit Nos. 1 and 2 (TAC Nos. ME7522 and ME7523)
12/11/14		Generic Fundamentals Section of the Written Operator Licensing Examination
12/15/14		Diablo Canyon Power Plant, Units 1 and 2 – New Seismic Hazards Information Developed in Response to State of California Assembly Bill 1632 (TAC Nos. MF4750 and MF4751)
12/15/14		Diablo Canyon Power Plant – NRC Focused Baseline Inspection Report 05000275/2014008 and 05000323/2014008
12/17/14		Diablo Canyon Power Plant, Unit 2 – Acceptance Review for ASME Section XI ISI Program Relief Request NDE-RCS-SE-2R19, Use of Alternate Sizing Qualification Criteria Through a Protective Clad Layer (TAC No. MF5348)
12/22/14		Summary of December 11, 2014, Public Meeting with Pacific Gas and Electric Company Regarding Installation of 500 Kilovolt Output Generator Breakers (TAC Nos. MF5315 and MF5316)
12/23/14		Diablo Canyon Power Plant, Units 1 and 2 – Inservice Inspection Program Request for Alternative REP-SI: Proposed Alternative to Requirements for Repair and Replacement Activities for Certain Safety Injection Pump Welded Attachments (TAC NOS. MF4476 AND MF4477)
12/29/14		Regulatory Conference with Diablo Canyon Nuclear Power Plant

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
11/25/14	2014-033	DCP J-41746/J-43064 Seismic Trip Upgrade DCP M-16332/M-50665 LP Rotor Replacement DCP M-49665 LP Rotor Replacement Digital Upgrades E-Plan, Section 5 Organizational Control E-Plan, Appendix F ERO In-Shift Staffing
12/9/14	2014-034	E-Plan Sections 1, 5, and 7

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1/5/15	50613306	2014 Achieve a better work-life balance
1/8/15		Diablo Canyon Power Plant Strategic Performance Improvement Plan
1/9/15		Outage Planning and Execution Summary

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		No ODMs for this month.
POA		No new POAs for this month.

J. Miscellaneous

Date	Title
12/2/14	PG&E @ Work – The Bulletin
12/9/14	PG&E @ Work – The Bulletin
12/16/14	PG&E @ Work – The Bulletin
12/23/14	PG&E @ Work – The Bulletin
12/30/14	PG&E @ Work – The Bulletin

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1450	T+1/T-0 Performance Critique
	Week 1451	T+1/T-0 Performance Critique
	Week 1452	T+1/T-0 Performance Critique
	Week 1501	T+1/T-0 Performance Critique
	Week 1502	T+1/T-0 Performance Critique

L. Documents Previously Transmitted during the Month

Date	Doc. No.	Title
		No documents previously transmitted during the month.

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E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCAs	50655170	DA-Evaluate response to DEG 22 MOW EI
ACE	50618079	DA-U1 RCDT has explosive gas mixture
	50655868	DA-Vehicle Damage to Security Mobile
	50658121	DA-QAAF-PSP rev out of date in field
	50662496	DA-Green NRC 3Q14 Baseline: AP-25 Issue
Eff. Eval		No Effectiveness Evals for this month.

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
		No QPAR for this month.
12/2/14	FileNet # 142030032	Audit Report – Quality Verification Department – Geosciences Quality Assurance Program Audit
		No new Schedule for this month.
11/2014	FileNet # 143370011	QV Assessment of ISFSI Activities for November, 2014

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
		No updated Quick Hit Self-Assessment (QHSA) Schedule for this month.
		No Formal Benchmarking and Self-Assessments Schedule for this month.
		No QHSA for this month.

H. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/28/14		Operating Plan 2014 – 2018, No new updates this month.
12/15/14	PPIR	Plant Performance Improvement Report (October)
Station Initiative		
12/10/14		DCPP Leadership Development Program Action Plan
12/10/14		Use Of Human Performance Tools Summary
12/10/14		Reinvigorating Employee Engagement Summary
12/29/14	SAPN	Outage Planning and Execution Action Plan

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A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
1/8/15	2014-017	DCP J-41746/J-43064; Seismic Trip Upgrade
1/8/15	2014-019	DCP M-49665/M-50665; LP Rotor Replacement
12/10/14	2014-022	DCN 200001404 MUDA; E-Plan Sections 1, 5, 7
1/23/15	2015-001	FHARE 29, Fire Traps for DG Rooms

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
1/8/15	DCL-15-001 DIL-15-001	Emergency Plan Implementing Document Update
1/8/15	DCL-15-002 DIL-15-002	Updates to Emergency Plan Section 5 and Appendix F
1/12/15	DCL-15-003 DIL-15-003	Updates to the Emergency Plan
1/15/15	DCL-15-004 DIL-15-004	Emergency Plan Implementing Document Update
1/29/15	DCL-15-014	Expected Submittal Date for Licensee Event Report 2014-002-01

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
1/7/15	Diablo Canyon Power Plant, Units 1 and 2 – NRC Emergency Preparedness Annual Inspection Report 05000275/2014501 and 05000323/2014501
1/8/15	Generic Fundamentals Examination Results
1/14/15	NWX-US Nuclear Regulatory Commission Regulatory Conference Transcript, January 14, 2015
1/21/15	Forthcoming Meeting with Pacific Gas and Electric Company Regarding Pre-Submittal Discussion on Alternate Source Term License Amendment Request for Diablo Canyon Power Plant, Units 1 and 2 (TAC Nos. MF5596 and MF5597)
1/23/15	Diablo Canyon Power Plant, Units 1 and 2 – Acceptance Review for the Application of Leak-Before-Break in the Fuel Structural Analysis and Use of the Fuel Structural Analysis Results to Satisfy 10 CFR 50.46(b)(4) (TAC Nos. MF4988 and MF4989)
1/29/15	Diablo Canyon Power Station, Units 1 and 2 – Requests for Additional Information (RAIs) for License Amendment Request 14-01 Associated with Revision TS 3.8.1, “AC Sources – Operating” (TAC Nos. MF3826 and MF3827)
1/29/15	Diablo Canyon Power Plant, Units 1 and 2 and Diablo Canyon Spent Fuel Storage Installation – Individual Notice of Consideration of Issuance of Amendments to Facility Operating Licenses and Special Nuclear Material License Proposed No Significant Hazards Consideration Determination.

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		and Opportunity for a Hearing and Order Imposing Procedures for Document Access to Sensitive Unclassified Non-Safeguards Information (TAC Nos. MF2809 and MF2810)
1/29/15		Diablo Canyon Power Plant – NRC Integrated Inspection Report 05000275/2014005 and 05000323/2014005

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
PSRC Minutes		
11/2/14	2014-030	Readiness for Restart OP1 ID1
1/13/15	2014-035	E-Plan Appendix G: PAR Strategy Bases
12/23/14	2014-036	- DDP 1000025064, Unit 1 SI Load Sequence Timers - Physical Security Plan
1/22/15	2015-001	FHARE 29, Fire Traps for DG Rooms

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCAs		No RCAs for this month.
ACE		No ACEs for this month.
Eff. Eval		No Effectiveness Evals for this month.

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
12/31/14		Quality Performance Assessment Report (QPAR) – Third Period 2014: September 1, 2014 through December 31, 2014
11/25/14	FileNet # 142260001	Emergency Preparedness Program Audit
1/14/15	FileNet # 142890009	2014 DCPD and ISFSI Maintenance Audit
1/28/15	FileNet # 143220030	2015 Applied Technology Services, San Ramon, Audit
11/20/14	TA # 143020009	Technical Assessment of Calculation N-227 (Rev. 5)
		No new Schedule for this month.
1/14/15		DCPD Site Status Report

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G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
		No updated Quick Hit Self-Assessment (QHSA) Schedule for this month.
		No Formal Benchmarking and Self-Assessments Schedule for this month.
		No QHSA for this month.

H. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/28/14		Operating Plan 2014 – 2018, No new updates this month
1/22/15	PPIR	Plant Performance Improvement Report (December)
2/13/15	PPIR	Plant Performance Improvement Report (January)
Station Initiative		
1/9/15		Outage Planning and Execution
1/12/15		Diablo Canyon Power Plant Strategic Performance Improvement Plan
1/13/15		Diablo Canyon Power Plant Strategic Performance Improvement Plan, Rev. 2
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 5
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 6
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 7
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 8
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 9
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 10
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 11
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 13
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 15
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 16

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1/28/15	SAPN 50642463	Implement World Class FIN Team
1/28/15		DCPD Integrated Equipment Reliability Action Plan – Action 18
2/2/15	SAPN 50670107	Improve Project Cost Monitoring / Predictability Task 18; Project Cost - SPSI
2/2/15		2013-2014 DCPD Knowledge Transfer Action Plan
2/4/15		Plant Health Improvement Plans (PHIPs) 2015 Action Plan
2/6/15	SAPN 50670107	DCPD Integrated Equipment Reliability Action Plan Final
2/6/15		DCPD Integrated Equipment Reliability Action Plan – Action 1 & 2
2/6/15		DCPD Integrated Equipment Reliability Action Plan – Action 3
2/6/15	SAPN 50586410 Task 57	Top Ten Equipment Issues 500 kV Turbine Building Stand-off Maintenance Strategy
2/6/15	SAPN 50586410 Task 40 / SAPN 50678565	Top Ten Equipment Issue 230kV Switchyard RG 165 Insulator Replacement
2/6/15	SAPN 50671712 / 50671809	Top Ten Equipment Issues Eliminate SCW HX Fouling
2/6/15	RCE SAPN 50652094	Top Ten Equipment Issues List EDG Inlet to Fuel Leader Special Capscrews Action Plan
2/7/15	SAPN 50580735 Task 3	Top Ten Equipment Issues CFCU SI Timer Relay Modification
2/7/15	SAPN 50671588 / 50672668	Top Ten Equipment Issues SFP Bridge Crane
2/7/15	SAPN 50302227	480V Breaker TB-06-02
2/7/15		Los Padres/Diablo Canyon Electric Power Reliability Plan
2/7/15		DCPD Integrated Equipment Reliability Action Plan – Action 12
2/7/15	SAPN 50670107	ER Action 13 DC Backlog Review and Priority List Action Plan
2/7/15		DCPD Integrated Equipment Reliability Action Plan – Action 16
2/7/15		DCPD Integrated Equipment Reliability Action Plan – Action 19

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List of Documents Transmitted Electronically

2/7/15		DCPD Integrated Equipment Reliability Action Plan – Action 20
2/7/15	SPAN 50586412 / 50654931	INPO EN.1-1 Response Needs Improvement
2/8/15		DCPD Integrated Equipment Reliability Action Plan – Action Plan 4
2/9/15	SAPN 50809077 / 50307598	Replace U1/U2 EDG Recorder Watt Transducer Accuracy Upgrade
2/10/15	SAPN 50639767	Supplemental Personnel Oversight 3Q2014 Nuclear Safety Oversight Committee (NSOC) Visit
2/12/15		Use of Performance Improvement Tools
2/13/15	SAPN 50670107	Outage Scope Improvements
2/13/15	SAPN 50670107	Long Range Project Plan Improvements
2/17/15		OUR Team's Equipment Reliability Excellence Initiatives
2/17/15		Strategic Communications Plan – Generating Awareness and Understanding of Our Team's Integrated Equipment Reliability Plan
2/17/15	SAPN 50659641	DCPD Action Plan in response to STARS Equipment Reliability Assist Visit September, 2014
2/17/15		Emergency Diesel Generator Reliability 2015 Action Plan
2/17/15		Main Condenser Reliability 2015 Action Plan
2/17/15		Critical Spares 2015 Action Plan
2/17/15		DCPD Integrated Equipment Reliability Action Plan – Action 17
2/18/15	SAPN 50642463 Task 002	Integrated site wide focus on reducing generation loss and improving reliability of critical equipment
2/18/15		ER Excellence Initiative – Governance
2/18/15	SAPN 50670107	Preventive Maintenance Program Improvement
2/18/15		DCPD Integrated Equipment Reliability Action Plan – Action 14
2/18/15		DCPD Integrated Equipment Reliability Action Plan – Action 17 Updated 2/18/15
2/18/15	SAPN 50670107	ER Action Plan 21

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		No ODMs for this month

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January 2015 NSOC/DCISC
List of Documents Transmitted Electronically

POA	No POAs for this month.	

J. Miscellaneous

Date	Title	
1/6/15	PG&E @ Work – The Bulletin	
1/13/15	PG&E @ Work – The Bulletin	
1/21/15	PG&E @ Work – The Bulletin	
1/28/15	PG&E @ Work – The Bulletin	

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1503	T+1/T-0 Performance Critique
	Week 1504	T+1 Performance Critique
	Week 1505	T+1 Performance Critique
	Week 1506	T+1 Performance Critique
	Week 1507	T+1 Performance Critique

L. Documents Previously Transmitted during the Month

Date	Doc. No.	Title
No documents previously transmitted during this month.		

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February 2015 DCISC
List of Documents Transmitted Electronically

2/25/15	DCL-15-031	Proposed Commitment for Response to NRC Request for Additional Information Regarding Submittal Date of the Integrated Analysis, National Fire Protection Association Standard 805
2/25/15	DCL-15-032	Response to NRC Request for Additional Information – National Fire Protection Association Standard 805
2/25/15	DIL-15-006	Annual Radioactive Effluent Release Report for 2014

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title	
2/4/15	Diablo Canyon, Units 1 and 2 – Requests for Additional Information (RAIs) for Fire Protection (NFPA-805) License Amendment Request (LAR) (TAC Nos. MF2333 and MF2334)	
2/5/15	Summary of Regulatory Conference to Discuss Safety Significance of Diablo Canyon Power Plant Protective Action Recommendations for Areas of the Ocean Finding	
2/11/15	Final Significance Determination of White Finding and Notice of Violation: Diablo Canyon Power Plant – NRC Emergency Preparedness Inspection Report 05000275/2015502 and 05000323/20135502	
2/18/15	Diablo Canyon RAI on Instrumentation and Controls for the Proposed TSTF-505 Amendment (TAC MF3240 and MF3241)	
2/19/15	Summary of February 3, 2015 Public Meeting with Pacific Gas and Electric Company Regarding Alternate Source Term Pre-Submittal License Amendment Request for Diablo Canyon Power Plant, Units 1 and 2 (TAC Nos. MF5596 and MF5597)	
2/24/15	Diablo Canyon 1 & 2 – Acceptance Review of Cyber Security Plan Implementation Schedule Completion Date for Milestone h (TAC Nos. MF5078 and MF5079)	
2/24/15	Diablo Canyon Unit 1 – RAIs for ASME Section XI ISI Program Request for Alternative RPV-U1 - Extension to Allow Use of Alternate Reactor Inspection Interval Requirements (TAC No. MF4678)	
2/24/15	Project Manager Change for the License Renewal of Diablo Canyon Power Plant, Units 1 and 2 (TAC Nos. MF4019 and MF4020)	
2/24/15	Forthcoming Meeting with Pacific Gas and Electric Regarding the Digital Replacement of the Process Protection System at Diablo Canyon Power Plant, Units 1 and 2 (TAC Nos. ME7522 and ME7523)	

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
2/3/15	2015-002	DCL-15-007, "Response to NRC Request for Additional Information Regarding License Amendment Request 13-02, "Revision to Technical Specifications to Adopt Risk Informed Completion Times TSTF-505, Revision 1, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4B"

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List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
2/6/15	2015-002	RCPB Analysis Using ANSYS
2/6/15	2015-003	Exchange Primary and Backup Reactor Protection Trips
2/9/15	2015-004	Establish 76°F as Design Basis Outdoor Ambient Temp.

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
2/2/15	DCL-15-015	Supplemental Licensee Event Report 1-2014-003-02, Unanalyzed Condition Affecting Units 1 and 2 Emergency Diesel Generators, Tornado Missiles
2/2/15	DCL-15-009	Submittal of Advanced Logic System Phase 2 Documents for the License Amendment Request for Digital Process Protection System Replacement
2/4/15	DCL-15-020	Owner's Activity Report for Unit 2 Eighteenth Refueling Outage
2/5/15	DCL-15-007	Response to NRC Request for Additional Information Regarding License Amendment Request 13-02, "Revision to Technical Specifications to Adopt Risk Informed Completion Times TSTF-505, Revision 1, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4B"
2/5/15	DCL-15-021	Response to NRC Request for Additional Information Regarding Relief Request REP-SI
2/17/15	DCL-15-024, DIL-15-005	Emergency Plan Implementing Document Update
2/19/15	DCL-15-022	Response to NRC Request for Additional Information Regarding License Amendment Request 14-01, "Revision to Technical Specification 3.8.1, "AC Sources - Operating"
2/23/15	DCL-15-026	Pacific Gas and Electric Company's Fourth Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)
2/23/15	DCL-15-028	Pacific Gas and Electric Company's Fourth Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)
2/25/15	DCL-15-023	License Amendment Request 15-01, Incorporation into Licensing Basis of Pressurizer Filling Analysis for Major Rupture of a Main Feedwater Pipe Accident
2/25/15	DCL-15-027	Update to the Diablo Canyon Power Plant License Renewal Application (LRA), Amendment 49 and LRA Appendix E, "Applicant's Environmental Report – Operating License Renewal Stage," Amendment 2

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List of Documents Transmitted Electronically

2/17/15	2015-003	- LBIE 2015-002, RCPB Analysis Using ANSYS - LBIE 2015-003, CRW15.3(x), Exchange Primary and Backup Reactor Protection Trips - LBIE 2015-004, CR V-9.4(x), Establish 76°F as Design Basis Outdoor Ambient Temperature
		DCL-15-022, "Response to NRC Request for Additional Information Regarding License Amendment Request 14-01, "Revision to Technical Specification 3.8.1, "AC Sources-Operating"
		DCL-15-015, "Supplemental Licensee Event Report 1-2014-003-02, Unanalyzed Condition Affecting Units 1 and 2 Emergency Diesel Generators, Tornado Missiles"
		E-Plan, Section 4, Revision 4.15, "Emergency Conditions"

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCAs	There are No RCAs for this month.	
ACE	There are No ACEs for this month.	
Eff. Eval	There are no Eff. Evals for this month.	

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
	There is no QPAR for this month.	
	There are no Audit Reports for this month.	
	There is no new Schedule for this month.	
2/12/15	TA # 143290067	Technical Assessment of Calculation STA-255 (Rev 3)
2/4/15	SFA # 150350033	Assessment of System Engineering
2/5/15	SFA # 150360043	Assessment of IY19

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
	There is no updated Quick Hit Self-Assessment (QHSA) Schedule for this month.	

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List of Documents Transmitted Electronically

		There is no Formal Benchmarking and Self-Assessments Schedule for this month.
		There are no QHSA for this month.
H. Performance Information (PIR, Operating Plan, Station Initiatives)		
Date	Doc. No.	Title
2/28/14		Operating Plan 2014 – 2018, No new updates this month.
PIR		There is no PIR this transmittal (sent 2 last month due to date sent out)
Station Initiative		
2/17/15		Main Condenser Reliability 2015 Action Plan
2/18/15		Plant Health Improvement Plans (PHIPs) 2015 Action Plan
2/19/15		OUR Team's Equipment Reliability Excellence Initiatives
2/19/15		Mapping of INPO 'Success Factors for Achieving High Equipment Reliability – A Leadership Perspective' to 'OUR Team's Equipment Reliability Excellence Initiatives'
2/20/15	SAPN 50560735 Task 3	Top Ten Equipment Issues CFCC SI Timer Relay Modification
2/20/15	SAPN 50586410 Task 67	Top Ten Equipment Issues 500 kV Turbine Building Stand-off Maintenance Strategy
2/20/15	SAPN 50586410 Task 40 / SAPN 50678565	Top Ten Equipment Issues 230kV Switchyard RG 165 Insulator Replacement
2/26/15	SAPN 50671712 / 50671809	Top Ten Equipment Issues Eliminate SCW HX Fouling
2/26/15	SAPN 50642463	Equipment Reliability Integrated Action Plan #12 Implement World Class FIN Team and Processes
2/28/15		DCPP Integrated Equipment Reliability Action Plan
2/27/15		Use of Our Human Performance Tools & Performance Improvement Processes
2/27/15	SPAN 50670107	Action Plan – Outage Scope Improvements
2/28/15		INPO EN.1-1 Response Needs Improvement
3/1/15		Operations Focus – Ops Leadership Action Plan
3/2/15	SAPN 50670107	Improve Project Cost Monitoring / Predictability

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List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations		
Date	LBIE No.	Title
3/2/15	2015-006	Spurious SI for PZR Filling Reanalysis/ CN-TA-12-67
3/2/15	2015-007	FLB Analysis for Pressurizer Filling/CN- TA-11-5 6
3/3/15	2015-005	E-Plan Section 4, Emergency Conditions, Rev. 4.15
3/3/15	2015-008	Replace SSPS Circuit Boards/RPE 8*4616
B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)		
Date	Letter No.	Title
3/2/15	DCL-15-033	Licensee Event Report 2015-001-00, Both Trains of Residual Heat Removal Inoperable Due to Circumferential Crack on a Socket Weld
3/11/15	DCL-15-034	Final Response to Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 Flooding
3/11/15	DCL-15-035	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
3/26/15	DCL-15-039	Consent to Confirmatory Order EA-14-134 and Hearing Waiver Form
3/30/15	DCL-15-038	Response to NRC Request for Additional Information Regarding Relief Request REP-SI - Part 2
3/30/15	DCL-15-040	Response to NRC Request for Additional Information Regarding Unit 1 Reactor Vessel Inspection Interval Extension From 10 to 20 Years
3/30/15	DCL-15-041	Supplemental Licensee Event Report 2-2013-004-01, Technical Specification 3.8.1 Not Met Due to Failed Wire Lug on Emergency Diesel Generator 2-3
3/30/15	DCL-15-042	Supplemental Licensee Event Report 1-2014-004-01, Actuation of Six Emergency Diesel Generators due to Loss of Offsite Power
3/31/15	DCL-15-044	Decommissioning Funding Report for Diablo Canyon Power Plant, Units 1 and 2
C. NRC Incoming Correspondence (including Inspection Reports)		
Date		Title
3/3/15		Diablo Canyon Power Plant, Units 1 and 2 – Reassignment of U.S. Nuclear Regulatory Commission Branch Chief
3/4/15		Annual Assessment Letter for Diablo Canyon Power Plant, Units 1 and 2 (Report 05000275/2014001 and 05000323/2014001)
3/9/15		Diablo Canyon Power Plant, Unit Nos. 1 and 2 – Request for Withholding Information From Public Disclosure (TAC Nos. ME7522 and ME7523)
3/20/15		Diablo Canyon Nuclear Power Plant Units 1 and 2 – Notification of Inspection (NRC Inspection Report 05000275/2015002 and 05000323/2015002 and Request for Information)

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List of Documents Transmitted Electronically

3/2/15	SAPN 50609077 / 50307598	Replace U1/U2 EDG Recorder Watt Transducer Accuracy Upgrade
3/2/15	SAPN 50378557 / 50523909	Replace U1/U2 Diesel Fuel Oil Day Tank (DFODT) Level Switches
3/3/15		Reinvigorating Employee Engagement
3/3/15	SAPN 50671281	Top Ten Issue Eagle 21 potential trip risk

I. Operational Documents (ODM Minutes, POAs)		
Date	Doc. No.	Title
ODMs		No ODMs for this month
POA		No POAs for this month

J. Miscellaneous		
Date		Title
2/3/15	PG&E @ Work – The Bulletin	
2/10/15	PG&E @ Work – The Bulletin	
2/18/15	PG&E @ Work – The Bulletin	
2/24/15	PG&E @ Work – The Bulletin	

K. Functional Area Documents		
Subcommittee	Date/Doc	Title
Maintenance	Week 1508	T+1 Performance Critique
	Week 1509	T+1 Performance Critique

L. Documents Previously Transmitted during the Month		
Date	Doc. No.	Title
		No documents previously transmitted during the month

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List of Documents Transmitted Electronically

3/25/15		Diablo Canyon Power Station, Units 1 and 2 – [Round 2] Requests for Additional Information (RAIs) for License Amendment Request 14-01 Associated with Revision to TS 3.8.1, 'AC Sources – Operating' (TAC Nos. MF3826 and MF3827)
3/25/15		Summary Of Telephone Conference Call Held On March 4, 2015, Between The U.S. Nuclear Regulatory Commission And Pacific Gas And Electric Company Concerning The Diablo Canyon Power Plant, Units 1 And 2, License Renewal Application

D. PSRC Minutes		
Date	Doc. No.	Title
PSRC Minutes		
3/3/15	2015-005	RPE 8*4616, SSPS Printed Circuit Boards
3/4/15	2015-004	CN-TA-12-67 Spurious SI for Pressurizer Filling Reanalysis CN-TA-11-56, FLB Analysis for Pressurizer Filling LAR 15-01, Incorporation into Licensing Basis of Pressurizer Filling Analysis for Major Rupture of a Main Feedwater Pipe Accident
3/20/15	2014-030	Readiness for Restart OP1, ID1: Status of Sign-offs for Mode 2 to Mode 1 Readiness for Restart OP1, ID1: Loss of 230 kV (The minutes from 11/2/14 have been updated for clarification on 3/20/15)
3/23/15	2015-006	STRIDE 15-001: Verify Battery Cell Parameters STRIDE 15-002: Routine Monthly Checks Required by Licenses Behind Radiation Doors

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)		
Type	Doc. No.	Title
RCAs		No RCAs for this month
ACE		No ACEs for this month
Eff. Eval		No Effectiveness Evals for this month

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)		
Date	Doc. No.	Title
5/1/14		Quality Performance Assessment Report (QPAR) First Period 2014 – January 1, 2014 through April 30, 2014
9/1/14		Quality Performance Assessment Report (QPAR) Second Period 2014 – May 1, 2014 through August 31, 2014
1/1/15		Quality Performance Assessment Report (QPAR) Third Period 2014 – September 1, 2014 through December 31, 2014

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List of Documents Transmitted Electronically

3/9/15	FileNet # 150120009	2015 Chemistry Audit Report
11/17/14		Nuclear Internal Audit Schedule
3/4/15	SFA 150610040	Unit 1 Spent Fuel Pool Bridge Crane GEMCO
3/31/15		DCPP Site Status Report

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
		No updated Quick Hit Self-Assessment (QHSA) Schedule for this month.
		No Formal Benchmarking and Self-Assessments Schedule for this month.
12/18/14	SAPN 50678409	2014 Fire Protection QHSA

H. Performance Information (PIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/17/15		Operating Plan 2015 – 2019
3/16/15	PIR	Plant Performance Improvement Report (February)
3/4/15	SAPN 50593697	DCPP Integrated Equipment Reliability Action Plan – Action 7
3/5/15	SAPN 50642463 Task 002	Integrated Site Wide Focus on Reducing Generation Loss and Improving Reliability of Critical Equipment
3/5/15		DCPP Integrated Equipment Reliability Action Plan – Action 2
3/7/15	SAPN 50642463	Equipment Reliability Integrated Action Plan #12 Implement World Class FIN Team and Processes
3/7/15	SAPN 50670107 Task 13	ER Action 13 Diablo Canyon Backlog Review and Priority List
3/12/15		Reinvigorating Employee Engagement
3/12/15		Emergency Diesel Generator Reliability 2015 Action Plan
3/18/15		Main Condenser Reliability 2015 Action Plan
3/19/15		Strategic Communication Plan – Generating Awareness and Understanding of Our Team's Integrated Equipment

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List of Documents Transmitted Electronically

4/2/15		Prep Action Plan - DCPP Integrated Equipment Reliability Action Plan - Action 17
4/5/15	SAPN 50302227	480V Breaker TB-06-02
4/6/15		Nuclear Work Management Department 2015 Improvement Plan
4/6/15	SAPN 50560735 Task 3	Top Ten Equipment Issues CFCU SI Timer Relay Modification
4/7/15		Maintenance, Engineering, Operations and Work Management (MEOW) Managers Meeting Top Ten Equipment Issues
4/7/15	SAPN 50609077 / 50307598	Units 1 and 2 EDG Watt Meter Recorder Accuracy Upgrade
4/7/15		Operations Excellence Action Plan
4/8/15		Risk Managed Tech Spec (RMTS) Action Plan

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		No ODMs for this month.
POA	50037513	Steam Leak on Trap 109 Weld
	50618051	MS-1-95 Bonnet Steam Leak 1F5

J. Miscellaneous

Date	Title
3/3/15	PG&E @ Work – The Bulletin
3/10/15	PG&E @ Work – The Bulletin
3/17/15	PG&E @ Work – The Bulletin
3/24/15	PG&E @ Work – The Bulletin
3/31/15	PG&E @ Work – The Bulletin

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1510	T+1 Critique
	Week 1511	T+1 Critique
	Week 1512	T+1 Critique
	Week 1513	T+1 Critique
	Week 1514	T+1 Critique

L. Documents Previously Transmitted during the Month

Date	Doc No.	Title
		No documents previously transmitted this month.

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List of Documents Transmitted Electronically

3/20/15		Reliability Plan
3/25/15		OUR Team's Equipment Reliability Excellence Initiative
3/26/15	SAPN 50639767	DCPP Leadership Development Program Action Plan
3/30/15	SAPN 50671712 / 50671809	Supplemental Personnel Oversight 3Q2014 Nuclear Safety Oversight Committee (NSOC) Visit
3/31/15	SAPN 50670107	Top Ten Equipment Issue Eliminate SCW HX Fouling
3/31/15	SAPN 50586410 Task 67	Improve Project Cost Monitoring ; Predictability Task 18; Project Cost - SPSI
3/31/15	SAPN 50586410 Task 40/ SAPN 50678565	Top Ten Equipment Issues 500 kV Turbine Building Stand-off Maintenance Strategy
4/2/15	SAPN 50586410 Task 40/ SAPN 50678565	Top Ten Equipment Issue 230kV Switchyard RG 165 Insulator Replacement
4/2/15	SAPN 50659641	DCPP Action Plan in response to STARS Equipment Reliability Assist Visit September, 2014
4/2/15	RCE SAPN 50652094	Top Ten Equipment Issues List EDG Inlet to Fuel Leader Special Capscrews Action Plan
4/2/15	SAPN 50671586 / 50672668	Top Ten Equipment Issues SFP Bridge Crane
4/2/15	SAPN 50670107	Action Plan – Preventive Maintenance Program Improvement
4/2/15	SAPN 50670107	Action Plan – Outage Scope Improvements
4/2/15	SAPN 50670107	Action Plan – Long Range Project Plan Improvements
4/2/15		EREI Scoreboard
4/2/15		Plant Health Improvement Plans (PHIPs) 2015 Action Plan
4/2/15		DCPP Integrated Equipment Reliability Action Plan – Action 5
4/2/15		DCPP Integrated Equipment Reliability Action Plan – Action 6
4/2/15		Critical Spares 2015 Action Plan
4/2/15		DCPP Integrated Equipment Reliability Action Plan – Action 14
4/2/15		DCPP Integrated Equipment Reliability Action Plan – Action 15
4/2/15		DCPP Integrated Equipment Reliability Action Plan – Action 16
4/2/15	SAPN 50586412 / 50654931	INPO EN.1-1 Response Needs Improvement

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April 2015 DCISC
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
4/17/15	2015-010	E-Plan, Section 6, Appendix F

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
4/1/15	DCL-15-043 HBL-15-004	2015 Annual Statement of Insurance for Pacific Gas and Electric Company's Diablo Canyon Power Plant (DCPP) and Humboldt Bay Power Plant (HBPP)
4/1/15	DCL-15-045 DIL-15-009	Emergency Plan Section 4 Update and Emergency Plan Implementing Document Update
4/9/15	DCL-15-048	ASME Section XI Inservice Inspection Program Request for Relief NDE-PNS-U2A to Allow Use of Alternate Examination Volume Coverage Requirements
4/16/15	DCL-15-047	License Amendment Request 15-02, Revision of Updated Final Safety Analysis Report for BEACON Power Distribution Monitoring System Methodology and Technical Specification 5.6.5, "Core Operating Limits Report (COLR)," for the PARAGON and NEXUS Core Design Methods
4/21/15	DCL-15-049 DIL-15-010	Emergency Plan Implementing Document Update
4/21/15	DCL-15-050	Diablo Canyon Units 1 and 2 – 1A2015 – PI Data Elements (QR) and (CR)
4/27/15	DCL-15-046	2014 Annual Radiological Environmental Operating Report
4/27/15	DCL-15-051	Annual Report of Occupational Radiation Exposure for 2014
4/29/15	DCL-15-052	Response to NRC Request for Additional Information Regarding License Amendment Request 14-01, "Revision to Technical Specification 3.8.1, 'AC Sources – Operating'"
4/29/15	DCL-15-053	2014 Annual Radioactive Effluent Release Report
4/29/15	DCL-15-054	One Hundred Eighty-Day Steam Generator Report for Diablo Canyon Power Plant Unit 2 Eighteenth Refueling Outage
4/29/15	DCL-15-058	2014 Annual Nonradiological Environmental Operating Report

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
4/1/15	Notice of Meeting with Pacific Gas and Electric Company Regarding the Digital Replacement of the Process Protection System at Diablo Canyon Power Plant, Units 1 and 2 (TAC Nos. ME7522 and ME7523)
4/1/15	Diablo Canyon 1 and 2 - License Amendment Request 15-01, Incorporation into Licensing Basis of Pressurizer Filling Analysis for Major Rupture of a Main Feedwater Pipe Accident (TAC Nos. MF5785 and MF5786)

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April 2015 DCISC
List of Documents Transmitted Electronically

4/8/15	Diablo Canyon 1 and 2 – Requests for Additional Information to License Amendment Request Associated with Adoption of TSTF-432, Rev. 1 (TAC Nos. MF4521)
4/13/15	Diablo Canyon, Units 1 and 2 – National Fire Protection Association Standard 805 Radiation Release Additional Requests for Additional Information (TAC Nos. MF2333 and MF2334)
4/15/15	Forthcoming Webcast Public Meeting to Discuss Seismic Hazard Reevaluation Response by Pacific Gas and Electric Company Related to the Fukushima Dai-ichi Nuclear Power Plant Accident
4/16/15	Summary of Diablo Canyon Power Plant, Units 1 and 2, July 14-17, 2014, Audit Associated with License Amendment Request to Transition to the National Fire Protection Association 805 Standard (TAC Nos. MF2333 and MF2344)
4/23/15	Notice of Meeting with Pacific Gas and Electric Company Regarding the Digital Replacement of the Process Protection System at Diablo Canyon Power Plant, Units 1 and 2 (TAC Nos. ME7522 and ME7523)
4/28/15	Schedule Revision for the Review of the Diablo Canyon Power Plant, Units 1 and 2, License Renewal Application

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
PSRC Minutes		
4/14/15	2015-008	- LAR 15-02 - E-Plan, Section 6, Appendix F
4/29/15	2015-009	E-Plan: - Table of Contents, Rev. 4.05 - Appendix A, Rev. 4.07 - Appendix B, Rev. 4.01

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCAs		No Root Cause Evaluations for this month.
ACE		No Apparent Cause Evaluations for this month.
Eff Eval		No Effectiveness Evaluations for this month.

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
		No QPAR for this month

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April 2015 DCISC
List of Documents Transmitted Electronically

10/31/14	SAPN 50588408-5	Benchmark/Trip Report – CY 2-1 Chemistry Controls Feedwater Iron Strategies
1/20/15	SAPN 50683251	Informal Benchmark/Trip Report – Preventative Maintenance Working Group
1/28/15	SAPN 50684569	Informal Benchmark – Equipment Reliability Working Group
2/4/15	SAPN 50685984	CPE Scenario Development Workshop Informal Benchmark
2/10/15	SAPN 50635057	Security Maintenance Benchmark Report, Location: Palo Verde Nuclear Generating Station
4/14/15	SAPN 50697982	Trip Report—Pressurized Water Reactor Owners Group (PWROG) Procedure Subcommittee (PSC) Meeting, San Francisco, CA
4/21/15	SAPN 50698757	Trip Report – INPO ATV – Catawba OPS Programs April 6-17, 2015

H. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/17/15		Operating Plan 2015 – 2019, No new updates this month.
4/18/15	PPIR	Plant Performance Improvement Report (March)
Station Initiative		
4/9/15		Strategic Communications Plan - Generating Awareness and Understanding of Our Team's Integrated Equipment Reliability Plan
4/14/15	SAPN 50670107	Long Range Project Plan Improvements
4/8/15	SAPN 50639767	Supplemental Personnel Oversight 3Q2014 Nuclear Safety Oversight Committee (NSOC) Visit
4/10/15	SAPN 50670107	Action Plan 21
4/16/15		Use of Our Human Performance Tools & Performance Improvement Processes
4/16/15		Reinvigorating Employee Engagement
4/16/15	SAPN 50378557 / 50523909	Replace U1/U2 Diesel Fuel Oil Day Tank (DFOOT) Level Switches
4/20/15		OUR Team's Equipment Reliability Excellence Initiative
4/20/15	SAPN 50586410-67	Top Ten Equipment Issues 500 kV Turbine Building Stand-off Maintenance Strategy

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April 2015 DCISC
List of Documents Transmitted Electronically

3/23/15	FileNet # 142960003	2015 Fire Protection Audit Report
3/24/15	FileNet # Turtle Creek 150700025	Quality Verification Assessment Report – Source Inspection of Holtec Manufacturing Division/Turtle Creek, PA
4/22/15	FileNet # 150150011	2015 Fitness for Duty and Access Authorization
		No new Schedule for this month

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
		No updated Quick Hit Self-Assessment (QHSA) Schedule for this month
		No Formal Benchmarking and Self-Assessments Schedule for this month
12/10/14	SAPN 50676213/ 50640075	Quick Hit Self-Assessment – Security-Access Authorization Pre-Inspection Activities
2/26/15	SAPN 50687751	Quick Hit Self-Assessment – Learning Services Operational Focus Survey
3/9/15	SAPN 50674227	Quick Hit Self-Assessment Report – Maintenance Rule Periodic (a)(3) Assessment 2014 – Systems Assessment Assessment Period 12/6/2012 to 12/6/2014
10/1/14	SAPN 50642112	Operations Equipment Monitoring Self-Assessment
10/8/14	SAPN 50634574	Radiological Protection Fundamentals
10/13/14	SAPN 50630159	Surveillance Test Program (STP) Assessment Report
2/26/15	SAPN 50671521	2014 Civil Maintenance Rule Formal Self-Assessment Report
2/27/15	SAPN 50674419	2015 Clearance and Tagging Self Assessment Report
3/21/14	SAPN 50672825	Activity: T+1 Meeting Benchmark, Benchmark Location: Hatch
9/8/14	SAPN 50638349	Fix It Now Team Benchmark Report, Location: Hatch Nuclear Generating Station
10/12/14	SAPN 50630037	Configuration Management Benchmarking Design Drafting & Drawing Incorporation

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April 2015 DCISC
List of Documents Transmitted Electronically

4/20/15	SAPN 50586410-40 / 50678565	Top Ten Equipment Issues 230 kV Switchyard RG 165 Insulator Replacement
4/20/15	SAPN 50671712 / 50371809	Top Ten Equipment Issues Eliminate SCW HX Fouling
4/20/15	SAPN 50652094	Top Ten Equipment Issue List EDG Inlet to Fuel Leader Special Capscrews Action Plan
4/21/15		Emergency Diesel Generator Reliability 2015 Action Plan
4/21/15		Main Condenser Reliability 2015 Action Plan
4/21/15		Critical Spares 2015 Action Plan
4/23/15		Equipment Reliability Action Plan Executive Oversight Board Agenda
4/24/15	SAPN 50670107	Outage Scope Improvements
4/30/15	SAPN 50696185	Top Ten Equipment Issues Fire Impairment Reduction Initiative
4/30/15		Plant Health Improvement Plans (PHIPs) 2015 Action Plan
5/1/15	SAPN 50580735-3	Top Ten Equipment Issues CFCU SI Timer Relay Modification
5/1/15	SAPN 50585412 / 50654931	INPO EN 1-1 Response Needs Improvement
5/4/15		Nuclear Work Management Department 2015 Improvement Plan
5/4/15		Maintenance, Engineering, Operations and Work Management (MEOW) Managers Meeting – Top Ten Equipment Issues – May 1, 2015
5/4/15	SAPN 50670107	Improve Project Cost Monitoring/Predictability Task 18, Project Cost – SPSI
5/4/15		Operations Excellence Action Plan
5/4/15		2015 DCP Plant Improvement Decision Making Process Simplification Plan
5/4/15		PG&E Distribution Control Center Consolidation

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		
	SAPN 50572355 / 50600728	Reconvened Operational Decision Making Report (ODM) to determine any further actions due to slow increasing trend in Unit 2 Reactor Coolant System (RCS) leakage

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April 2015 DCISC
List of Documents Transmitted Electronically

SAPN 50525442	Operation Decision Making Report (ODM) to determine the actions to be performed for increased Unit 1 Condenser differential pressures (SAPN 50525442).
SAPN 50568886 / 50568920	Operational Decision Making Report (ODM) to determine actions for MFP 1-1 vibrational issues. (SAPN 50568886)
SAPN 50547003	Unit 2 12kV Auxiliary Grounding Transformer TZA21GT developed a thru wall oil tank leak
POA	No POAs for this month.

J. Miscellaneous

Date	Title
4/7/15	PG&E @ Work – The Bulletin
4/14/15	PG&E @ Work – The Bulletin
4/21/15	PG&E @ Work – The Bulletin
4/28/15	PG&E @ Work – The Bulletin

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1515	T+1 Critique
	Week 1516	T+1 Critique
	Week 1517	T+1 Critique

L. Documents Previously Transmitted during the Month

Date	Doc. No.	Title
		No documents previously transmitted during this month.

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May 2015 DCISC
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
5/5/15	2015-011	E-Plan, Volume 11, Appendix A
5/5/15	2015-012	E-Plan, Volume 11, Table of Contents
5/5/15	2015-013	E-Plan, Volume 11, Appendix B
5/20/15	2015-014	DDP 1000025004, Unit 2 HSDP Upgrade

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
5/5/15	DCL-15-059	Technical Specification Bases, Revision 9
5/6/15	DCL-15-060	Updated Final Safety Analysis Report, Revision 22
5/7/15	DCL-15-055	Response to NRC Request for Additional Information Regarding License Amendment Request 14-02, "License Amendment Request for Adoption of Technical Specification Task Force Traveler TSTF-432, Revision 1, Change in Technical Specification End States (WCAP. 16294)"
5/7/15	DCL-15-058	Licensee Event Report 2014-002-01, Unit 2 Plant Shutdown Required By Technical Specifications
5/7/15	DCL-15-051	Second Radiation Release Response to NRC Request for Additional Information National Fire Protection Association Standard 805
5/7/15	DCL-15-062	Expected Submittal Date for Licensee Event Report 2015-001-01
5/27/15	DCL-15-063	Response to March 12, 2012, NRC 10 CFR 50.54(f) Request for Information Regarding Recommendation 9.3, Phase 2 Staffing Assessment
5/28/15	DCL-15-065	Response to NRC Request for Additional Information Regarding License Amendment Request 13-02, "Revision to Technical Specifications to Adopt Risk Informed Completion Times TSTF-505, Revision 1, Provide Risk-Informed Extended Completion Times - RITSTF Initiative 48"

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
5/5/15	Diablo Canyon Power Plant – NRC Integrated Inspection Report 05000275/2015001 and 05000323/2015001
5/12/15	Diablo Canyon Power Plant, Unit 2 – ASME Section XI ISI Program RR NDE-PNS-U2A to Allow Use of Alternate Examination Volume Coverage Requirements for Pressurizer Nozzle-to-Head Welds (TAC No. MF6073)
5/13/15	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 Re-Evaluations for

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May 2015 DCISC
List of Documents Transmitted Electronically

5/15/15	Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident
5/18/15	Diablo Canyon Power Plant, Units 1 and 2 – Regulatory Audit Plan for June 22-26, 2015, Audit at Westinghouse Facility in Warrendale, Pennsylvania, in Support of Digital Process Protection System Replacement License Amendment Request (TAC Nos. ME7522 and ME7523)
5/19/15	Summary of May 7, 2015, Teleconference Meeting with Pacific Gas and Electric Company on Digital Replacement of the Process Protection System Portion of the Reactor Trip System and Engineered Safety Features Actuation System at Diablo Canyon Power Plant, Unit Nos. 1 and 2 (TAC Nos. ME7522 and ME7523)
5/19/15	Diablo Canyon Power Plant, Units 1 and 2 – Regulatory Audit Report for the June 3-5, 2014 Audit at the INVENYS Operations Management Facility in Lake Forest, California for the Digital Update to the Process Protection System License Amendment Request (TAC Nos. ME7522 and ME7523)
5/20/15	Diablo Canyon, Units 1 and 2 – Acceptance Review of LAR 15-02 to Revise UFSAR for BEACON Power Distribution Monitoring System Methodology and TS 5.6.5 for the PARAGON and NEXUS Core Design Methods (TAC Nos. MF6120 and MF6121)
5/28/15	Summary of April 28, 2015, Category 1 Public Meeting with Pacific Gas and Electric Company to Discuss Diablo Canyon Power Plant, Unit Nos. 1 and 2 Seismic Hazard Reevaluation Associated with Implementation of Japan Lessons-Learned Near-Term Task Force Recommendation 2.1, Seismic
5/27/15	Summary of April 28, 2015, Category 1 Public Meeting with Pacific Gas and Electric Company to Discuss Diablo Canyon Power Plant, Unit Nos. 1 and 2 Seismic Hazard Reevaluation Associated with Implementation of Japan Lessons-Learned Near-Term Task Force Recommendation 2.1, Seismic

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
PSRC Minutes		
5/12/15	2015-010	- Unit 2 Hot Shutdown Panel Upgrade - Tool Pouch and Minor Maintenance Program

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCAs	50655170	Root Cause Evaluation Report DEG 2-2 MOW Organizational Response
	50669932	Root Cause Evaluation Report, Rev 1, 230 kV Switchyard Flashover, Loss of Startup Power
ACE	50656898	DA-2014 PIR Degraded Fuel Inject not in

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List of Documents Transmitted Electronically

	50657637	DA-2014 PIR: Green NCV 10 CFR 50.36
	50660730	DA-EDG 2-3 aftercooler air leak
	50662498	DA-Green NRC 3Q14 Baseline: TS 5.4.1
	50687377	DA-Containment Closure Report – 2R18
	50688632	DA-water percolates from seal table drain
	50669939	DA-HS 205 surveys w/o appropriate postin
	50670151	LTC DA-PZR Safety 8010A Weepage
	50671256	DA-MIDS Potential Adverse Trend
	50671281	DA-52-PY11-13 blown fuse
	50671672	DA-Access officer manual search issues
	50671674	DA-Pathway X6 Outage Configuration Issue
	50672809	DA-QAAF – Geosciences CAP ineffectiveness
	50673560	DA-NRC Green NCV Security Baseline
	50677789	DA-CC ACE Sim Instructor Perf issue
	50679891	DA-High level alarm in the 1-5 FW heater
	50681028	DA-Equipment Event Adverse Trend
	50684343	DA-Accuracy of presentations to NRC
	50688192	DA-NRC 71111 SA NC-2-1 Medical Reporting
	50690017	DA-Valve Operated with CVI Signal In
	50696862	DA-unexpected condition during work exec
Eff. Eval	50303502	LTC A Evaluations Thoroughness
	50409024	*RCE Maintenance Work Instruction Quality
	50428148	LTC A SSFF adverse trend
	50553479	Line 727, W1B-359 Overlay ISI Indication
	50601792	DA-H 4(a) Adv Trend – Human Error Preven
	50617408	DA-RCP 1-3 #1 SEAL LEAK –OFF HIGH
	50655170	

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
		No QPAR for this month.
5/28/15	FileNet # 150640019	2015 Special Processes, ISI, & IST Audit Report
		No new Schedule for this month
5/25/15		DCPP Site Status Report

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
		No updated Quick Hit Self-Assessment (QHSA) Schedule

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List of Documents Transmitted Electronically

		for this month.

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List of Documents Transmitted Electronically

		No Formal Benchmarking and Self-Assessments Schedule for this month.
10/15/14	SAPN 50700222	Quick Hit Self-Assessment Summary Diablo Canyon – STARS Part 37
5/4/15	SAPN 50701186	Quick Hit Self-Assessment Report – Periodic Program Review of Three Selected Geosciences Department Level Procedures (DLAPs)
5/27/15	SAPN 50509740-4	Quick Hit Self –Assessment of the DCPPE Engineering Obsolescence Management Effectiveness
6/2/15	SAN 50699965	Chemistry Continuous Improvement - HU
3/10/15	SAPN 50658395	NRC 71111.11 Pre-Inspection Self-Assessment Report
4/28/15	SAPN 50699709	Wolf Creek 07-14 Peer Assessment Trp Report

H. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/17/15		Operating Plan 2015 – 2019. No new updates this month.
5/14/15	PPIR	Plant Performance Improvement Report (April)
Station Initiative		
5/5/15	SAPN 50378557 50523909	Replace U1/U2 Diesel Fuel Oil Day Tank (DFOOT) Level Switches
5/10/15		Reinvigorating Employee Engagement Summary
5/11/15		Use of Our Human Performance Tools & Performance Improvement Processes
5/12/15	SAPN 50560735-3	Emergency Diesel Generator Reliability 2015 Action Plan
5/12/15		TOP Ten Equipment Issues, CFCU SI Timer Relay Modification
5/13/15	SAPN 50671281	Top Ten Issue, Eagle 21 Potential Trip Risk
5/14/15		Project Charter – Reliability Team
5/14/15		Diablo Canyon 230kV Switchyard Insulator Replacement (31116747) Switch Replacement (31122606) Construction/Outage Plan

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List of Documents Transmitted Electronically

5/14/15		Morro Bay Substation Insulator & Switch Replacement (31044014)
5/14/15		Diablo Canyon Electric System Reliability Action Plan
5/14/15		Diablo Canyon Power Plant 500 kV Yard, Disconnect Switch & Insulator Replacement Project Construction Sequence
5/14/15		Los Padres DCPPE Action Plan Status
5/14/15		Operations Excellence Action Plan
5/18/15	SAPN 50639767	Supplemental Personnel Oversight 3Q2014 Nuclear Safety Oversight Committee (NSOC) Visit
5/18/15		Los Padres/Diablo Canyon Electric Power Reliability Plan
5/19/15		Critical Spares 2015 Action Plan
5/21/15		Reinvigorating Employee Engagement
5/28/15	SAPN 50671712 & 50371809	Top Ten Equipment Issues, Eliminate SCW HX Fouling
5/28/15	SAPN 50670107-10	Plant Health Improvement Plans (PHIPs) 2015 Action Plan
5/28/15	SAPN 50670107	Main Condenser Reliability 2015 Action Plan
5/29/15	SAPN 50670107	Action Plan – Improvement Project Cost Monitoring Predictability
5/29/15	SAPN 50586412 50654961	INPO EN 1-1 Response Needs Improvement
5/31/15	SAPN 50670107	Action Plan – Long Range Project Plan Improvements
6/1/15	SAPN 50670107	Action Plan – Preventive Maintenance Program Improvement
6/1/15		Strategic Communication Plan – Generating Awareness and Understanding of Our Team's Integrated Equipment Reliability Plan
6/2/15		OUR Team's Equipment Reliability Excellence Initiative
6/2/15		Maintenance, Engineering, Operations and Work Management (MEOW) Managers Meeting Top Ten Equipment Issues

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		No ODMs for this month.
POA		
	50301167	LTCA CDBI: Unanalyzed Condition 230 kV
	50307598	LTCA 2010PIR DG Lic Bases Load Exceeded

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List of Documents Transmitted Electronically

50366801	Non-conservative SR 3.8.1.10
50383957	LTCA SR 3.8.1.3 / 3.8.1.14 Non conform
50404966	LTCA Pri Equip&Support Load Combination
50407034	LTCA feedline rupture analysis
50408899	OE Gas Intrusion CS System
50410266	LTCA Shoreline Fit Eval. Against SSE POA
50445580	Design Classification for UV and UF Trip
50503487	LTCA 230V Capacity/Trans Network capab
50514765	LTCA DA LBB and 50.46 Coolable Geometry
50526159	LTCA Action Pin- Remove HOLD moving fuel
50526287	LTCA DA=Action Plan to Restore CRE Oper
50590178	LTCA –EDGVS Plan, Torn. Wind Load Meth.
50592094	LTCA-Rev Missile Assump. Calc 85-T-825
50599190	DA-High Wind Effect on EDGVS
50600119	LTCA Orig. Const Weld made w/incur WPS
50606190	LTCA (MMF) Non-Con. TS 3.4.1 Tot RCS Flo
50625470	1R19 / POA-CFCU12 Vibration
50636744	LTCA DA-TB HELB Analysis on 4kV SWGR
50655953	DA-Vital 480V SGR Tornado Impacts

J. Miscellaneous

Date	Title
5/5/15	PG&E @ Work – The Bulletin
5/12/15	PG&E @ Work – The Bulletin
5/19/15	PG&E @ Work – The Bulletin
5/27/15	PG&E @ Work – The Bulletin

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1518	T+1 Critique
	Week 1519	T+1 Critique
	Week 1520	T+1 Critique
	Week 1521	T+1 Critique
	Week 1522	T+1 Critique

L. Documents Previously Transmitted during the Month

Date	Doc. No.	Title
		No documents previously transmitted during the month.

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June 2015 DCISC
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
6/1/15	2015-015	DDP 1*24851, RCP Shutdown Seal DCP
6/4/15	2015-016	TMOD EVAL- Remove 1-TE-433
6/23/15	2015-017	Pzr Level Increase
6/23/15	2015-018	Remove Duplicate UFSAR Statement

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
6/3/15	DCL-15-068, DIL-15-011	Updates to the Emergency Plan
6/3/15	DCL-15-069	License Amendment Request 15-03, Application of Alternative Source Term
6/15/15	DCL-15-074 DIL-15-013	Updates to the Emergency Plan and Emergency Plan Implementing Procedures
6/17/15	DCL-15-069	License Amendment Request 15-03 - Application of Alternative Source Term
6/18/15	DCL-15-075	Relief Request REP-SI - Supplement
6/22/15	DCL-15-072	Revisions to Supplement for License Amendment Request 11-07, "Process Protection System Replacement"
6/22/15	DCL-15-076, DIL-15-014	Updates to Emergency Plan Implementing Procedure
6/30/15	DCL-15-079	Revision to Regulatory Commitment - Generator Circuit Breakers License Amendment Request, Commitment Withdrawal

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
6/1/15	Public Outreach and Meeting with Pacific Gas and Electric (PG&E)
6/4/15	Diablo Canyon, Units 1 and 2 - RAs for LAR Associated with Pressurizer Filling Concerns due to MPW Pipe Rupture Accident (TAC Nos. MF5785 and MF5786)
6/10/15	Nuclear Regulatory Commission Plan for the Audit Of Pacific Gas and Electric Company's Flood Hazard Reevaluation Report Submittal Relating to the Near-Term Task Force Recommendation 2.1-Flooding for Diablo Canyon Power Plant, Unit Nos. 1 and 2 (TAC Nos. MF6039 and MF6040)
6/19/15	Diablo Canyon Power Plant, Unit No. 1 - Request for Alternative RPV-U1-Extension to Allow Use of Alternate Reactor Inspection Interval Requirements (TAC No. MF4678)
6/29/15	Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Request for Additional Information Associated with Near-Term Task Force Recommendation 2.1, Seismic Reevaluations (TAC Nos. MF5275 and MF5276)
6/29/15	Diablo Canyon 1 and 2 RAs for LAR Associated with TSTF-505, Rev. 1 (TAC Nos. MF3240 and MF3241)

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List of Documents Transmitted Electronically

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
PSRC Minutes		
05/26/15	2015-011	LER 2014-002-01, Unit 2 Plant Shutdown required by Technical Specifications
		DDP 1000024851, Unit 2 RCP Shutdown Seal
6/3/15	2015-012	Remove 1-TE-433A TMOD

E. CAP Documents (RCAs, ACEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
RCAs		No RCAs for this month.
ACE	50687192 50697379	DA-Trend in Explosive Detector failure DA-Security Insufficient comp measure
Eff. Eval		No Evals for this month.

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
		No QPAR for this month.
		No Audit Reports for this month.
		No new Schedule for this month.
6/3/15	SFA # 151540018	230kV Site Outage for Shoo-Fly Installation Preparedness
6/11/15	SFA # 151550001	Nuclear Operator Watchstander Turnover
6/4/15	TA # 151100027	Assessment of DCP 1000000495, Reactor Coolant Pump Shutdown Seals Performed May 26 through June 4, 2015
6/10/15	FileNet # 151130001	Pre-Nuclear Industry Evaluation Program (NIEP) Assessment of Diablo Canyon Power Plant Quality Verification

G. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
		No updated Quick Hit Self-Assessment (QHSA) Schedule.
		No Formal Benchmarking and Self-Assessments Schedule.

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List of Documents Transmitted Electronically

5/5/15	SAPN 50705841	2015 NRC Baseline Inspection Readiness Assessment Report
6/2/15	SAPN 50699965	Quick Hit Self-Assessment Report - Continuous Improvement HU
6/11/15	SAPN 50697584	Apparent Cause and Root Cause Evaluations - Corrective Action Timeliness Quick Hit Self-Assessment Report
6/15/15	SAPN 50702119	NRC Inspection 71124.04 - Occupational Dose Assessment
6/4/15	SAPN 50705636	Informal Benchmark - Nuclear Energy Institute Emergency Preparedness Forum
6/11/15	SAPN 50706781	ANO Operations Training Programs Self-Assessment Peer Assist
6/25/15	SAPN 50709259	EPRI SGMP TAG meeting
6/29/15	SAPN 50706301	Informal Benchmark - McGuire T-3 readiness

H. Performance Information (PIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
2/17/15		Operating Plan 2015 - 2019, No new updates this month.
6/5/15	PPIR	Diablo Canyon Power Plant, Plant Performance Improvement Report, Alignment & Accountability Data: May 2015
Station Initiative		
6/12/15		Human Performance Excellence Action Plan
6/12/15		Reinvigorating Employee Engagement
6/16/15		Use of Our Human Performance Tools & Performance Improvement Processes
6/18/15		Equipment Reliability Excellence Initiative (Plan on a Page)
6/24/15	SAPN 50641017	Top Ten Issue - Aux Board HMI reliability
7/1/15		Nuclear Work Management Department 2015 Improvement Plan
7/1/15	SAPN 50639767	Supplemental Personnel Oversight 3Q2014 Nuclear Safety Oversight Committee (NSOC) Visit
7/1/15		Top Ten Equipment Issues - Eliminating Specific Unit 1 LK3 and LK4 BA Leakers
7/1/15		Maintenance, Engineering, Operations and Work Management (MEOW) Managers Meeting - Top Ten Equipment Issues - July 1, 2015

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June 2015 DCISC
List of Documents Transmitted Electronically

I. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
ODMs		No ODMs for this month.
POA	50523909	LTCA Increase in DFODT Unusable Volume

J. Miscellaneous

Date	Title
6/9/15	PG&E @ Work - The Bulletin
6/16/15	PG&E @ Work - The Bulletin
6/23/15	PG&E @ Work - The Bulletin
6/30/15	PG&E @ Work - The Bulletin

K. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 1523	T+1 Performance Critique
	Week 1524	T+1 Performance Critique
	Week 1525	T+1 Performance Critique
	Week 1526	T+1 Performance Critique

L. Documents Previously Transmitted during the Month

Date	Doc. No.	Title
		No documents previously transmitted during the month.

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[25th Annual Report, Volume 2, Exhibit B1, Notice of Public Meeting and Teleconference](#)

NOTICE IS HEREBY GIVEN that on August 8, 2014, at the Embassy Suites Hotel, in the Los Osos Room meeting facility, located at 333 Madonna Road, San Luis Obispo, CA and at the following teleconference locations: 40 Acacia Avenue, Berkeley, CA, and 1701 Rockville Pike, Rockville, MD, a public meeting and teleconference 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 matters:

1. **Morning Session (08/08/2014)–10:00 A.M. PDT** Committee member comments; consideration of approval of a draft report on the DCISC’s assessment and evaluation of Bechtel Power Corporation’s Addendum to the Independent Third-Party Final Technologies Assessment for the Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling Systems for Diablo Canyon Power Plant Addressing the Installation of Saltwater Cooling Towers in the South Parking Lot, and authorize transmittal of the approved report to the California State Water Resources Control Board (SWRCB) and the SWRCB’s Review Committee for Nuclear Fueled Power Plants and other interested parties; approval of December 10–11, 2013 and May 21–22, 2014 Fact Finding Reports; receive public comments and communications to the Committee; and wrap-up discussion by Committee members.

Access will be afforded to the audio portion of this public teleconference at the teleconference locations specified above and the session conducted at the San Luis Obispo location may be viewed live, or subsequently by archived video, by following the link on the Committee’s web site to www.slo-span.org or after the meeting on government access television, Channel 21. The DCISC’s policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Embassy Suites Hotel, 40 Acacia Avenue and 1701 Rockville Pike are 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 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 materials regarding the above meeting agenda items will be available for public review commencing Wednesday, August 6, 2014, on the Committee’s web site. For further information regarding the public meeting and teleconference, 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 web site. at <http://www.dcisc.org>.

Dated: July 28, 2014.

[25th Annual Report, Volume 2, Exhibit B2, DCISC Agenda for Friday, August 8, 2014](#) **Public Meeting & Teleconference**

Committee Members:

Robert J. Budnitz

Peter Lam (by teleconference)

Per F. Peterson (by teleconference)

Friday, August 8, 2014 10:00 AM (PDT)

Public Meeting Location

Embassy Suites Hotel, Los Osos Room
333 Madonna Road, San Luis Obispo, California.)

Public Teleconference Locations

1701 Rockville Pike, Rockville, MD
40 Acacia Avenue, Berkeley, CA

I Call To Order–Roll Call

II Establishment of a Quorum

III Committee Member Comments

IV Action Item

- A. Consideration of a draft report on the DCISC’s Evaluation of Safety Issues for Bechtel Power Corporation’s “Addendum to the Independent Third Party Final Technologies Assessment of 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.”: Approve

V Approve and Authorize Transmittal of Fact-finding reports to PG&E

- A. Approval of May 21–22, 2014 Fact Finding Report
Approval of Section on Load Follow Update from the December 10–11, 2013 Fact Finding Report: Approve

VI 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 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.)*

VII Adjourn Public Meeting & Teleconference

The DCISC's policy is to schedule its public meetings in locations that are accessible to people with disabilities. The Embassy Suites Los Osos Conference Facility, 1701 Rockville Pike, and 40 Acacia Avenue are 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.

[25th Annual Report](#), [Volume 2](#), Exhibit B3, Minutes of the Diablo Canyon Independent Safety Committee, August 8, 2014 Public Meeting (Approved at the October 14–15 2014 Public Meeting)

Public Meeting Location

Embassy Suites Hotel, Los Osos Room, 333 Madonna Road, San Luis Obispo, California

Public Teleconference Locations

1701 Rockville Pike, Rockville, MD

40 Acacia Avenue, Berkeley, CA

Notice of Meeting

A legal notice of the public meeting and teleconference was published in the Tribune, a San Luis Obispo County newspaper of general circulation, and mailed to the media and those persons on the Committee's service list. The legal notice and meeting agenda were also posted on the Committee's website at www.dcisc.org

Agenda

I Call to Order–Roll Call

The August 8, 2014, public meeting and teleconference of the Diablo Canyon Independent Safety Committee (DCISC) was called to order by Committee Member Dr. Robert J. Budnitz at 10:00 A.M. in the Los Osos Room at the Embassy Suites Hotel in San Luis Obispo, California. Dr. Budnitz observed the meeting was being recorded and live-streamed in real time on the worldwide web and he stated the other two members of the Committee, Chair Dr. Per F. Peterson and Vice-Chair Dr. Peter Lam, would be in attendance remotely from Berkeley, California, and Rockville, Maryland, respectively.

Present:

Committee Member Robert J. Budnitz

Committee Member Peter Lam (participating by a telephone linkup)

Committee Member Per F. Peterson (participating by a telephone linkup)

Absent:

None:

II Establishment Of a Quorum

Dr. Budnitz reported that with all three members in attendance a quorum was established for this meeting. As Dr. Budnitz stated that as he was the sole member in attendance at the public meeting location would act as the presiding officer for this meeting.

III Committee Member Comments

Dr. Peterson reported that Mr. John Geesman, representing the Alliance for Nuclear Responsibility, was present at the teleconference location in Berkeley, California. Dr. Budnitz observed that the date for this public meeting was discussed and established at the DCISC public meeting held on June 14–15, 2014, in Avila Beach, California, and today was found to be the only date within a period of several weeks when the Members' schedules allowed them all to attend. Dr. Budnitz reported that the request to review a report by the Bechtel Power Corporation ("Bechtel"), which is the principal purpose and subject for this public meeting, came from the State Water Resources Control Board's (SWRCB) Review Committee for Nuclear Fueled Power Plants (RCNFPP) and initially the time provided for the DCISC's review was extremely short. The DCISC received Bechtel's draft of its "Addendum to the 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 Addressing the Installation of Saltwater Cooling Towers in the South Parking Lot" (Bechtel Draft Addendum) on July 3, 2014, and a draft of an Evaluation of safety issues ("Proposed Draft Evaluation") of certain safety issues identified in the Bechtel Draft Addendum was prepared by DCISC Member and current Chair Dr. Peterson and Technical Consultant Mr. R. Ferman Wardell, P.E., as its principal authors. Mr. Wardell was connected by telephone for this entire meeting.

Dr. Budnitz introduced Mr. Robert Rathie, the DCISC's Assistant Legal Counsel, in attendance at the meeting location in San Luis Obispo. Mr. Rathie welcomed the members of the audience and observed that the proceedings today were discussed extensively during the DCISC's June 2014 public meeting and reports on the attendance of DCISC representatives at the meetings of the RCNFPP have been made by DCISC Members during past public meetings. The DCISC previously received a request from the RCNFPP to review Bechtel's "Independent Third Party Final Technologies Assessment of Alternative Cooling Technologies or Modification to the Existing Once-Through Cooling System for Diablo Canyon Power Plant" ("Bechtel Final Assessment") and the DCISC submitted its Evaluation (DCISC Evaluation) to the SWRCB on September 5, 2013, following its approval at a public meeting and teleconference held in Berkeley, California on September 4, 2013. Dr. Budnitz stated the schedule for the Committee's subsequent review of the Bechtel Draft Addendum was determined by the RCNFPP and not by the DCISC and he reported the DCISC can only take collective action to reach a concurrence during a noticed public meeting. Copies of the Proposed Draft Evaluation and the Bechtel Draft Addendum appeared on the DCISC website at www.dcsic.org at the earliest possible opportunity for review by the public. Dr. Budnitz expressed the appreciation of the DCISC to the members of the public in attendance.

IV Action Item

- A. Consideration of a draft report on the DCISC's Evaluation of Safety Issues for Bechtel Power Corporation's Draft "Addendum to the Independent Third Party Final Technologies Assessment of Alternative Cooling Technologies or Modification to the Existing Once-Through Cooling System for Diablo Canyon Power Plant Addressing the Installation of Saltwater Cooling Towers in the South Parking Lot".

Dr. Peterson provided an overview of the DCISC Evaluation, dated September 5, 2013, of the Bechtel Final Assessment (for which Dr. Peterson and Consultant Wardell served as principal authors) and Dr. Peterson reported the Bechtel Final Assessment examined seven options to replace or mitigate the effects of once-through cooling (OTC) at Diablo Canyon Power Plant (DCPP) including two which would require changes to the intake of saltwater to reduce entrainment through use of a fine mesh screening system or an offshore system using modular wedge wire. Five other potential options involved the use of cooling towers and Dr. Peterson reported the Bechtel Final Assessment concluded the most cost effective and practical option would involve wet mechanical forced draft cooling with possibly a hybrid wet/dry cooling scheme as a backup. Dry cooling and natural draft cooling towers were found to be too costly due to the much larger footprint they would require. The DCISC Evaluation of the Bechtel Final Assessment was limited to the potential impacts of these changes on the operational safety of plant systems. Dr. Peterson observed the DCISC Evaluation did not assess the environmental impact of closed or once-through cooling. The DCISC concluded relative to the Bechtel Final Assessment that it was unlikely that any of the seven options would pose a significant safety problem provided they did not significantly impact DCPP's reliability or increase the frequency of plant trips. Dr. Peterson commented the closed cooling options might arguably provide a benefit in making it less likely the plant would experience a trip caused by kelp or sea life impact on the present screening system for incoming water.

Dr. Peterson reported a defined criterion was employed by the DCISC for the Proposed Draft Evaluation which included the determination of whether the changes to the plant would significantly impact its overall level of safety. The Draft Evaluation also included review of whether a license amendment request (LAR) from the Nuclear Regulatory Commission (NRC) would be required. Dr. Peterson stated at least one of the seven options reviewed in the Bechtel Final Assessment would require a LAR, and the DCISC Evaluation disagreed with Bechtel concerning the question of the need for a LAR.

Subsequent to the approval in September 2013 of the DCISC Evaluation of the Bechtel Final Assessment public comment was received by the RCNFPF concerning additional methods to provide closed cycle cooling using towers which might result in significantly reduced costs. Dr. Peterson stated an extensive report was prepared by Drs. Peter Henderson and Richard Selby with recommendations on these additional options. The RCNFPF then directed Bechtel to examine these additional design options and the Bechtel Draft Addendum was the result. The overall design modifications examined in the Bechtel Draft Addendum include: (1) locating cooling towers on the southern side of the plant site where the land is flatter as opposed to the northern site analyzed in the Bechtel Final Assessment; (2) using saltwater for evaporative cooling makeup, as opposed to fresh water from reclaimed water plus a desalination plant analyzed in the Bechtel Final Assessment; and (3) increasing the cooling temperature in order to reduce the size of the cooling

towers, recognizing that this would cause some reduction in the plant's power output. Dr. Peterson stated the Bechtel Draft Addendum described two different design options to implement these changes which were not evaluated from the perspective of optimization but rather for their potential impact on plant operational safety and whether a LAR would be required. Dr. Peterson stated that the Bechtel Draft Addendum did not address or allow for the time required for a LAR and in this respect the Proposed Draft Evaluation disagrees with the Bechtel Draft Addendum.

Dr. Peterson stated in performing the DCISC review a number of sources of information were developed including a fact-finding visit to DCPD on May 21–22, 2014, with a request for technical information relevant to potential safety impacts including the effect of salt deposition on the plant structures and equipment, underground piping, and site access. Information was also requested by the DCISC and provided by Bechtel concerning wind patterns. Dr. Peterson and Mr. Wardell (DCISC Review Team) also reviewed and used the November 2013 Report of Drs. Henderson and Selby as a reference regarding the design options. The California Energy Commission (CEC) Public Interest Energy Research Program also provided detailed studies on closed cooling options for power plants and on the question of the use of seawater and brackish water. Dr. Peterson stated the technology proposed in the Bechtel Draft Addendum includes the use of Clear Sky® cooling towers and the DCISC Review Team made use of information from the corporation manufacturing the Clear Sky® technology. Information obtained from the Palo Verde Nuclear Generating Station (Palo Verde) located near Phoenix, Arizona, was also evaluated because Palo Verde's use of reclaimed water for plant cooling approaches the conditions which would be experienced with the use of saltwater due to the residual salt content in the cooling water at Palo Verde which approaches that of seawater.

In summarizing the conclusions of the Proposed Draft Evaluation Dr. Peterson observed that all three options reviewed in the Bechtel Draft Addendum are independent, in that there are different permutations possible. He stated that with regard to a southern site, the primary route to access DCPD is from the south and most of the plant's infrastructure including parking, security, training, and support buildings are located on the southern side of the plant and therefore construction of cooling towers to the south of the plant would have a larger impact on those plant systems than construction on the northern site where there is very little infrastructure, as reviewed in the Bechtel Final Assessment. The design assessment in the Bechtel Draft Addendum proposes that the majority of construction work would occur during a 6.3 to 6.5-year-long period during which the plant would continue to operate. The final connection of the new cooling towers would then occur during a 2.3 year-long period that would require simultaneous outages for both units. The DCISC Review Team studied the substantive impacts of these proposals including the impacts arising from construction during generation operations while the reactors continued to operate and during the period when the plant would be shut down. Dr. Peterson observed that in the past the DCISC reviewed design modifications and upgrades undertaken on the southern side of the plant in connection with DCPD's implementation of post 9-11 security measures. The DCISC review was undertaken in context of the potential for impact on plant operational safety and Dr. Peterson reported DCPD has a set of procedures in place to evaluate and approve design changes involving construction of infrastructure. The Proposed Draft Evaluation concludes that the logistics for maintaining effective plant access for normal operations, emergency response, and physical security during a six-year period for construction of cooling towers would be substantially more

complex for a southern site option.

Dr. Peterson reported the option to locate cooling towers to the south of the plant would also be likely to have an impact on plant operations because modifications would be required for two safety-related systems. The more substantive and important of these systems involves the Auxiliary Saltwater System (ASW) which is used to provide cooling to safety-related equipment, to fuel in the reactors, and to the Spent Fuel Pools (SFPs). The ASW pumps draw water from the intake cove through a system of piping integrated into the same concrete structure as the much larger circulating water pipes. In order to install new cooling tower water pipes for the southern site cooling tower configuration the existing ASW piping system would need to be replaced and replacement would require careful design and planning to ensure there was no disruption of the ASW and work would need to occur during the dual outage period when the primary heat load which must be removed safely would be from the SFPs. Dr. Peterson observed that without the ASW the SFPs containing freshly offloaded cores would begin to boil in approximately 24 hours and after fuel had cooled for 12-18 months that period would increase to approximately 72 hours.

Dr. Peterson reported that other safety-related systems that would be impacted by locating cooling towers to the south of the plant include the emergency diesel generators (EDGs) as the fuel tanks for the EDGs would have to be removed, relocated, and replaced. Dr. Peterson stated the Proposed Draft Evaluation concludes that it is likely a LAR would be required for this and that the Bechtel Draft Addendum also addressed temporarily replacing the EDGs with temporary generators. He remarked the functional requirements for the EDGs including their ability to withstand external events are rather complex and any proposal to use temporary emergency generators would require careful review.

Dr. Peterson stated the primary impact of the use of seawater for evaporative cooling includes the effect of the drift of droplets of salt water that would be entrained and released from the cooling towers and deposited elsewhere. He reported this would result in a substantially larger quantity of salt being deposited on the plant site than if freshwater were used and power plants which use high salinity cooling towers have experienced accelerated corrosion on unprotected metal surfaces of buildings and equipment located near the cooling towers. The Clear Sky® cooling towers can be fitted with drift eliminators which pull outside air through the tower's lower level which then flows in the opposite direction to the cooling water, but small droplets of cooling water will be entrained from in the water and carried by the air to pass through drift eliminators, which can limit entrainment to about 0.0005% of the circulating water flow. Dr. Peterson reported calculations have shown the use of saltwater cooling towers would release approximately 800-900 metric tons of salt per year as aerosols. He reported a principal concern addressed in the Proposed Draft Evaluation is the effect of this salt on plant equipment and that this is dependent, in part, upon wind conditions. He observed the southern location is somewhat more favorable than the northern location in this regard as the prevailing winds at DCPD come from the northwest and therefore much of the plume from cooling towers sited to the south of the plant would be pulled away from the plant, but 23% of the year wind speeds are relatively low and significant deposit of droplets from the cooling towers would fall on the plant and its equipment. During 10% of the time the winds are from the southeast and droplets would be deposited on the plant and its equipment in accordance

with wind speed. Dr. Peterson stated the DCISC Review Team did not have a direct basis to specifically estimate how much the salt deposition rate would increase and this analysis is important. He reported PG&E has initiated a program to place sample coupons in locations around DCP, including around its transformers where the plant has experienced significant events with flashovers, to collect salt and measure deposition rates. Dr. Peterson stated a significant source of salt deposition at DCP comes from the outfall structure where the water used for OTC runs down a rippled cliff and thereby entrains air and generate droplets which are in turn picked up by prevailing winds and travel between the Turbine Building and the Administration Building and therefore the rate of deposition measured at the Unit-1 transformer locations is double the rates measured at transformer locations for Unit-2. This may explain why Unit-1 has experienced significantly more problems with flashover events than Unit-2. Dr. Peterson stated data available from measurements made in 1969 estimate that the total salt deposition on the plant site is currently 1.7 tons per year and he noted this is a very small amount compared to the 800-900 tons which would potentially be produced by saltwater cooling towers. Dr. Peterson reported the Proposed Draft Evaluation concludes that large increases in the rates of salt deposition on plant equipment produced by saltwater cooling towers is of concern and would have a primary impact on the reliability of plant equipment including equipment which draws in significant quantities of outside ambient air including the EDGs; the Auxiliary Building, the Control Rooms, the Fuel Handling Ventilation Systems; and the Dry Cask Storage System. Likewise, high voltage equipment reliability would almost certainly be negatively impacted and the DCISC Review Team identified a significant concern regarding the potential for an increased probability of a loss of offsite power if there were simultaneous electrical failures.

Dr. Peterson reported Palo Verde uses lower cooling water flow rates than those postulated for DCP cooling towers and the salinity of Palo Verde's cooling water is somewhat lower than would be the case at DCP. He remarked that Palo Verde experiences approximately one half the salt deposition rate that would be expected at DCP if saltwater cooling towers were installed and the deposition of salt would differ due to differences in humidity and wind direction. In summary, Dr. Peterson stated that if saltwater were used for cooling water towers at DCP it would result in potentially large increases in the rate of the deposition of salt on plant equipment and therefore the DCISC Review Team has concerns about the impact on and degradation of safety.

Dr. Peterson stated the DCISC Review Team considered the potential safety impacts of the proposed design change involving the increase of the temperature of the water used in the Circulating Water System to cool the plant's condensers and the Service Water System which provides cooling to other equipment. The Bechtel study, in order to avoid the need to change equipment used in the Service Cooling Water System, would continue to use OTC for the Service Cooling Water System and includes the installation of two 10,000 gallon-per-minute seawater pumps which would result in a far smaller withdrawal of seawater from the ocean than at present. The ASW would also continue to use seawater. Dr. Peterson stated the main impact from the increase in water temperature would be on the condensers and on the low pressure turbines which would operate with a higher back pressure, because the condensation of steam would occur at higher pressure, with the principal impact being a reduction in the power output of the plant's low pressure turbines. However, Dr. Peterson observed this would be balanced by potentially

significant reduction in the cost of the cooling towers. Dr. Peterson stated the DCISC Review Team concluded the low pressure turbines could likely operate reliably with higher back pressure and operation of the condensers at higher back pressure would be unlikely to affect plant safety equipment.

Dr. Peterson closed his summary by stating the recommendations in the Proposed Draft Evaluation include: (1) performing additional review and analysis to determine the extent of the review required by the NRC including incorporation of input from NRC staff; (2) conducting a probabilistic risk assessment to quantify the impact of cooling towers on the risk of transients and accidents and on any reduction in margins of safety; (3) analyzing projections of salt deposition rates and other factors to understand the impact of the use of saltwater cooling towers on environmental conditions for plant safety equipment and the potential for additional NRC review of the impact on plant equipment reliability; and (4) evaluating the impact of locating the cooling towers on the southern site on plant security and emergency response capabilities.

Dr. Peterson asked for comments from the other DCISC members.

Dr. Lam complimented and expressed his appreciation to Dr. Peterson and Mr. Wardell for their work on the Proposed Draft Evaluation and he remarked the Draft Evaluation has been prepared on an exceptionally tight schedule.

Dr. Budnitz stated that, in common with all nuclear safety analysts, he is concerned with avoiding an accident sequence which begins with an initiating event and proceeds through other failures to produce a large accident and that in order to avoid accident sequences it is necessary to analyze every possible accident sequence and category of accidents. Dr. Budnitz stated that the safest condition for an operating nuclear plant, aside from complete safe shut down, is when the plant is running without any upset condition as any potential upset condition produces the potential for an accident. Dr. Budnitz observed upset conditions have been studied and analyzed worldwide and systems, equipment, and procedures are in place to ensure that if an upset condition occurs a plant can be brought into a safe condition. Therefore, avoiding accident sequences is of paramount importance and Dr. Budnitz observed this comes down to avoiding initiating events and assuring that for every initiating event the designs and plans for all systems, operations, and human actions are all available and in place and work properly. He described this as the challenge of designing and safely operating a nuclear plant. Dr. Budnitz observed any increase in the frequency of initiating events is of concern even if the systems and procedures to respond are in place because there is the possibility those systems and procedures might fail. He further observed anything that increases the possibility of such failure is also of concern in that once an initiating event occurs it is less likely the plant will reach a safe state.

Dr. Budnitz remarked that with reference to Dr. Peterson's discussion of locating saltwater cooling towers to the south of the plant site the concern expressed by Dr. Peterson about the impact on the reliability of the offsite power systems is a major concern for him, as nuclear power plants rely heavily on the availability of offsite power to maintain plant safety. The EDGs and other systems are available in case offsite power is lost but the availability of offsite power must be as reliable as

possible. He stated the possibility that a higher deposition rate of salt as a result of the proposals reviewed in the Bechtel Draft Addendum increasing the likelihood over the life of DCPD of a loss of offsite power is also a major factor in his consideration as it calls into question the reliability of other important systems. Dr. Budnitz stated that a probabilistic risk analysis would be required to fully assess the impact on safety and to quantify the extent of any increase in the likelihood of a loss of offsite power and to determine whether any such increase could be mitigated in part or entirely. He stated the impact on the EDGs would also need to be reviewed because without offsite power and without the EDGs a plant could find itself in a condition akin to what happened at Fukushima, Japan, in March 2011. A probabilistic risk analysis would also assess the impact of the proposed changes on the risk of transients and any reduction in the margin of safety and Dr. Budnitz stated that to proceed without such an analysis would not be a proper basis for a policy decision. Dr. Budnitz commented that the Bechtel Draft Addendum's failure to provide a realistic allowance for extensive NRC review was also troubling to him. He stated that based upon his experience in working for and with the NRC that such a review would be required.

Dr. Budnitz stated that the need to review a draft report that was not in the public domain at the time it was made available by the RCNFPD for review represented an uncomfortable situation for the DCISC but it was not something that was within the DCISC's power to control. He reported the Bechtel Draft Addendum is now scheduled to be finalized and released to the public for comment, with or without the input provided by the Proposed Draft Evaluation, in early September 2014 and Dr. Budnitz observed the public will not be left out of the review process and any member of the public will have an opportunity to provide comments to the RCNFPD.

In response to Dr. Budnitz' inquiry, Consultant Wardell, participating by a telephone linkup, stated he had no further comments on the review of the Proposed Draft Evaluation. Dr. Budnitz thanked Mr. Wardell for his work and contributions to the Draft Evaluation. In response to Dr. Budnitz' request Drs. Peterson and Lam confirmed they had no changes to the Draft Evaluation presented for this public meeting and teleconference. Dr. Peterson expressed his thanks to Dr. Budnitz for having been the principal author of the DCISC Evaluation in September 2013 of the Bechtel Final Assessment and Dr. Peterson described that effort as a more extensive and substantive review. Dr. Peterson commented that the Bechtel Draft Addendum does include 5.5 years for permitting activities with the State of California and there is a question as to whether that period of time may also include parallel review by the NRC. Dr. Lam commented that based upon his experience with the NRC, a five-year permitting period would be extremely optimistic as the NRC tends to be very deliberate in connection with licensing activities.

Dr. Budnitz reviewed the provisions for receiving public comment. Mr. John Geesman, participating by a telephone linkup, was invited to provide comments. Mr. Geesman replied that he did not have any comments at this time.

Mr. Joey Ritano was recognized. Mr. Ritano stated he was the Director of the California Ocean Outfall Group and a resident of Los Osos, California. He stated he appreciated the work of DCISC concerning this matter but he was troubled by Dr. Budnitz' comment concerning Dr. Budnitz' past work for and association with the NRC and he remarked he did not believe Dr. Budnitz was

independent in the matter. Dr. Budnitz replied that he is presently an employee at the Lawrence Berkeley National Laboratory at the University of California but that he does conduct research funded by the NRC. Mr. Ritano stated it was his impression the DCISC was stating it was dangerous to protect the ocean and flout the law. He observed the law requires that the ocean must be protected and larval impingement and entrainment are unacceptable and illegal. He remarked that DCP, like other facilities, must eliminate OTC and DCP was by far the worst offender now that the San Onofre Nuclear Generating Station (SONGS) has closed. He stated he understood nuclear waste must be protected but it should be done in a manner that protects the ocean. He remarked that the problems associated with the buildup of salt at the plant should have been considered when it was decided to build a power plant next to the ocean. Mr. Ritano remarked that any discussion of probabilities in context of nuclear waste, which lasts for thousands of years, is misplaced as during that period of time every problem that could occur will occur and likely without any oversight in place to watch over the waste. Mr. Ritano stated concern over the interruption of electric power seems to him to be a dichotomy, as DCP is a power plant and should be able to ensure the availability of a steady stream of electric power. Mr. Ritano observed that with SONGS and the Morro Bay Power Plant closed there does not appear to be a shortage of electric power and as more solar power is available it is time to shut down DCP but until it is shut down it must follow the law which requires the plant to adhere to the best available technology that will not use the ocean for cooling water and destroy sea life. Mr. Ritano remarked the Committee's expressions regarding safety during the discussion were misplaced as it is PG&E that is creating a threat due to its creation of nuclear waste and a nuclear waste storage site in an area of known earthquake faults and a tsunami zone known for significantly large events in the past. He closed his comments by urging the DCISC to shut down the plant immediately to stop the production of nuclear waste, but until DCP is shut down to build whatever is necessary to replace OTC. He stated the public does not care if it has to pay for this as it must pay to remove the plant just as at SONGS.

Dr. Henriette Groote was recognized. Dr. Groote questioned the timing of the DCISC's consideration of a draft evaluation of a draft report and why the matter was being considered by the DCISC at this time and she commented it was her observation that the DCISC's actions appeared to be taken in haste. Dr. Groote stated that the DCISC's proposed list of recommendations should include an item to explore whether a better alternative exists and she remarked that closure of the plant should be considered by the DCISC in its role as a safety committee. Dr. Budnitz responded to Dr. Groote and explained that the schedule and process for the DCISC's review was determined by the RCNFP. He confirmed that if the final version of the Addendum, when issued by Bechtel, differs from the Bechtel Draft Addendum the DCISC will conduct an additional review. Dr. Budnitz stated that as the DCISC and the RCNFP are both State bodies and work in the public's interest it was entirely appropriate that the DCISC should cooperate with the RCNFP by reviewing the Bechtel Final Assessment and Bechtel Draft Addendum.

Dr. Gene Nelson was recognized. Dr. Nelson stated he is a resident of San Luis Obispo, California, and serves on the faculty of the California State Polytechnic University at San Luis Obispo (Cal Poly) and teaches at Cuesta College. He expressed his faith in the adage 'if it isn't broken don't fix it' and stated his opinion that in context of the elimination of OTC a State regulatory body was requesting review of a proposed major design change for DCP. He stated his belief that if large cooling towers

were constructed at DCPD they could serve as targets for terrorist attacks. Dr. Nelson stated the financial impact of OTC is estimated to be \$50,000 per year to commercial fisheries and he stated that DCPD's present operations may likely be a net gain to fisheries due to the plant's production of things fish eat. He remarked that a two-year outage would represent the loss of clean, safe, and reliable electric power from DCPD and he cited data from a text book on a comparison of the production of greenhouse gases between electricity produced by coal as opposed to that produced by nuclear power plants. He remarked that when DCPD is not producing electricity more carbon dioxide is generated and the ultimate sink for that carbon dioxide is in the oceans. Dr. Nelson observed the real agenda behind the initiative to eliminate OTC at DCPD is to involve the plant in regulatory 'red tape' so that it cannot produce clean power and he urged the DCISC to issue a strong recommendation that the status quo concerning OTC at DCPD be maintained for the sake of California's economy.

Mr. William Gloege was recognized. Mr. Gloege stated he resides in Orcutt, California. He remarked he is unsure about the damage done by the water emitted by DCPD which is warmer than seawater that has not been used for OTC. He commented that the sea life around DCPD appears to be thriving. He stated that this matter appears to him to be an issue regarding preventing the possibility of harming sea life as weighed against the issue of producing more carbon dioxide in the atmosphere which produces global warming. He observed the current drought in California is tied to global warming and he questioned why the environmental community is apparently unconcerned about carbon dioxide in the air. He remarked that in his opinion DCPD is a huge net plus for the environment and the health of the world and the real choice is between fossil fuel and nuclear power, as solar power represents only about 0.2% of U.S. power supplies while wind power constitutes about 4%. He remarked that opposition to nuclear power is, in essence, a vote in favor of fossil fuel. He stated that there are 440 nuclear reactors operating in the world and for more than 50 years there have been but two significant accidents, including the accident at Fukushima which resulted in no deaths. Mr. Gloege stated the United Nations released a report stating there was no damage to human health due to radiation released as a result of the accident at Fukushima and that the amounts released were too small to detect. He stated the environmental community is lying about nuclear power including in an article which appeared in the *Santa Maria Times* which claimed DCPD was producing plutonium for use in nuclear weapons. He closed his remarks by stating nuclear power is environmentally positive for the United States and he thanked the DCISC for its oversight role.

Ms. Linda Seeley was recognized. Ms. Seeley stated she was speaking as a representative of the group San Luis Obispo Mothers for Peace (Mothers for Peace). Ms. Seeley thanked the Members of the DCISC and stated Mothers for Peace has submitted a letter to the DCISC with questions regarding the DCISC's review of the Bechtel Draft Addendum. Ms. Seeley stated she understood the explanation by Dr. Budnitz concerning the timing of the Committee's review but that Mothers for Peace wished to review the record of the exchanges between the DCISC and PG&E concerning the cooling tower projects. Ms. Seeley stated it was her understanding that the Bechtel Draft Addendum would be finalized in September and released for public comment from other independent safety experts. She inquired if this matter was in the nature of a private transaction between PG&E and Bechtel and therefore different from proceedings conducted by the NRC which

provide time for public comment. Ms. Seeley stated that Mothers for Peace remains worried about the “unknown unknowns” at DCPD in context of the cooling tower proposals. She stated Mothers for Peace supports the State’s mandate to do away with OTC along the California coastline and it shares the DCISC’s concerns. She stated the recommendation of Mothers for Peace is for the DCISC to recognize that the present situation is a ‘no win’ scenario for the local community, the State of California, and the Nation in terms of safety. She stated Mothers for Peace looks to a carbon-free, nuclear-free, future and is concerned about global climate change, realizing that solutions must be innovative and creative including learning how to conserve and obtain power from sources that do not contribute to global climate change or leave a lasting legacy of nuclear waste.

Dr. Budnitz and Assistant Legal Counsel Rathie confirmed the DCISC would respond to the request for documents made in the letter from Mothers for Peace referred to by Ms. Seeley. Dr. Budnitz confirmed that when the RCNFP releases the final version of the Addendum to the Bechtel Final Assessment any member of the public may provide comments directly to the RCNFP. Mr. Rathie confirmed that the DCISC engaged in its review in accordance with the requirements of the RCNFP and that PG&E did not initiate the process. Dr. Budnitz remarked that any comments about the time provided for review should be addressed to the SWRCB.

Ms. Simone Malboeuf was recognized. Ms. Malboeuf stated she was a member of Mothers for Peace and she read and provided a copy of a letter from Jerry B. Brown Ph.D., Director of the Safe Energy Project of the World Business Academy of Santa Barbara, California, addressed to DCISC Legal Counsel Robert Wellington. In his letter concerning the evaluation of the Bechtel Draft Addendum Dr. Brown stated the World Business Academy (Academy) received a copy of the notice for the DCISC public meeting. The Academy is a nonprofit corporation with broad experience in the energy field including nuclear power and has participated as an intervener in the SONGS rate case with the California Public Utilities Commission. Dr. Brown’s letter stated the members and supporters of the Academy are affected by the operation and safety of DCPD and the impact of its archaic OTC system on the marine environment. Dr. Brown’s letter as read by Ms. Malboeuf stated the Academy’s concerns and requests include removal of the topic concerning review of the Bechtel Draft Addendum from the agenda for this public meeting until the relevant documents including the final version of the Addendum can be provided to the public and other experts in sufficient time for review; that it is procedurally egregious and premature for the DCISC to consider approving the Draft Evaluation; and that as the Bechtel Draft Addendum is in draft form it is incomplete and lacks internal Bechtel review and may contain material errors. In his letter Dr. Brown stated that DCISC approval of an evaluation of the Bechtel Draft Addendum would be a moral hazard from a public safety transparency and procedural perspective and he requested that the matter be rescheduled for a future meeting of the DCISC with sufficient public notice and time for independent review by experts of the final version of the Addendum.

Mr. Rathie confirmed the Committee office was in receipt of Dr. Brown’s letter and had provided a response to Dr. Brown and he confirmed the letter would be included in the Committee’s correspondence for its next public meeting.

Ms. Jane Swanson was recognized. Ms. Swanson stated she was a member of Mothers for Peace

but was speaking on behalf of the Friends of the Earth organization. She read a statement from Mr. Damon Moglen, Senior Strategic Advisor on Climate and Energy Programs for Friends of the Earth. Mr. Moglen in his statement observed Friends of the Earth supports the other groups and activists who are requesting removal of the agenda item regarding DCISC approval of an evaluation of the Bechtel Draft Addendum and he requested that the Committee delay its consideration of this item until the next meeting of the DCISC in October 2014. Mr. Moglen observed the DCISC has a responsibility to provide the public with access to information in a timely and open fashion and in this instance has failed to do both by having made the Draft Evaluation and the Bechtel Draft Addendum available to the public only hours before this public meeting, thereby making it impossible for the public to inform itself about the issue before the Committee. Mr. Moglen's statement maintained that, taken together, the DCISC made this process opaque, secretive, and counter to the public interest. He stated the Proposed Draft Evaluation was premature as the Bechtel Draft Addendum was itself in draft form and contains numerous errors; the Draft Evaluation is rife with mistakes, unsubstantiated claims, and, as identified by Friends of the Earth's expert Mr. Bill Powers of Powers Engineering who has presented information to the RCNFPF and other State agencies, contains substantial omissions, errors, and unsupported conjectures including the failure to discuss reliability or safety problems presently caused by OTC and ignores current and past reports by Bechtel to the RCNFPF while making unsubstantiated and frivolous claims about purported safety issues which do no honor to its authors and do not serve legitimate safety concerns. Ms. Swanson stated she would provide a copy of Mr. Moglen's communication to the DCISC.

Assistant Legal Counsel Rathie observed the DCISC received and responded to a previous communication from Mr. Moglen concerning the matter before the Committee.

Mr. Gary Corsilia was recognized. Mr. Corsilia stated he lives in San Luis Obispo, California and holds a license as a professional electrical engineer and is a retired DCPF electrical systems engineer. He stated that while he had not reviewed the Final Assessment or the Bechtel Draft Addendum or the Committee's reviews of those reports he stated he agreed with the DCISC on the issue of salt deposition on high voltage equipment as having a potential for creating safety issues at DCPF. Mr. Corsilia stated that it was his recommendation that DCISC should consider recommending to the SWRCB that since the implementation date for the elimination of OTC at SONGS was to have been by 2023, since SONGS shut down in 2013 that those ten years of operation with once through cooling which were to have been permitted for SONGS be instead credited to DCPF. Mr. Corsilia stated DCPF is safe at present and has operated as such for the 15 years he worked at the plant. Mr. Corsilia stated extra operational terms have been granted in context of carbon tradeoffs and should be considered with respect to the elimination of OTC at DCPF. He thanked the Committee for its presentation and for the opportunity for the public to speak on this issue.

Ms. Sherry Lewis was recognized. Ms. Lewis stated she was a representative of Mothers for Peace and she thanked the Committee for being present in the community. She inquired about the composition of the membership of the RCNFPF. She commented that the discussion of the issue of salt buildup on the spent fuel storage casks perhaps revealed a certain delicacy about the concrete used in the casks even without the salt deposition. She remarked that a probabilistic risk

assessment cannot be considered to be all inclusive and to include all human error. Ms. Lewis closed her remarks by stating that she wished the same emphasis on safety evident in the consideration of salt in the air due to the operation of cooling towers was applied to issues resulting from the overcrowded conditions in the spent fuel pools.

Dr. Budnitz stated a list of the members of the RCNFPP is publicly available on the SWRCB/RCNFPP's website and includes representatives from the CEC, the California Coastal Commission, the Alliance for Nuclear Responsibility, PG&E, and Southern California Edison. He remarked that data on human error rates is compiled and used in probabilistic risk assessment of accident sequences.

Mr. Raoul Brenner was recognized. Mr. Brenner stated he is a retired engineer having worked in electronics design for instrumentation for research at a national laboratory for more than twenty years. He stated he did not understand the use of words meant to scare as his concern was with information and calculations. He stated he supports continuance of operations at DCPD and observed that energy available in nuclear power offers three million times the energy available in coal and there are consequences to forgetting that fact.

Ms. Evie Justison was recognized. Ms. Justison stated she is a member of Mothers for Peace. She remarked that she did not believe a terrorist attack on a nuclear power plant would target the plant's cooling towers but stated she believed such an attack would target the spent fuel pools as they hold highly radioactive nuclear waste and would provide a more attractive target.

Dr. Budnitz stated security concerns, except for their potential effect on operational safety due to security measures, are outside the DCISC's purview but that all nuclear plants, including those with cooling towers, are required to have plans which include the security environment and protection for the cooling towers.

Mr. Otto Schmidt was recognized. Mr. Schmidt stated he has testified for four or five decades to the Atomic Energy Commission, the NRC, and others about an earthquake he experienced 48 years ago in Avila Beach, California, with a magnitude of 6.0. He stated he considers the seismic levels for Devil's Canyon to be seismic suicide. He stated the DCISC must shut down DCPD and it was his hope it would do so today rather than extend this legacy of suicide for the entire Central Coast. He stated the independence of the DCISC is, in his opinion, questionable and it is criminally insane to continue.

Mr. R. J. Hanson was recognized. Mr. Hanson observed that concerning degradation produced by salt deposits there would also be detrimental effects on the roadways serving DCPD and upon the vehicles of the DCPD employees using those roadways to travel to and from the plant site.

The Committee Members discussed whether a motion to approve the Draft Evaluation would be appropriate at this time. Drs. Lam and Peterson pointed out that there have been suggestions made during this public meeting that the Proposed Draft Evaluation is in some respects technically incomplete or contains technical errors and they indicated their preference to defer approval of the Draft Evaluation until the October 14-15, 2014, public meeting of the Committee. Dr. Lam inquired of Mr. Rathie whether the comments of the Committee could be provided to the RCNFPP without the

formal approval of the Members. Assistant Legal Counsel Rathie replied that until adopted by a majority of the membership of the DCISC the Draft Evaluation does not constitute the collective concurrence of the Members and therefore without such action it cannot be considered to be the statement of the entire DCISC. Until its adoption by a majority of the Members at a public meeting the Draft Evaluation is a report authored by Dr. Peterson and Mr. Wardell. Dr. Budnitz stated that if adoption of the Draft Evaluation were to be deferred and the document remains available on the DCISC's website a disclaimer should be added to the information on the website that it remains in draft form and does not constitute a statement by the DCISC. Dr. Peterson stated that it was his recommendation that, aside from the disclaimer suggested by Dr. Budnitz, the Draft Evaluation should remain in draft form, unmodified and available on the DCISC's website to allow time for additional input and comments. Dr. Budnitz remarked that the assertion that the Draft Evaluation contains unsubstantiated and frivolous claims about potential safety issues did not appear to him to be supported as the authors of the Draft Evaluation call for more analysis and more information to support a better basis for making a judgment on the issues addressed in and raised by the Bechtel Draft Addendum. Until that analysis can be performed and the information made available Dr. Budnitz commented it was impossible to make the assertions claimed in the communication to the DCISC.

The Members agreed the public interest would be best served by deferring their consideration of approval of the Draft Evaluation until the October 2014 public meeting of the DCISC. Dr. Budnitz observed, however, that by deferring its approval the DCISC will not meet its commitments to the RCNFPP nor will Bechtel have the benefit of the Committee's evaluation.

Ms. Linda Seeley of Mothers for Peace was recognized. Ms. Seeley inquired whether the DCISC could, on the basis that the Bechtel Draft Addendum was released to the DCISC for its review two weeks later than expected, claim an additional two weeks for its approval of the Draft Evaluation.

Dr. Budnitz reviewed the schedule and the rationale set by the RCNFPP for review of the Bechtel Draft Addendum by the DCISC and he confirmed that with the extension of additional time previously afforded the DCISC by the RCNFPP sufficient, albeit not ample, time was provided to the DCISC for its review. However, Dr. Budnitz stated that the Committee is very sensitive to and sympathetic with the fact that only a short time was able to be provided to the members of the public to review the Draft Evaluation and the Bechtel Draft Addendum. Dr. Peterson stated he attended meetings of the RCNFPP when Mr. Bill Powers made presentations and found him to be a capable engineer and therefore approval of the Draft Evaluation would, in Dr. Peterson's opinion, be premature and the Draft Evaluation should remain available on the Committee's website with a suitable disclaimer. He observed that the Draft Evaluation should be commended to the attention of the RCNFPP and Bechtel for their information and review as a statement of its authors which will be considered subsequently for approval by the entire DCISC. The Members then reviewed the schedule for their further consideration of the Draft Evaluation and the inclusion of any revisions based upon public comments received at this meeting or upon Bechtel's issuance of a final version of the Addendum, and for approving and providing a final version of their Evaluation to the RCNFPP and the SWRCB following the DCISC's October 14-15, 2014, public meeting.

Ms. Linda Seeley was recognized. Ms. Seeley expressed thanks on behalf of the Mothers for Peace as it was her belief that the Committee's deferral of approval of the Draft Evaluation provides the public with a much better opportunity to assist the Committee and to make the Draft Evaluation better and she further observed that this would increase the faith of the community in the DCISC as an independent safety committee which is actually working for the benefit of the greater whole.

Dr. Gene Nelson was recognized. Dr. Nelson suggested that any changes to the Draft Evaluation should be made available in a format which shows the changes made to the version now posted on the DCISC website as the document is essentially a living document. Dr. Nelson stated he hoped the person who made the comment that the Draft Evaluation includes frivolous concerns will further explain that comment.

Ms. Simone Malboeuf was recognized. Ms. Malboeuf stated she believed the World Business Academy would support the deferral of consideration of approval of the Draft Evaluation until the DCISC's next public meeting on October 14–15, 2014. She provided the Committee with a copy of a letter from Dr. Brown which she had read earlier.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis inquired and received confirmation that the public was invited to bring forth comments on the Draft Evaluation prior to the DCISC public meeting in October 2014. Ms. Lewis stated that it was her understanding that it was the DCISC that made the Bechtel Draft Addendum available to the public and she stated the Committee should be commended for that action.

Mr. William Gloege of Orcutt, California, was recognized. Mr. Orcutt stated he hoped any final report would not propose something that would endanger the plant which provides a positive contribution to fighting global warming and providing clean air. He remarked that if the final report contains a recommendation concerning cooling towers he hoped that it would take cost into consideration as a balance needs to be struck between the damage supposedly being done and the cost of the proposed alterations or modifications. Dr. Budnitz replied the Final Assessment and Bechtel Draft Addendum both address issues of cost but consideration of cost is outside of the DCISC's remit. Dr. Budnitz suggested Mr. Gloege address his concerns about cost to the SWRCB.

Mr. John Geesman, representing the Alliance for Nuclear Responsibility was recognized. Mr. Geesman stated he has attended each of the meetings of the RCNFPP and he recommended that a letter be sent to the RCNFPP from Dr. Peterson, as DCISC Chair, clearly explaining the status of the Draft Evaluation and the reasons for the DCISC's determination in considering the matter today. Drs. Budnitz and Peterson agreed with Mr. Geesman and stated the Draft Evaluation should be attached to that letter commending it to the attention of both the RCNFPP and Bechtel albeit as a draft. Dr. Peterson agreed that if and when a revised version of the Draft Evaluation is posted to the DCISC website any revisions to a previously posted draft should be clearly indicated.

Dr. Budnitz then requested the concurrence of the membership concerning: (1) Dr. Peterson as DCISC Chair communicating with the RCNFPP explaining the DCISC's determination not to approve the Draft Evaluation at this time and to inform the RCNFPP that the Draft Evaluation remains

available on the DCISC's website and commending it to the attention of the RCNFPF and Bechtel; (2) setting forth in that letter the DCISC's understanding of the schedule for further consideration of the Bechtel Draft Addendum; and (3) describing the future actions to be taken by the DCISC concerning consideration of approval of the Draft Evaluation. On a roll call vote the Committee Members unanimously affirmed the consensus of the Committee to proceed as described by Dr. Budnitz. In response to the Chair's inquiry Assistant Legal Counsel Rathie confirmed that the action taken by the Committee was in accordance with the law and the public agenda for this meeting.

V Approval and Authorization of Transmittal Of Fact Finding Reports to PG&E

Dr. Budnitz stated consideration and approval of the section on the load following update from the December 10–11, 2013 Fact Finding Report and the May 21–22, 2014 Fact Finding Report was deferred at previous public meetings and he asked for public comment on those reports.

Mr. John Geesman, on behalf of the Alliance for Nuclear Responsibility was recognized. Mr. Geesman stated he recognized the DCISC was likely to adopt and approve the section of the December 10–11, 2013 Fact Finding Report concerning load-following operation of DCPD with certain redactions from an earlier draft. He stated he found that action perplexing but consistent with the Committee's Charter which sets forth what he described as a very open-ended capability for PG&E to designate certain items as confidential based upon PG&E's designation of the information as confidential business information which could injure PG&E in its business. Mr. Geesman stated consideration of operating DCPD on a load-following basis involves a radical change to the way in which every nuclear plant in the U.S. is operated and represents a very questionable idea. He cited a report on the future of nuclear power by Professor John Deutch and Secretary Ernest Moniz from April 2011, in which those authors state current nuclear plants are not designed for flexible operations but are intended to provide steady base load generation. The report states the economics of base load power plants are affected significantly if called upon to operate in load follow mode and this is especially true of nuclear plants which have very high capital costs and require very high capacity factors for cost recovery. Mr. Geesman remarked the report further states that expanding the ability of nuclear power plants to physically ramp and cycle to varying degrees would negatively impact their operations, maintenance schedules, and expected operational lifetimes. Mr. Geesman stated the DCISC December 10–11, 2013 Fact Finding Report recognizes that load follow operations have the potential to affect plant reliability and safety and the Fact Finding Report states the DCISC should review the feasibility study when it is completed and continue to follow this topic closely. Mr. Geesman stated he recognized that when PG&E designates certain information as confidential for proprietary reasons, under the DCISC's Charter there is little alternative available to the Committee unless a majority of the DCISC members challenge the propriety of the designation by a vote taken within 30 days. He stated he understood the 30-day requirement was moot in terms of the DCISC action to approve the section on load-following from the December 10–11, 2013 Fact Finding Report but he asked each of the DCISC Members to address individually the propriety of the designation of confidentiality in recognition that a radical change such as load follow operations should be taken with considerable transparency.

Dr. Budnitz stated that the DCISC would continue to review any proposals for load following operation of DCP. Dr. Peterson stated the planning done by PG&E with respect to its strategy to meet future energy generation requirements, in an environment where generation is expected to change greatly due to increased deployment of renewable, solar and other changes, represents elements which are legitimate business planning and therefore may represent proprietary information. However, Dr. Peterson stated the DCISC must identify potential changes that are implicated in terms of plant operations and then assess how those changes might affect plant reliability. Dr. Peterson stated nuclear plants in France routinely operate on a load-following basis but in order to do so modifications are generally required to the plant and its equipment. If PG&E contemplates operating DCP on a load follow basis, the DCISC would need to assess whether the necessary changes to equipment would preserve safety. He gave the example of extended refueling outages during spring and fall as an aspect of operation that would be unlikely to have an impact on plant safety. Dr. Peterson stated the DCISC needs to remain cognizant about what types of information may be legitimately proprietary with respect to PG&E's planning process for future generation and delivery and information which addresses direct potential modifications to the plant.

On a roll call vote, the section on load following update from the December 10–11, 2013 Fact Finding Report and the May 21–22, 2014 Fact Finding Report were unanimously approved and their transmittal to PG&E was authorized by this action.

VI Public Comments and Communications

Dr. Budnitz invited any members of the public to address the Committee on matters not on the agenda for this public meeting. There was no response to his invitation.

V Adjournment Of Public Meeting & Teleconference

Dr. Budnitz remarked there were eighteen members of the public and four representatives of PG&E in attendance at this public meeting and teleconference and he thanked everyone for attending. There being no further business, the seventy-seventh public meeting and teleconference of the Diablo Canyon Independent Safety Committee was adjourned by Dr. Budnitz at 12:58 P.M.

25th Annual Report, Volume 2, Exhibit B4, Notice of Plant Tour and Public Meeting

NOTICE IS HEREBY GIVEN that on October 15, 2014, at 8:00 A.M., the members of the Diablo Canyon Independent Safety Committee (DCISC) will conduct an inspection tour of certain accessible areas of the Diablo Canyon Power Plant (DCPP). This tour, which will take approximately three and one half hours, was previously advertised to the public. Because the plant is an operating nuclear power plant the number of participants was limited and space has been assigned on the basis of prior reservation taken on a first-come, first-served basis, with priority given to those persons who were not accommodated on recent DCISC inspection tours. 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 considerations preclude the public tour on October 15th, the DCISC may convene an informal power point 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 October 14–15, 2014, at the Avila Lighthouse Suites, located at First and San Francisco Streets, Avila Beach, California and at 30 Acacia Avenue, Berkeley, California, a public meeting and teleconference will be held by the DCISC in the Point San Luis Conference Facility in four separate sessions, at the times indicated, to consider the following matters:

1. **Morning Session: (10/14/2014)–8:30 A.M.** Opening comments and remarks; receive public comments and communications to the Committee; approve minutes of June 11–12, 2014, public meeting and August 8, 2014, public meeting and teleconference; discussion of administrative matters, including review and approval of the DCISC 24th Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations for the period July 1, 2013—June 30, 2014; an update on financial matters and activities during 2014 and 2015; review of the Open Items List; reports by Committee members and scheduling of future public meetings and fact-finding visits; reports by technical consultants and legal counsel; receive, approve and authorize transmittal of fact-finding reports to PG&E; and review of Committee correspondence and documents received.
2. **Afternoon Session: (10/14/2014)–1:30 P.M.** Comments by Committee members; receive public comments and communications to the Committee; a discussion by the Committee members concerning the DCISC’s Evaluation of Safety Issues for the Bechtel Power Corporation’s “Addendum to the Independent Third Party Final Technologies Assessment of the Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling System for Diablo Canyon Power Plant Addressing the Installation of Saltwater Cooling Towers in the South parking Lot” receive informational presentations requested by the Committee from

PG&E on topics relating to plant safety and operations, including a presentation on the Buried Pipes and Tanks Program; and a report on recent Licensee Event Reports, NRC Notices of Violation and NRC Performance Indicators.

3. **Evening Session: (10/14/2014)–5:30 P.M.** Committee member comments; receive public comments and communications to the Committee; receive informational presentations requested by the Committee from PG&E on topics relating to plant safety and operations, including a presentation by PG&E on the state of the plant including key events, highlights, and station activities; and a presentation on the Advanced Seismic Safety Studies for DCP.
4. **Afternoon Session: (10/15/2014)–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 Digital Control Systems including performance, history and upgrades; and a presentation on the Maintenance and Technical Training Update; wrap-up discussion by Committee members, and confirmation of future site visits, study sessions and 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 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 2 (website) and October 4 (SLO Tribune,) 2014.

[25th Annual Report, Volume 2, Exhibit B5, DCISC Agenda for the October 14–15, 2014 Public Meeting](#)

Committee Members:

Robert J. Budnitz

Peter Lam

Per F. Peterson

Tuesday & Wednesday, October 14–15, 2014

Point San Luis Conference Center, Avila Lighthouse Suites, First & San Francisco Streets, Avila Beach, California

([Click for an interactive map.](#))

Public Meeting Agenda

Morning Session: 10/14/2014–8:30 A.M.

I Call To Order–Roll Call

II Introductions

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 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.)*

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 June 11–12, 2014, Meeting: Approve
- B. Minutes of August 8, 2014, Meeting & Teleconference: Approve

V Action Items

- A. DCISC 24th Annual Report on Safety of Diablo Canyon Operations; July 1, 2013—June 30, 2014: Discussion/Approval
- B. Update on Financial Matters and Committee Activities during 2014–2015: 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; 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 R. Ferman Wardell:
Fact-finding Topics; Report on and Approval of August 13–14, 2014 Fact Finding Report
- B. Consultant David C. Linnen:
Fact-finding Topics; Reports on and Approval of June 24–25 and September 17–18, 2014 Fact Finding Reports,
Approval of Section on Load Follow Update from the December 10–11, 2013 Fact Finding Report
- C. Legal Counsel Robert Wellington:
Administrative, Regulatory and Legal Matters

VIII Correspondence

IX Adjourn Morning Meeting

Afternoon Session: 10/14/2014–1:30 P.M.

X Reconvene for Afternoon Meeting

XI Committee Member Comments

XII 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 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.)

XIII Action Items (Cont'd)

- D. DCISC's Evaluation of Safety Issues for Bechtel Power Corporation's "Addendum to the Independent Third Party Final Technologies Assessment of 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.": Discussion/Approval

XIV Information Items Before the Committee

- A. Informational Presentations Requested by the Committee of PG&E Representatives
 - 1. Buried Pipes and Tanks Program
 - 2. Review of NRC Performance Indicators, Licensee Event Reports, and NRC Notices of Violations

XV Adjourn Afternoon Meeting

Evening Session: 10/14/2014-5:30 P.M.

XVI Reconvene for Evening Meeting

XVII Committee Member Comments

XVIII 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 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.)*

XVII Information Items Before the Committee (Cont'd)

3. Presentation on the State of the Plant including Key Events, Highlights and Station Activities
4. Advanced Seismic Safety Studies

XX Adjourn Evening Meeting

Public Tour: 10/15/2014–8:00 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.

Afternoon Session: 10/15/2014–1:00 P.M.

XXI Reconvene for Afternoon Meeting

XXII Committee Member Comments

XXIII 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 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.)*

XXIV Information Items Before the Committee (Cont'd)

5. Digital Control Systems: Overview, Performance, History, and Upgrades
6. Maintenance and Technical Training Update

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 Seventy-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 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.

25th Annual Report, Volume 2, Exhibit B7, Notice of Plant Tour and Public Meeting

NOTICE IS HEREBY GIVEN that on February 4, 2015, at 8:00 A.M., the members of the Diablo Canyon Independent Safety Committee (DCISC) will conduct an inspection tour of certain accessible areas of the Diablo Canyon Power Plant (DCPP). This tour, which will take approximately three and one half hours, was previously advertised to the public. Because the plant is an operating nuclear power plant the number of participants was limited and space has been assigned on the basis of prior reservation taken on a first-come, first-served basis, with priority given to those persons who were not accommodated on recent DCISC inspection tours. 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 considerations preclude the public tour on February 4th, the DCISC may convene an informal power point 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 4–5, 2015, at the Avila Lighthouse Suites, located at First and San Francisco Streets, Avila Beach, California and at 30 Acacia Avenue, Berkeley, California, a public meeting and teleconference will be held by the DCISC in the Point San Luis Conference Facility in four separate sessions, at the times indicated, to consider the following matters:

1. **Afternoon Session: (02/04/2015)–1:30 P.M.** Opening comments and remarks; receive public comments and communications to the Committee; approve minutes of October 14–15, 2014, public meeting; discussion of administrative matters, including review of PG&E’s response to the DCISC 24th Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations for the period July 1, 2013–June 30, 2014; an update on financial matters and activities during 2015; review of the Open Items List; reports by Committee members, consultants, and legal counsel; receive, approve, and authorize transmittal of fact-finding reports to PG&E; and review of Committee correspondence and documents received.
2. **Evening Session: (02/04/2015)–5:30 P.M.** Committee member comments; receive public comments and communications to the Committee; receive informational presentations requested by the Committee from PG&E on topics relating to plant safety and operations, including a presentation by PG&E on the state of the plant, station activities and events and a summary of key aspects and performance indicators for refueling outage 2R18; and a review of NRC performance indicators, reportable events, and notices of violation.
3. **Morning Session: (02/05/2015)–8:00 A.M.** Comments by Committee members; receive public comments and communications to the Committee; receive informational presentations requested by the Committee from PG&E on topics relating to plant safety and operations,

including an update on the 2015 Operating Plan and performance goals and a comparison with accomplishments under the 2014 Operating Plan; an overview of Nuclear Safety Culture; and an overview of the Action Plan for high voltage flashovers.

4. **Afternoon Session: (02/05/2015)–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 update on the Independent Spent Fuel Storage installation (ISFSI) and the status of the condition of the ISFSI multi-purpose canisters; an overview of the Action Plan for DCCP's large station transformers; 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 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: January 25, 2015.

25th Annual Report, Volume 2, Exhibit B8, DCISC Agenda for the February 4–5, 2015 Public Meeting

Committee Members:

Robert J. Budnitz

Peter Lam

Per F. Peterson

Wednesday & Thursday, February 12–13, 2014

Point San Luis Conference Center, Avila Lighthouse Suites, First & San Francisco Streets, Avila Beach, California

Public Tour: 02/04/2015–8:00 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.

Afternoon Session: 02/04/2015–1:30 P.M.

I Call To Order–Roll Call

II Introductions

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 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.)

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 October 14–15, 2014, Meeting: Approve

V Action Items

- A. Review of PG&E's Response to DCISC's 24th Annual Report on Safety of Diablo Canyon Operations; July 1, 2013—June 30, 2014: Discussion/Action
- B. Update on Financial Matters and 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; scheduling and confirmation of future fact-findings 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. Ferman Wardell
Fact-finding Topics; Report on and Approval of November 19–20, 2014 and January 21–22, 2015 Fact Finding Reports
- B. David C. Linnen
Fact-finding Topics: Report on and Approval of December 2–3, 2014 Fact Finding Report
- C. Robert Wellington
Administrative, Regulatory and Legal Matters

VIII Correspondence

IX Adjourn Afternoon Meeting

Evening Session: 02/04/2014–5:30 P.M.

X Reconvene for Evening Meeting

XI Committee Member Comments

XII 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.*

XIII Information Items Before the Committee

A. Informational Presentations Requested by the Committee of PG&E Representatives

1. Presentation on the State of the Plant, Station Activities and a Summary of Performance Indicators for Refueling Outage 2R18
2. Review of NRC Performance Indicators, Reportable Events and Notices of Violation

XIV Adjourn Evening Meeting

Morning Session: 02/05/2014–8:00 A.M.

XV Reconvene for Morning Meeting

XVI Committee Member Comments

XVII 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.*

XVIII Information Items Before the Committee (Cont'd)

3. Update on the 2015 Operating Plan and Performance Goals and Comparison with Accomplishments Under 2014 Operating Plan
4. Overview of Nuclear Safety Culture
5. Overview of the Action Plan for High Voltage Flashovers

XIX Adjourn Morning Meeting

Afternoon Session 02/05/2015 1:00 P.M.

XX Reconvene for Afternoon Meeting

XVI Committee Member Comments

XVII 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.*

XVIII Information Items Before the Committee (Cont'd)

6. Update on the Independent Spent Fuel Storage Installation (ISFSI) and Status of the Condition of the ISFSI Multi-Purpose Canisters
7. Overview of the Action Plan for DCPD Large Station Transformers

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

- A. Future Actions by the Committee
- B. Further Information to Obtain/Review
- C. Scheduling of Future Site Visits, Study Sessions and Meetings

XXV Adjournment of Seventy-ninth Public Meeting

The Committee's policy is to schedule its public meetings in locations that are accessible to people with disabilities. Devices for attendees who may be hearing impaired are available.

25th Annual Report, Volume 2, Exhibit B10, Notice of Public Meeting

NOTICE IS HEREBY GIVEN that on May 14, 2015, at 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 14, 2015–10:00 A.M. PDT Committee member comments; 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 its environs from tsunamis; 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 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: May 4, 2015.

[25th Annual Report, Volume 2, Exhibit B11, DCISC Agenda for Thursday, May 14, 2015 10:00 A.M. \(PDT\) Public Meeting](#)

Committee Members:

Robert J. Budnitz

Peter Lam

Per F. Peterson

Public Meeting Location: 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 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.

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 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 Adjourn Public Meeting

The Committee’s policy is to schedule its public meetings in locations that are accessible to people with

disabilities. The Hotel Durant 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.

[25th Annual Report, Volume 2, Exhibit B13, Notice of Plant Tour and Public Meeting on June 16–17, 2015](#)

NOTICE IS HEREBY GIVEN that on June 17, 2015, at 8:00 A.M., the members of the Diablo Canyon Independent Safety Committee (DCISC) will conduct an inspection tour of certain accessible areas of the Diablo Canyon Power Plant (DCPP). This tour, which will take approximately three and one half hours, was previously advertised to the public. Because the plant is an operating nuclear power plant the number of participants was limited and space has been assigned on the basis of prior reservation taken on a first-come, first-served basis, with priority given to those persons who were not accommodated on recent DCISC inspection tours. 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 considerations preclude the public tour on June 17th, the DCISC may convene an informal power point 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 16–17 2015, at the Avila Lighthouse Suites, located at First and San Francisco Streets, Avila Beach, California and at 30 Acacia Avenue, Berkeley, California, a public meeting and teleconference will be held by the DCISC in the Point San Luis Conference Facility in four separate sessions, at the times indicated, to consider the following matters:

1. **Morning Session: (06/16/2015)–8:30 A.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 4–5, 2015, and May 14, 2015, public meetings; discussion of administrative matters, including an update on financial matters and activities during 2015; review of the Open Items List; nomination and election of Chair and Vice Chair to serve for the July 1, 2015 to June 30, 2016 term; reports by Committee members, technical consultants and legal counsel and scheduling of future public meetings and site visits; receive, approve and authorize transmittal of fact-finding reports to PG&E; and review of Committee correspondence and documents received.
2. **Afternoon Session: (06/16/2015)–1:30 P.M.** Comments by Committee members; receive public comments and communications to the Committee; consider informational presentations from PG&E on topics relating to plant safety and operations, including a report on the status of the NRC Performance Indicators, recent Licensee Event Reports, and NRC Notices of Violation; the status of the Office Seismic Safety and the Seismically Induced System Interaction Programs; a report on the Quality Verification organization's perspective on plant performance and the results of the post-Fukushima study of DCPP external flooding hazards.

3. **Evening Session: (06/16/2015) –5:30 P.M.** Committee member comments; receive public comments and communications to the Committee; receive informational presentations requested by the Committee from PG&E on topics relating to plant safety and operations, including a presentation on the results of PG&E's recent tsunami studies; and a presentation on the results of PG&E's recent seismic studies.
4. **Afternoon Session: (06/17/2015)–12:30 P.M.** Comments by Committee members; receive public comments and communications to the Committee; a report by the DCISC on its activities related to understanding the seismic hazard and tsunami risk at the DCPD site and environs; consider informational presentations from PG&E including a status report on PG&E's assessment of the DCPD internal flooding probabilistic risk assessment; and a report on the State of the Plant including key events, operational highlights, and station activities; 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 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 6, 2015.

[25th Annual Report, Volume 2, Exhibit B14, DCISC Agenda for the June 16–17, 2015 Plant Tour and Public Meeting](#)

Committee Members:

Robert J. Budnitz

Peter Lam

Per F. Peterson

Tuesday & Wednesday, June 16–17, 2015, Point San Luis Conference, Room, Avila Lighthouse Suites,
First & San Francisco Streets, Avila Beach, California

Morning Session: 06/16/2015–8:30 A.M.

I Call To Order–Roll Call

II Introductions

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 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.)*

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 4–5, 2015, Meeting: Approve
- B. Minutes of May 14, 2015, Meeting: Approve

V Action Items

- A. Update on Financial Matters and Committee Activities during 2015: Discussion/Action
- B. Discussion of Open Items List: Discussion/Action
- C. Nomination and Election of Chair and Vice Chair for the July 1, 2015—June 30, 2016 Term: Discussion/Action

VI Committee Member Reports and Discussion

- A. Public Outreach, Site Visits and Other Committee Activities; 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 R. Ferman Wardell:
Fact-finding Topics; Report on and Approval of April 21–22, 2015, Fact Finding Report
- B. Consultant David C. Linnen:
Fact-finding Topics; Report on and Approval of March 30—April 1 and May 19–20, 2015, Fact Finding Reports
- C. Legal Counsel Robert R. Wellington: Administrative, Regulatory and Legal Matters

VIII Correspondence

IX Adjourn Morning Meeting

Afternoon Session: 06/16/2015—1:30 P.M.

X Reconvene for Afternoon Meeting

XI Committee Member Comments

XII 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 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.)*

XIII Information Items Before the Committee

A. Informational Presentations Requested by the Committee of PG&E Representatives

1. Review of NRC Performance Indicators, Licensee Event Reports, and NRC Notices of Violations
2. Status of Office Seismic Safety and the Seismically Induced System Interaction Housekeeping Program
3. Quality Verification Organization's Perspective on Station Performance: Strengths, Top Issues, and the Quality Performance Assessment Report
4. Results of Post-Fukushima Study of DCPD External Flooding Hazards

XIV Adjourn Afternoon Meeting

Evening Session: 06/16/2015–5:30 P.M.

XV Reconvene for Evening Meeting

XVI Committee Member Comments

XVII 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 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.)*

XVIII Information Items Before the Committee (Cont'd)

5. Presentation on Results of PG&E's Tsunami Studies
6. Presentation on Results of PG&E's Seismic Studies

XIX Adjourn Evening Meeting

Public Tour: 06/17/2015–8:00 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.

Afternoon Session: 06/17/2015–12:30 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 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.)*

XXIII Actions Items (Cont'd)

- D. DCISC's Report on Its Activities Related to Understanding the Seismic Hazard and Tsunami Risk at the Plant Site and Environs: Discussion

XXIV Information Items Before the Committee (Cont'd)

- 7. Status of PG&E's Assessment of DCPD Internal Flooding Probabilistic Risk Assessment
- 8. Presentation on the State of the Plant including Key Events, Highlights and Station Activities

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 Eighty-first 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 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.

Committee Members:

Robert J. Budnitz

Peter Lam

Per F. Peterson

Wednesday & Thursday, June 5–6, 2013

Point San Luis Conference Center, Avila Lighthouse Suites, First & San Francisco Streets, Avila Beach, California

Morning Session: 06/05/2013–8:30 A.M.

I Call To Order–Roll Call

II Introductions

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 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.)*

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 6–7, 2013, Meeting: Approve

V Action Items

- A. Update on Financial Matters and Committee Activities during 2013: Discussion/Action

- B. Discussion of Open Items List: Discussion/Action
- C. Nomination and Election of Chair and Vice Chair for the July 1, 2013–June 30, 2014 Term:
Discussion/Action

VI Committee Member Reports and Discussion

- A. Public Outreach, Site Visits and Other Committee Activities; scheduling and confirmation of future fact-finding 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. Ferman Wardell:
Fact-finding Topics; Report on and Approval of March 12–13 and April 9–10, 2013, Fact Finding Reports
- B. David C. Linnen:
Fact-finding Topics; Report on and Approval of January 16–17, 2013, Fact Finding Report; Report on May 7–8, 2013, Fact-finding
- C. Robert Wellington:
Administrative, Regulatory and Legal Matters

VIII Correspondence

IX Adjourn Morning Meeting

Afternoon Session: 06/05/2013–1:30 P.M.

X Reconvene for Afternoon Meeting

XI Committee Member Comments

XII 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.*

XIII Information Items Before the Committee (Cont'd.)

- A. Informational Presentations Requested by the Committee of PG&E Representatives
 - 1. Quality Verification Organizations Perspective on Plant Performance, Top Issues, and the Quality Performance Assessment Report

2. Project Update from the Seventeenth Refueling Outage for Unit-2
3. Results of the Seventeenth Refueling Outage for Unit-2

XIV Adjourn Afternoon Meeting

Evening Session: 06/05/2013-5:30 P.M.

XV Reconvene for Evening Meeting

XVI Committee Member Comments

XVII 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.*

XVIII Information Items Before the Committee (Cont'd)

4. Presentation on the State of the Plant including Key Events, Highlights and Station Activities
5. Review of NRC Performance Indicators, Licensee Event Reports, and NRC Notices of Violations
6. Status of Activities in the 2013 DCPD Operating Plan and Results to Date

XIX Adjourn Evening Meeting

Public Tour: 06/06/2013-8:00 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.

Afternoon Session: 06/06/2013-1:00 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 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.*

XXIII Information Items Before the Committee (Cont'd)

7. Status of the Control Room Ventilation System
8. Presentation and Assessment of Activities Directed at Achieving High Levels of Human Performance

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

- A. Future Actions by the Committee
- B. Further Information to Obtain/Review
- C. Scheduling of Future Site Visits, Study Sessions and Meetings

XXV Adjournment of Sixty-ninth Public Meeting

The Committee's policy is to schedule its public meetings in locations that are accessible to people with disabilities. Devices for attendees who may be hearing impaired are available.

25th Annual Report, Volume 2, Exhibit B16, 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 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 the 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.

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[25th Annual Report](#), [Volume 2](#), Exhibit D.1, Diablo Canyon Independent Safety Committee Report on Fact Finding Meeting at DCPD on June 24–25, 2014 by Robert J. Budnitz, Member, and David C. Linnen, Consultant

1.0 Summary

The results of the June 24–25, 2014 fact-finding trip to the Diablo Canyon Power Plant in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Actions to Address Trend of NRC Violations with Respect to Work Practices and Human Error Reduction
2. Nuclear Fuel Performance
3. Management of On-line Maintenance Risk
4. Outage Planning and Execution
5. Meeting with NRC Resident Inspector
6. Management of Single Point Vulnerability
7. Critical Equipment Clock Resets
8. Auxiliary Feedwater System Health
9. 2013 Annual Radioactive Effluent Release Report and 2013 Annual Radiological Environmental Operating Report
10. Plans to Address 230 kV System Issues
11. Component Mispositionings
12. Operations Training
13. Engineering Training
14. Meeting with PG&E Chief Nuclear Officer

2.0 Introduction

This fact-finding trip to the DCPD 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 DCPD 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 Actions to Address Trend of NRC Violations with Respect to Work Practices and Human Error Reduction < /h3 > < p > The DCISC Fact-finding Team (FFT) met with Jeff Harker, Maintenance and Technical Training Manager. The DCISC last reviewed the topic of Human Performance in January 2014 (Reference 6.1), when it concluded:

The DCISC Fact-finding Team (FFT) met with Jeff Harker, Maintenance and Technical Training Manager. The DCISC last reviewed the topic of Human Performance in January 2014 (Reference 6.1), when it concluded:

Three Station Level Human Performance Event Clock Resets occurred during the fourth quarter of 2013, causing the station’s 18-month indicator for such Resets to become Yellow (deficient). Two of these three events involved Operations personnel. Operations performance with respect to human error rate has been Red (Unsatisfactory) since July 2013. Component mispositioning appears to be a contributor. The DCISC should examine Operations’ efforts with regard to plant status control and component mispositioning with regard to the station as a whole no later than the third quarter of 2014.

Mr. Harker stated that DCPD has escalated its ongoing emphasis on human error prevention. This increased emphasis stemmed primarily from a number of human performance events that were of particular concern to DCPD and that were discussed in DCISC’s January 2014 Fact-finding Visit as follows:

- On December 19, 2013, Operations was conducting testing on EDG 1-2 in order to return it to operable status at the end of its Maintenance Outage Window. During this testing period the rooms of the two other Unit 1 EDGs were posted as restricted areas. Nevertheless, a Nuclear Operator entered the room containing EDG 1-3, without authorization from the Control Room. His intent was to use the telephone in order to coordinate with Control Room staff and to familiarize himself with the location of a pump drive belt that he later would be inspecting on EDG 1-2. In the process of maneuvering out of the drive belt area, the Operator stepped on an EDG fuel oil line that broke, causing this second EDG to be inoperable as well as EDG 1-2.

On November 2, 2013 a Control Operator left FCV-495, the Auxiliary Feedwater cross-tie valve, in the wrong position (closed) at the end of a surveillance test.

- On October 22, 2013, a Locked High Radiation Area was discovered to be unsecured. Evaluation of the situation determined that the barrier that had been established by Radiation Protection and Maintenance workers had apparently been inadvertently bumped by a Maintenance worker.
- On February 28, 2013 a Vital 4 kV Bus was inadvertently de-energized by a Maintenance technician during troubleshooting activities.

Also, Station Human Performance Clock Resets had been rated as Yellow (Deficient) during the period of September 2013 through November 2013 and the Human Error Rate for the Operations Group had been rated as Red (Unsatisfactory) during that same period. In addition, Quality Verification's (QV) November 2013 Site Status Report noted that QV was reinstating Human Performance as a top QV Concern. The history of QV's interest in DCPH Human Performance is provided below:

- In July 2012 QV identified Human Performance as one of QV's top three Concerns.
- In January 2013 QV issued an audit finding that human performance errors continued to challenge station performance.
- In July 2013 QV concluded that human performance had improved based on the fact that department and station level event rates were continuing to show improved performance. (In QV's November 7, 2013 Site Status Report QV provided an insight into this conclusion, citing that the decision in July was based on metric performance (i.e. performance indicators) rather than on observed worker behaviors.)
- In November 2013 QV reinstated human performance as a top QV concern.

To address what appeared to be a growing, or at least a recurring, issue, DCPH conducted a formal Evaluation of the situation, and developed a formal Action Plan to address the identified issues. In brief, the Evaluation determined that a sense of accountability for human performance had not sufficiently permeated the station organization. This was reflected in an inadequacy in the assessment of human performance events from the standpoint of organizational or programmatic weaknesses. A formal Action Plan has been developed to address these inadequacies, and the elements of the plan appear to be appropriate.

Mr. Harker cited a number of key actions that are being taken to address this issue, as follows:

- Each manager is to devote one full day each quarter to observing activities in the plant and providing feedback to the workers. The intent is to engage with the worker and encourage workers to identify problems that they might encounter during performance of work.
- Lower level events are examined at the section level, going deeper than the examination of station-level and department-level events.
- Risks are assigned for each work activity regardless of risk level to stimulate a continuous

focus on and recognition of risk. The orientation is promoted that “low” risk doesn’t mean “zero” risk.

- First line supervisors are encouraged to spend more time observing their employees.
- DCP’s Chief Nuclear Officer engages staff members in dynamic learning activities that stimulate discussion of how a variety of scenarios should be approached.
- DCP’s Director of Station Support is assigned as the site’s “Champion” for this effort in order to ensure a senior management presence.

The Fact-finding Team also noted that DCP’s recent increased focus on preventing events caused by human error appears to be achieving results. A variety of performance measures support this, including improvements in human error rates, component mispositionings, outage level and station level events, and NRC indicators. Of particular note is that no station department is listed on the first data page of the May 2014 Plant Performance Improvement Report as having a noteworthy (i.e. Red/Yellow) problem for the most recent three months with regard to “Component Mispositionings”.

Also, the NRC’s ratings for specified Human Performance Traits, as shown in DCP’s May 2014 Plant Performance Improvement Report, are listed below. The rating scheme for each of the color ratings is as follows:

Green: No Cross-Cutting Issues

White: 1-2 Cross-Cutting Issues

Yellow: 3 Cross-Cutting Issues

Red: Greater than 3 Cross-Cutting Issues

Dark Red: Substantive Cross-cutting Issue Open with NRC

Trait	Rating
Leadership, Safety Values, and Actions	White
Personal Accountability	Green
Work Processes	White
Continuous Learning	Green
Effective Safety Communication	Green
Questioning Attitude	White
Decision Making	White

Finally, since the DCISC has reviewed Human Performance at DCP throughout the years, this Fact-finding Team reviewed some of the more recent history. The DCISC notes that in 2011 the station was also confronting a similar issue. In response to the issue at that time, DCP developed a “Human Performance Line Ownership Action Plan” to address some human performance events that occurred in May 2011. The Objectives of this Action Plan were as follows:

1. Communicate clearly to the Extended Leadership Team (ELT) the importance of human performance errors and value of human performance tools.
2. Create a Dynamic Learning Activity (DLA) and designate First Line Supervisors and Individual Contributors with excellent human performance tool usage to facilitate. The DLA should be directly attributable to plant work and long enough to demonstrate consistent, sustained tool usage. Coaching by the facilitator should be on the spot and consistent. All Operation, Maintenance, and Projects personnel should participate.
3. Implement a consistent accountability model for First Line Supervisors.
4. Communicate expectations regarding accountability for individual contributors.
5. Perform an assessment of the effectiveness of the overall plan.
6. 1R17 Human Performance High Intensity Team (HIT) Actions for Pre-Outage Training Development and Rapid Trending Team actions.

Some of the above listed objectives appear to be similar to the focus of DCP's most recent Action Plan.

Conclusion:

The DCISC acknowledges that DCP's efforts in recent years with regard to human error reduction have resulted in some improvement, although performance has fluctuated. In fact, DCP's most recent performance with respect to NRC's indicators and other performance indicators now appears to be improving again. Although the long-term trend has been somewhat positive, DCP has not achieved the level and consistency that the station itself intends to achieve. Current plans for further remedial action appear to be appropriate. The obvious goal is sustainability. The DCISC should consider conducting its next review of this topic during the first quarter of 2015.

Recommendations:

None

3.2 Nuclear Fuel Performance

The DCISC Fact-finding Team met with Mark Mayer, Reactor Engineering Group Supervisor, and Chris Groff, Manager, Nuclear Fuels Purchasing. The DCISC last reviewed this topic in November 2011 (Reference 6.2), when it concluded:

With the exception of a small leak in a fuel assembly (not identified in a previous cycle) DCP's Unit 2 fuel has been performing defect-free since Cycle 14. DCP's failed fuel procedure has been satisfactorily enhanced to better detect failed fuel. Unit 1 had been defect-free since Cycle 4. DCP continues to study the feasibility of going to 24-month fuel cycles from the current 19-21-month cycles.

Currently Unit 1 is in Cycle 19. Unit 2 is in Cycle 18 and will begin Cycle 19 after the completion of Refueling Outage 2R18, which is currently scheduled for September 28 to October 28, 2014. Unit 1 has continued to run with no fuel defects since Cycle 4, i.e. for 25 years. Unit 2 has had no defects identified since DCISC's previous review of this topic in November 2011, when the Unit 2 fuel was in Cycle 17

Mr. Mayer noted that the Electric Power Research Institute (EPRI) had started a program four to five years ago aimed at achieving zero leakage in nuclear fuel. The EPRI guidelines for achieving this goal include targets for chemistry of the reactor coolant, including targets for oxygen, grid to rod fretting, and fuel surveillance. Also, noted was that some instrument tubes for flux measurements have been replaced on occasion due to tube wear

Mr. Mayer also noted that vacuum can sipping had been performed on all first core fuel assemblies in preparation for placing them in the Independent Spent Fuel Storage Installation (ISFSI). Also, forty different assemblies were examined (twenty from each Unit), and there was no evidence of grid to rod fretting. Mr. Mayer noted further that the outer periphery of the cores was also examined for the same purpose, and no evidence of this condition was found there as well. He noted, however, that fuel assembly distortion (FAD) measurements cannot be performed until the vendor develops the required tooling.

These early assemblies experienced fuel failures, which originally made them undesirable for movement from the Spent Fuel Pools to the ISFSI. However, these assemblies have also provided an accompanying benefit by having decayed to levels where they can be used to generate the "Checkboard" pattern of low-decay-heat assemblies needed to surround freshly off-loaded fuel bundles that are removed from the reactors during refueling outages.

Conclusion:

DCPP's nuclear fuel has continued to function without any fuel failures since DCISC's prior review of this topic in November 2011. Implementation of the Electric Power Research Institute's (EPRI) guidelines for nuclear fuel management appears to have contributed positively to nuclear fuel performance and is aiding the continued preparation for transfer of used fuel to the Independent Spent Fuel Storage Installation.

Recommendations:

None

3.3 Management of On-Line Maintenance Risk

The DCISC Fact-finding Team met with Rasool Baradaran, Probabilistic Risk Assessment (PRA) Supervisor, Bill LaLone, Work Control Manager, and Matt Shepard, PRA Engineer. The DCISC last reviewed this topic in September 2013 (Reference 6.3), when it concluded:

DCPP On-Line Maintenance Risk Management and Integrated Maintenance Risk

Management appeared to be strong processes in determining and controlling the risk of maintenance work involving removing equipment from service to perform maintenance on and in working on or near sensitive equipment. Program health was Green (good).

The DCISC has been following OLM for a number of years as DCPD has been engaged in replacing its computerized ORAM (Outage Risk Analysis - Maintenance) program, a qualitative on-line risk assessment program, with Safety Monitor, a quantitative computer program for on-line risk assessment. Safety Monitor is now fully functional 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.

The level of DCPD's use of OLM has not changed significantly since the last DCISC review in September 2013. DCPD uses two procedures to determine Maintenance risk:

1. Procedure AD7.DC6, "On-Line Maintenance Risk Management"
2. Interdepartmental Administrative Procedure AD7.ID14, "Assessment of Integrated Risk"

DCPD's use of this OLM process was expanded substantially in February 2012 with the formation of the DCPD 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, and Security. Normally, DCPD's Work Control Manager or Outage Manager serves as chair. 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.

Mr. Baradaran noted that DCPD's Work Week Manager develops a 12-week rolling work cycle for its pre-planned OLM, using inputs from PRA assessments of the planned maintenance to assist in scheduling. By knowing which equipment is to be taken out of service 12 weeks ahead of time, DCPD can determine the related risk of core damage. DCPD has rules on what levels of risk are acceptable during maintenance work windows. Risk is minimized by the following rules:

- Performing only those maintenance items on-line required to maintain the reliability of the component.

- Limiting the number of at-power Maintenance Outage Windows (MOWs) in an operating cycle.
- Minimizing the total number of items out-of-service (OOS) at the same time.
- Minimizing the risk of initiating plant transients, which could affect safety systems.
- Avoiding higher risk combinations of items OOS by using Probabilistic Risk Assessment (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
 - Lightning strikes
- Seismic and tsunami risks
- Unusual ocean conditions (e.g., jellyfish entrainment)

Assessment of Maintenance Risk

Whereas the above OLM Risk Management is focused on nuclear safety for on-line maintenance, DCCP 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

Recurring work is pre-screened by risk factor in the procedure, as follows, including actions required to accommodate the risk level:

- Low Risk
 - No additional actions required—follow station policies and procedures
- Medium Risk
 - Follow station policies and procedures
 - Perform and document a look-ahead analysis
- High Risk
 - Follow station policies and procedures
 - Perform and document a Risk Management Plan
 - Obtain review and approval from all department involved
 - Prepare risk briefing materials and management oversight
 - Obtain approval from the Risk Management Challenge Board
 - Hold and document a post-job critique
- Very High Risk
 - Implement the actions above for Medium and High Risk work
 - Perform contingency planning
 - Obtain review and approval from a Readiness Review Board (chaired by a Director)
 - Hold and document a post-job critique

The risk management process uses the following phases:

1. Phase 1: Risk Classification
2. Phase 2: Assess the Risk
3. Phase 3: Prevent and Mitigate the Risk
4. Phase 4: Implementation of Work

Processes are also included for the following types of work:

1. Recurring Task Risk Evaluation

2. On-line Emergent Work Risk Assessment
3. Outage Emergent Work Risk Assessment
4. Performing Work on Protected Equipment
5. Entering a Protected Area to Perform Nonintrusive Work

Mr. Baradaran noted that the focus on risk has become 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.

DCPP's Plant Performance Improvement Report issued for the period May 2013 through April 2014 indicated that DCPP's On-line Maintenance Risk Management Program was rated as Green, or Good, for every month during 2014. Each month's reported performance is a composite of DCPP's cumulative performance over the most recent six months and is on a color scale of:

- Green = Good
- Yellow = Needs Improvement
- Red = Unsatisfactory

In fact, since August 2013 there was only one month (December 2013) in which the station experienced an online risk issue. This was when Emergency Diesel Generator (EDG) 1-3 was rendered inoperable while EDG 1-2 was also inoperable during its post-maintenance testing, as discussed in Section 3.1 of this Fact-finding Report. Earlier performance was impacted negatively by problems associated with hot washing of portions of the 500 kV systems, which have been separately reviewed and reported by the DCISC.

Conclusions:

DCPP's program for managing on-line maintenance risk appears to be well-structured, and its implementation appears to be effective. Reported performance has been rated as healthy for the first four months of 2014. DCISC's next review of this topic need not be any earlier than in the fourth quarter of 2015.

Recommendations:

None

3.4 Outage Planning and Execution Action Plan

The DCISC Fact-finding Team met with Tim King, Director of Work Management. This is DCISC's first review of this Action Plan. However, DCISC last reviewed Outage Planning and Execution in April 2013 (Reference 6.4), when it concluded:

The 2R17 DCPD Refueling Outage was successful in meeting or exceeding almost all goals.

There were no significant nuclear safety events or concerns. Of note, 2R17 experienced the lowest radiation dose in Unit 2 outage history.

Mr. King provided the DCISC Fact-finding Team with material that defined the focus of the subject action plan, and he noted that the Plan was developed to address some areas determined to be in need of improvement based on performance in prior outages. Specifically, the focus areas are:

- Prioritization of Scope and Alignment of Costs
- Improvement of Line Ownership of Outage Scheduling
- Implementation of Improved Outage Risk Management
- Improvement in Electric Equipment Reliability

Desired goals addressed:

- No loss of decay removal
- Outage Safety Plan goals
- Outage durations
- Unit Capability Factor
- Equipment Reliability Index

Results were provided for the following aspects of DCP's performance in the most recent refueling outage 1R18 compared to refueling outage 2R17, as follows:

	1R18	2R17
Outage Human Performance		
Station Level Events	0	1
Department Level Events	4	13
Loss of Decay Removal		0
Industrial Safety		
Lost Time Injuries	0	0
Recordable Injuries	0	0
First Aid Cases	14	27
Personal Contamination Events (PCE)		
Actual	13	10
Goal	16	17
Collective Radiation Exposure (Person Rem)	31	25
Foreign Material Exclusion (FME) Conditions	16	23
FME Threats	1	1
Significant FME Events	0	0

Outage Duration		
Actual	32	48
Goal	33	52

Spent Fuel Cooling was interrupted for several minutes in 1R18 due to a disturbance on the electric grid. The pump was restarted manually by Operations.

Mr. King noted that 1R18's "Department Level" performance in the area of Human Performance was the best of any outage in the station's history, and there were no Site Clock Reset events in this performance area. This is commendable and reflects the continuing attention devoted by the station for a number of years to this area of performance. The DCISC notes, however, that vendor performance deficiencies were noted in the following activities: thimble tube replacement, the reactor vessel inspection, and the overhaul of Reactor Coolant Pump 1-3. Of particular significance is that the vendor performing the overhaul of Reactor Coolant Pump 1-3 misaligned the pump and motor shafts. This, in turn, caused pump seal leakage that was sufficiently large that the Unit needed to be taken off line for 10 days shortly after start-up after the outage in order to realign the shafts.

The DCISC Fact-finding Team reviewed the subject Outage Planning and Execution Action Plan. The majority of actions have been completed. Almost all of the remaining actions address aspects of scope and cost and the improvement of electric equipment reliability. The Action Plan also outlines station activities for developing and implementing a 5-year planning process. A project model is nearing completion and is scheduled to be reviewed by the Project Review Committee and Outage Management Team in July 2014.

Conclusion:

DCPP's statistical performance, in general, in refueling outage 1R18 reflects continuing improvement over that of earlier outages. Also, DCPP's intended future outage focus on the reliability of electrical equipment appears to be reasonable. In follow-up to some problems that occurred with respect to vendor performance in outage 1R18, DCPP might consider examining the processes it follows to monitor vendor performance as the industry continues to mature and highly experienced vendor personnel retire.

Recommendations:

None

3.5 Meeting with NRC Resident Inspector

The DCISC Fact-finding Team met with John Reynoso, NRC Resident Inspector at DCPP, to discuss ongoing and future activities pertaining to the station, DCISC, and the NRC.

Conclusions:

DCISC's discussions with the NRC Resident and Senior Resident Inspectors continue to be informational and beneficial to DCISC.

Recommendations:

None

3.6 Management of Single Point Vulnerability

The DCISC Fact-finding Team met with Ken Bych, Technical Support Engineering Manager, and Dennis Hammond, Performance Improvement Coordinator. The DCISC last reviewed this subject in July 2011 (Reference 6.5), when it concluded:

The Single Point Vulnerability (SPV) program appears to be comprehensive and fully functional. No overall indicators of performance appear to be tracked. Issues appear to be addressed on a case basis within the various affected systems. DCISC future reviews should be dictated by performance issues.

A component is an SPV component if its failure can result in a reactor trip or turbine trip, or a plant decrease in power of greater than 2% power. To be defined as a SPV failure, the component must be able to create the plant impact by itself.

DCPP first performed an SPV study in 2002 to identify single points of failure in the plant that could potentially adversely affect plant safety or reliability. That study was performed at a system and component level. Then in 2006, using external contractor engineers working with DCPP System Engineers and Operations, DCPP performed a more extensive SPV study and completed it in 2008. DCPP has completed the SPV study on all systems (about 20) that have an impact on either generation or reliability. This has been a collaborative effort including support from industry organizations such as the Electric Power Research Institute (EPRI) and the Nuclear Energy Institute (NEI).

As a result of the studies, DCPP made changes to preventive maintenance (PM) on some of the systems. They have also revised a substantial number of procedures to remove SPVs. In addition, the Preventive Maintenance Optimization review was complete and PM activities were revised as necessary.

Safety equipment is not included in any of these studies as all Safety Equipment is covered by the NRC Maintenance Rule, and thus has already been reviewed for SPV. DCPP also worked with an Industry Working Group to review nuclear plant scrams in order to determine what caused the scrams and what was done to prevent future scrams. (Most scrams were caused by failed circuit cards).

In the approximately 20 plant systems that were covered by the above-mentioned studies, a total of 1,574 SPVs were identified and evaluated for the two units (over 750 for each individual unit). These evaluations focused on whether changes were needed to a component's design and/or

preventive maintenance requirements. Changes were then implemented as needed. One example is the Compressed Air System which yielded a 36-page report, reflecting a comprehensive system review to ascertain the potential SPV components. Based on the redundancy found throughout the system design and on a detailed component-by-component review, the only components found in that system to have the potential to be SPVs were the system's 1,273 air supply regulators. Each of these regulators was then evaluated for failure consequence based on review of the system design up to the component(s) to which the regulator supplies air. As a result of this review, 49 air regulators were identified as SPVs. Further analysis was then performed to determine the appropriate PM for each of the SPV air regulators.

The concept of single point vulnerability continues to be applied as various issues arise, and these analyses tend to be performed by contractors who specialize in this discipline and in the systems/components that require analysis. One recent example is the risk-of-failure and single point failure assessment study performed on eight Auxiliary and Start-Up transformers at DCP in 2013. The purpose of the study was to determine the risk of failure of each of the transformers and single point failure modes that could lead to reactor trip, turbine trip, or power decrease to 98% or less.

The additional purpose was to prioritize them for follow-up corrective actions to reduce the risk or loss of availability. The results of the study were as follows:

- There were no transformers in the Urgent (or Red) code that would have dictated immediate action.
- Seven of the eight transformers were in the Normal (or Green) code.
- One transformer, the standby (SU 1-1) Startup Transformer, was in the Priority (or Yellow) code due to low oil dielectric. The recommended action was to retest, and if the retest also showed low oil dielectric, a dielectric frequency response test was recommended to determine the actual moisture in the insulation and to determine if there is possible carbon tracking or contamination. DCISC follow-up on this issue revealed that subsequent retesting determined that the oil test results were above the IEEE C57.104-1991 recommended minimum dielectric of 26kV, which confirmed that the SU 1-1 transformer was in the Green code.

In another similar study performed on four operating Single Phase Generator Transformers, three were in the Normal band and one transformer (Unit 2 C Phase GSU transformer) was in the Priority (Yellow) band. This was due to high moisture in oil, old ball-bearing pumps and bushings, and high oxygen in the oil, indicating likely deterioration of the bladder in the conservator tank. DCISC follow-up on this issue revealed that this transformer was subsequently replaced with a new Siemens model during Refueling Outage 2R17, and the new transformer is in Green status.

Conclusions:

The Single Point Vulnerability (SPV) Program continues to be comprehensive and functional. Recent SPV evaluations performed by knowledgeable contractors appear to be incisive. Station follow-up on out-of-specification test results appears

to be thorough and effective.

Recommendations:

None

3.7 Critical Equipment Clock Resets

The DCISC Fact-finding Team met with Ken Bych, Technical Support Engineering Manager, and Dennis Hammond, Performance Improvement Coordinator. The DCISC last reviewed this topic as part of a combined review of Deficient Critical Components Backlog and Critical Equipment Clock Resets during the DCISC's Fact-finding Meeting in January 2014 (Reference 6.6), when it concluded:

Equipment problems and failures have recently increased the frequency of Critical Event Clock Resets. Also, equipment problems due to aging have led to an increasingly negative trend in the station's Deficient Critical Component Backlog Orders. Although the station continues to operate safely and its overall reliability has not been significantly affected, the DCISC should consider conducting a more lengthy and in-depth examination of these issues during one of its upcoming Fact-finding Trips. This review could also include interfacing with DCP's Maintenance organization to gain their perspective of challenges that may be encountered in the maintenance of aging equipment.

A Critical Equipment Event is defined by the occurrence of any the following as the result of equipment failure:

- Automatic or manual unit trip
- Submittal of a Licensee Event Report to the Nuclear Regulatory Commission (NRC), i.e. the equipment failure results in an NRC reportable condition under 10CFR50.72 or 10CFR50.73
- Unplanned Entry into a Limiting Condition of Operation (LCO), i.e. the equipment failure directly results in an unplanned entry into a short (less than or equal to 24 hours) shutdown or derate Technical Specification Action Statement
- Unplanned Down-power, i.e. the equipment failure directly results in either an unplanned reduction in power greater than 2 percent or a forced unit outage.

ADCPP records, evaluates, tracks, and trends all Critical Equipment Events at the station. Information regarding station performance in this area is also shared within a group of seven western nuclear power plants known as the Strategic Teaming and Resource Sharing (STARS) Group. Since these types of events typically occur infrequently, performance is assessed based on the number of events occurring on a rolling 12-month basis, i.e. the number of events occurring during the most recent 12 months is reported each month. This assessment is graded as follows (where Green is considered Good):

Green: Less than or equal to 6 events in most recent 12 months

White: Less than or equal to 8 events

Yellow: Less than or equal to 1

Red: Greater than or equal to 11

Messrs. Bych and Hammond stated that DCPD has been actively engaged in examining the causes of critical event clock resets and in taking appropriate corrective actions. Although the running monthly values of the total number of events causing clock resets in the prior twelve months has remained between nine and eleven resets, considerable progress has been made during the past nine months. During the past nine months DCPD experienced four Resets and during the most recent six months, the station has had only two resets. The two recent resets were as follows:

- First event: On February 2, 2014, after an hour and a half of light rain, the Unit 2 Main Bank Transformer (MBT) “B” Phase Lightning Arrester failed, causing a single-line-to ground fault that resulted in a Unit 2 reactor trip from 100% power. DCPD has experienced similar problems during the past few years, and this recent apparent vulnerability of DCPD’s exterior high voltage components to contaminants resulted in an extensive examination of the problem. However, because of the damage incurred by the lightning arrester the specific root cause could not be conclusively determined. Nevertheless, DCPD has engaged the vendor and others in order to obtain and install components that are more impervious to contaminants. Also, the intent is to create procurement and inspection requirements for ensuring the quality of the affected components. In addition, DCPD is seeking to have the vendor request the standards committee of the Institute of Electrical and Electronics Engineers (IEEE) revise its standard to address non-uniform contamination levels, rate of contamination build-up exceeding polymer absorption capacity, and acceptable external-to-internal internal voltage gradient margins.
- Second event: While Unit 1 was in the process of preparing to return to power operation at the end of Refueling Outage 1-18, the Number 1 seal of Reactor Coolant Pump (RCP) 1-3 was experiencing slight leakage when the pump was started on March 7 while the Unit was still in Cold Shutdown condition. As the Unit returned to power operation and during the subsequent several days, the seal return flow to the Volume Control Tank (VCT) fluctuated, and was higher than expected, but remained within allowable operational limits. However, on March 16 the leak-off rate alarm at 5.0 gallons per minute (gpm) activated a number of times and the leak-off flow then increased to over 6 gpm. The vendor-recommended maximum Number 1 Seal Return Flow for continuous operation, which is reflected in station Operating Procedure OP AP-25, “Rapid Load Reduction” is 6 gpm. (A Seal Return Flow of 7 gpm would have dictated a Reactor Trip.) Thus, the station performed a controlled shutdown of Unit 1, and remained in forced outage 1X19 from 8:20pm on March 16, 2014 until 3:30am on March 27, 2014. Disassembly and troubleshooting revealed that the pump and motor shafts had not been properly aligned by the vendor after performance of pump maintenance during the outage. The shafts were several thousandths of an inch out of alignment in both angularity and concentricity. DCPD is implementing a number of corrective actions to prevent recurrence including the following:
 - Implementation of vendor manual guidance for a second check of physical measurement

- on pump shaft centering
- Utilization of the latest technology for dial indicators
- Two-person verification of final stages of alignment during centering actions and independent verification of final alignment readings

The station also recognizes that equipment aging can be a factor in Critical Event Clock Resets. Accordingly, DCPD is increasing its efforts to monitor and document aging and degradation mechanisms. Where areas needing improvement are identified, this process also leads to the development of strategies for interim implementation until appropriate corrective actions can be taken.

Conclusions:

DCPD appears to be sustaining its reduction of Critical Event Clock Resets since October 2012. Only two such resets have occurred since that time. The station's approach to minimizing the effects of any noted emerging equipment degradation appears to be appropriate.

Recommendations:

None

3.8 Auxiliary Feedwater System Health

The DCISC Fact-finding Team met with Amanda Sorensen, Auxiliary Feedwater (AFW) System Engineer. The DCISC last reviewed this subject in September 2011 (Reference 6.7), when it concluded:

Both AFW systems are operable, but Unit 1 has some non-conforming conditions that can affect system reliability. While Unit 2's AFW Health Rating is Green, Unit 1's rating was recently changed from White to Yellow due to a leak on its outboard seal. Both units share one design deficiency involving outdated control systems. Unit 1 has several others pertaining to the governor of the turbine driven pump and to the actuators of electro-hydraulic level control valves. The station plans to address the issues during upcoming refueling outages.

Design Criteria Memorandum S-3B provides a comprehensive discussion of the AFW System's design basis and a thorough description of the system. The AFWS is a safety-related system that provides feed water under shutdown, startup, and low power conditions. During normal power operation the Main Feedwater System (MFWS) supplies feedwater to the secondary side of the Steam Generators (SGs), where water is pumped to the SGs in which the water is boiled into high pressure steam. This steam is then supplied to and spins a turbine generator to produce electricity, after which it is condensed back into water that is pumped back to the secondary side of the SGs.

The AFWS is relied upon to prevent damage to the nuclear reactor fuel and to prevent

overpressurization of the reactor coolant system in the event of transients such as a loss of normal Main Feedwater or a pipe rupture on the secondary side. The MFWS is not designed to operate stably at the low-flow conditions needed under shutdown, start-up, and low power operation, which is why it is not used to provide feed water under these operating modes. During normal plant shutdown the AFWS replaces the MFWS and serves as a cooldown system to maintain hot standby and to proceed further through cooldown to a point where the Residual Heat Removal (RHR) System can be placed in operation, which can be accomplished when Reactor Coolant System temperature goes below 350 degrees. The AFWS is also used during normal plant startup prior to placing the MFWS in service.

The AFWS consists of three feedwater supply trains with diverse means of powering the pumps. One train consists of a full-capacity steam turbine-driven pump, which can be aligned to use steam from any of the four SGs. The other two supply trains consist of half-capacity electric-motor-driven pumps, each supplying flow to two of the four SGs, with the capability to be aligned to any of the four SGs.

DCPP employs a broad color coding system for grading the overall health of plant systems:

- Green—Healthy
- White—Achievable Action Plans in place to return system to complete Healthy status
- Yellow—Needs Improvement
- Red—Unsatisfactory

Currently, the System Health Reports show that Unit 1’s AFWS is rated White and Unit 2’s AFWS is rated Green.

The following table, consisting of information extracted from the AFW System Health Reports for each Unit, provides the number of Items in each Unit that pertain to various performance characteristics. (Note in particular that Prompt Operability Assessment (POAs) are performed on equipment to demonstrate that it is safe for the equipment to continue operating even though there is an apparent problem. Also, unless otherwise indicated in the table below, the Performance Characteristic is rated Green, where Green is “Good”, White indicates that actions have been assigned to return the condition to Green, Yellow means “Needs Improvement”, and Red is “Unsatisfactory”):

Performance Characteristic	U1	U2
Critical Component Failures	0	0
Critical Equipment Clock Resets	0	0
Causes of Reductions in Unit Capacity	0	0
Causes of Unit Trips	0	0
Emergent Work Orders	0	0
Conditions Requiring Prompt Operability Assessments (POA)	0	0

Degraded/Non-conforming Conditions (Other than POA) (Red for Unit 1 and Yellow for Unit 2)	2	1
Aging Issues Affecting Reliability	0	0
Margin Issues	0	0
Causes of Operator Workarounds/Burdens	0	0
Operability Issues in the Past 180 Days	0	0
Adverse Equipment Trends	0	0
Design Deficiencies Affecting System Performance or Reliability (White for Unit's 1 and 2)	1	1

The reasons for Unit 1's "Red" rating with respect to "Degraded/Non-conforming Conditions" (other than those that require POAs) are as follows:

- With regard to manual control of new auto/manual hand stations at the Hot Shutdown Panel: If power is lost and restored with the controller in manual and demand is in the range of 0-10% or 90-100%, the demand button needs to be "jogged" in order for the controller to respond.
- The corresponding hand controllers in the Control Room were replaced with new units that are not susceptible to this problem, (which was the second of the two Unit 1 Other "Nonconforming Conditions" listed in the table above.)

The reason for Unit 2's "Yellow" rating with respect to "Degraded/Non-conforming Conditions" (other than those requiring POAs) is that there is a body to bonnet leak on one of the Steam Generator Level Control Valves, LCV-107. The "Design Deficiencies Affecting System Performance or Reliability" for both Units pertain to the fact that the AFW Chemical Injection Pumps can be challenging to operate effectively to control steam generator chemistry and are also a maintenance burden.

When asked by the Fact-finding Team whether there were any issues that she felt pertinent that were not reflected in the System Health Report, Ms. Sorensen indicated that it would be helpful to have a replacement parts evaluation (RPE) for the Auxiliary Feedwater Pumps' Turbine Governors. She noted that an RPE Group was formed about a year ago and that the group has about a five year backlog.

Conclusion:

The health of Unit 1's Auxiliary Feedwater (AFW) System has improved to White from Yellow in September 2011. Unit 2's AFW System Health is Green, as it was in 2011. The few existing system health issues do not appear to be significant enough to negatively affect system reliability or plant safety. Considering the significance of this safety system, DCISC should conduct its next review of AFW System no later than the fourth quarter of 2015.

Recommendations:

None

3.9 2013 Annual Radioactive Effluent Release Report and 2013 Annual Radiological Environmental Operating Report

The DCISC Fact-finding Team met with John Knemeyer, Chemistry Engineering Supervisor, to review DCP's 2013 Annual Radioactive Effluent Release Report and its 2013 Annual Radiological Environmental Operating Report. The DCISC last reviewed these topics in July 2012 (Reference 6.8), when it concluded:

DCP's 2011 total liquid and gaseous radiological releases were very small fractions of amounts permitted by regulations and plant Technical Specifications. The Radiological Environment Monitoring Program confirmed that the operation of DCP had no significant radiological impact on the environment in 2011. The results of the program were also compared to preoperational data and showed no unusual trends. Very small concentrations of the radioactive releases from the Fukushima accident were detected and measured by DCP and by other nuclear plants, government agencies, and universities throughout the United States.

DCP submitted its 2013 Annual Radioactive Effluent Release Report and its 2013 Annual Radiological Environmental Operating Report to the Nuclear Regulatory Commission (NRC) on April 30, 2014. The former report describes the quantities of radioactive gaseous and liquid effluents released from the plant. In all cases the releases were well below Technical Specifications limits for the year. The latter report provides the results of the radiological monitoring and sampling performed on and around the plant site in 2013.

Based on radioactive releases, the following whole body radiation doses to a theoretical "maximum exposed individual" at the site boundary approximately 800 yards from the plant and their corresponding percent of Technical Specifications limits for the year 2013 were calculated to be as follows:

Effluent Type	Calculated Radiation Dose	Percent of Tech. Spec. Limit
Liquid	0.00023 milliRem	0.008%
Gaseous	0.0065 milliRad	0.017%

The Radiological Environmental Operating Report (REOR) describes the results of the Radiological Environmental Monitoring Program (REMP), which reports and assesses the levels of radiation or radioactivity in the environment related to operation of DCP. The 2013 REMP includes about 2,200 samples (including Thermo-luminescent Dosimeters [TLD]) 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 2013 REMP showed no unusual environmental isotopic findings from DCP 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 in the environment.

Direct ambient radiation was measured at 32 locations surrounding DCPD using thermo-luminescent dosimeters (TLD). These 32 locations are made up of 30 indicator stations and 2 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 search for adverse trends. The ambient direct radiation levels in the DCPD offsite environs did not change and were within the preoperational range throughout 2013.

The Old Steam Generator Storage Facility (OSGSF) contains four old steam generators and two old reactor vessel heads. The OSGSF did not cause any detectable changes to the ambient direct radiation levels in the DCPD environment during 2013. Also the sumps to the OSGSF were inspected quarterly and remained empty and dry during 2013.

Tritium levels in three monitoring wells beneath the power block were all 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 exiting the plant through an approved discharge path. All ground water at the site flows into the Pacific Ocean and is not a source of drinking water.

Beginning in June 2009, DCPD began loading of the onsite dry cask Independent Spent Fuel Storage Installation (ISFSI). At the end of 2013, a total of 29 casks had been shipped to the ISFSI. In addition to the 32 TLD locations mentioned above, direct radiation is also measured at eight TLD locations surrounding the ISFSI. Specifically, two TLDs are located on each of the four sides of the ISFSI pad. From the time these casks began to be stored until the present, the radiation levels at these locations have increased approximately 0.2 mrem per day (i.e. from about 0.3 mrem per day to about 0.5 mrem per day). An evaluation of direct radiation measurements and member-of-public occupancy times surrounding the ISFSI have indicated that all federal criteria for member-of-public dose limits are being met with significant margin. Also, since all of these TLDs are located well within the site boundary and are not within the unrestricted area, the ISFSI loading has not affected the TLD trending results with respect to the 32 locations surrounding DCPD, and the public is not significantly affected 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 evaluated to be 0.254 mrem.

As part of its Environmental Radiological Monitoring Program, DCPD initiated and has continued environmental samplings following and directed at the March 11, 2011 accident at the Fukushima Nuclear Power Plant in Japan. Other facilities in the U.S. have performed similar samplings and

analyses to identify the extent to which radioactive releases from Fukushima were transported by the jet stream to the U.S. During this most recent reporting period DCPD identified minute, but detectable, concentrations of cesium 137 in one of the station's four monitoring wells that correlated with its sampling of rain events during the March 2011 accident at Fukushima. Concentrations of other radioactive isotopes, including iodine 131 and 132, cesium 134, and tellurium 132 that were initially detected after the Fukushima accident have since diminished to below detectable levels. Studies of the DCPD site have indicated that any groundwater (subsurface) flow beneath the DCPD power block is not used as a source of drinking water, and it discharges into the Pacific Ocean which is 100 yards away from the power block.

The results of DCPD's 2013 REMP showed no unusual environmental isotopic findings from DCPD site operations. These results were also compared to DCPD preoperational data and showed no unusual trends. The report concludes that DCPD had no significant environmental radiological impact on airborne, surface water, drinking water, marine life, aquatic vegetation, terrestrial vegetation, sediment, milk, or meat radioactivity.

Mr. Knemeyer provided the following additional comments:

- Total curies of radioactivity discharged by DCPD in 2013 were slightly less than prior years.
- In the past DCPD recycled boric acid, but had some difficulty maintaining water quality. Instead the station is now processing this liquid and then discharging the processed water.

Conclusions:

DCPD's 2013 total liquid and gaseous radiological releases were very small fractions of amounts permitted by regulations and Technical Specifications. The Radiological Environmental Monitoring Program confirmed that the operation of DCPD had no significant radiological impact on the environment in 2013. The results of the program were also compared to preoperational data and showed no unusual trends. Minute and diminishing traces of radioactivity from the radioactive releases that occurred in the March 2011 accident at Japan's Fukushima Nuclear Plant were detected in one of DCPD's four monitoring wells.

Recommendations:

None

3.10 Plans to Address Potential Future Low Voltage Conditions on the 230 kV System

The DCISC Fact-finding Team met with Ariel Montoya, Supervisor of Nuclear Engineering, and Gregg Reimers, Senior Nuclear Consulting Engineer. The DCISC last reviewed the 230 kV System in November 2013 (Reference 6.9), when it concluded:

Voltage fluctuations on PG&E's 230 kV system, which is the first source of emergency electrical power to DCPD's 4 kV vital buses, reduce the reliability of this power source, although the system is still within NRC's licensing basis. DCPD is taking action within its

own capacity to address the issue, and PG&E's Transmission organization is also engaged in examining options for remedial action. The options being examined and pursued by both DCPD and PG&E's transmission group appear to provide satisfactory remedies to this issue. DCISC should continue to examine the status of this longstanding problem on at least an annual basis.

The 230 kV system is DCPD's primary source of Vital AC electrical power, in the event of a loss of normal power from a station main turbine generator. DCPD's 230 kV system is served by PG&E's offsite 230 kV system through two incoming lines to the switchyard. In turn, DCPD is then served by one 230 kV line from the switchyard to the plant. The 230 kV system serves DCPD's vital buses through the station's Startup Transformers. The station's Emergency Diesel Generators serve as backup if the 230 kV system is unable to perform its function. The station is also served by a 500 kV offsite power line which is available for emergencies.

The Fact-finding Team was presented with information describing PG&E's assessment of the possible future demands on the 230 kV system in the several-county region near the plant. As the system is now configured these demands could possibly result in occasional drops in voltage on the 230 kV power to DCPD, which in turn could affect the capability of the system to meet DCPD's needs if called upon.

To help address this issue, DCPD has been taking action to prevent any nonessential 4 kV equipment loads from being supplied by the 4 kV Vital Buses in order to ensure that sufficient electrical power is available for vital equipment in situations when DCPD's main generators are unable to supply power to the station. DCPD is also pursuing the feasibility of installing Main Generator Output Circuit Breakers onsite to provide another option for sources of emergency power to the station. The current scoping study for this installation projects 5 years from commencement to completion, i.e. completion would be expected in 2017.

To partially address the issue further, DCPD is pursuing a License Amendment which seeks NRC approval to replace the current undervoltage relays with more reliable/robust relays. To further address the problem of voltage fluctuations, DCPD is planning to install VAR (i.e. Voltage/Amperage/Resistance) Compensators in the 230 kV switchyard. These devices are commonly used in high voltage transmission networks for stabilizing voltage. Nevertheless, the VAR Compensators do not appear to fully compensate for the issue that PG&E is experiencing with continually increasing offsite demand on its 230 kV system. This particular issue appears to reside with the PG&E corporate office rather than with the nuclear power plant.

In response to this need, PG&E's transmission group has developed project plans and schedules for strengthening the 230 kV system so that the more-robust system can serve the local area and also meet DCPD's safety requirements, if called upon in the future.

Conclusions:

PG&E's Transmission Group has developed what appear to be reasonable plans and schedules for addressing the predicted effect of future load growth on the 230 kV

system in the area of DCPD and so that the system can continue to fulfill DCPD's safety requirements. The DCISC should continue to monitor progress on this effort, and DCISC's next review should be no later than the third quarter of 2015.

Recommendations:

None

3.11 Component Mispositionings

The DCISC Fact-finding Team met with Dave Gouveia, Manager, Operations. The DCISC last reviewed this topic in August 2012 (Reference 6.10), in conjunction with its review of Clearances and Safety Monitor Performance, when it concluded:

DCPD is working to minimize mispositioned component events using the Corrective Action Program to document, track, investigate, and correct events, leading to prevention of recurrence. DCPD's misposition trend shows improvement, especially in Outage 1R17 compared to past outages.

A "Mispositioned Plant Component" is defined by Procedure OP1.ID6, Definition and Measurement of Mispositioned Plant Components, as follows: "Any positionable component placed or left out of the required position for existing plant conditions when the component's required position is tracked by one or more of the following status control tools: procedures, clearances, work management process (e.g. orders), other similar authorizing documents that align or re-align components, any positionable component placed or left out of the required position or existing plant conditions due to inadequate or incorrect status control tools described above. This includes situations where a lack of process exists that should have controlled the configuration of the component."

Operations has overall responsibility for the program. The program defines five levels of significance for mispositioned components. An identified mispositioned component is documented in the DCPD Corrective Action Program (CAP), corrected for correct positioning, investigated (and analyzed as appropriate) for prevention of recurrence, reviewed by the Operations Director, and recorded in the Mispositioned Component Trend Record. DCPD's mispositioning performance has fluctuated in past years and, accordingly, has continued to be a performance area that has received management focus.

DCPD reports and tracks plant mispositionings on a monthly basis, and each mispositioning is color coded to designate the department that was responsible for the mispositioning. As would be expected, the preponderance of mispositionings occur in Operations.

Each mispositioning is assigned a level of significance. Levels 1 and 2 constitute mispositionings that have "Severe" and "Major" consequences for the plant respectively. Level 3 mispositionings have "Minor" consequences. Level 4s are those that are immediately identified and have minimal or no impact. Levels 5s are those that were imminent or possible but were averted. During 2008, the

station became more conservative with regard to what constitutes a less consequential mispositioning. In that year the lower grouping in the tabulation below was expanded to include Level 4 and 5 mispositionings that were not identified or tracked in prior years. The table below provides a history of the number of mispositionings reported by year from 2008 through April of 2014.

	2008	2009	2010	2011	2012	2013	2014 (thru April)
Levels 1&2	3	0	0	0	2	2	0
Level 3-5	48	35	26	26	17	9	5

Clearly, the station has made great strides in steadily reducing the number of lower level (i.e. Level 3-5) component mispositionings during the past seven years. It also should be noted that, while it might appear that a setback could be occurring in 2014, mispositionings have typically occurred most frequently during refueling outages, and the station has already had a refueling outage in 2014. A second refueling outage is scheduled for the Fall of 2014. For comparison, DCPD had only one refueling outage in each of 2012 and 2013. Mr. Gouveia noted that great emphasis was placed on avoiding component mispositionings during the recent refueling outage 1R18. Two mispositionings involved a toggle switch on a battery charger being bumped by a contractor, and Operations removing the wrong battery charger from service (i.e. one that was not required by station Technical Specifications). Emphasis is also placed on avoiding mispositionings in general. Training activities, pre-job briefings, and shift briefings contain elements with respect to avoiding mispositionings. Accountability is taken to the worker level, even to the point of temporarily suspending an individual's qualification if such is felt to be warranted. All Level 1 and 2 mispositionings are thoroughly evaluated, and actions are taken to prevent recurrence.

Conclusions:

The station's approach to avoiding component mispositionings appears to be sound. DCPD has steadily and markedly reduced the number of lower level (Level 3 to 5) component mispositionings since 2008. Continued attention is needed to avoid the more significant mispositionings.

Recommendations:

None

3.12 Operations Continuing Training on Time Critical Operator Actions

The DCISC Fact-finding Team observed Continuing Training on Time Critical Operator Actions (TCOA) for personnel holding a Reactor Operator or Senior Reactor Operator License. The training was conducted by Jeff Davis, Lead Operations Continuing Training Instructor. The DCISC last reviewed Operations Training in the plant simulator and on the topic of Anticipated Transients without SCRAM (ATWS) in August 2013 (Reference 6.11), when it concluded:

DCPD includes both classroom and control room simulator training on Anticipated

Transients Without Scram (ATWS) as part of its Continuing Training Program for Control Room Operators, and the training appeared to be appropriate.

Mr. Davis was a replacement for the intended instructor who became unavailable due to a death in the family. Immediately prior to the commencement of this classroom training the Fact-finding Team was provided a copy of the Instructor Lesson Guide. The Objectives of the Guide, which define the key sections of the Lesson Guide, are as follows:

- Given plant conditions, recognize that a TCOA sequence is required.
- Explain what the Operations Department expectations are concerning TCOAs.
- Explain the emergency boration process.
- Using OM6.ID3, “Confined Space Entry Program,” address administrative controls for entering confined spaces.

A TCOA was defined ““a manual action or series of actions with a specified time limit to meet a plant licensing basis requirement”. Each section of the lesson guide listed what were referred to as “Need to Know” and “Nice to Know” elements of the training.

Mr. Davis demonstrated great familiarity with the training materials and knowledge of the subject. He noted to his students that during training critiques in the third quarter of 2013 the cases in which students were not able to meet the TCOA were not due to a lack of knowledge on how to perform the TCOA but were rather to the lack of realization that they were in a TCOA situation. Therefore, a major thrust of this training was devoted to the instructor posing hypothetical situations to the students and the asking them whether or not the situation was a TCOA. When the situation was, in fact, a TCOA, Mr. Davis then questioned the students regarding the specific actions that were required and the specific time constraints of the various cases.

The instructor was extremely engaging and showed great interest in the students and the learning process. Throughout the major portion of the training, as he was discussing various TCOAs, he posed clear, relevant questions to the class and often called on various students at random and in different areas of the classroom to answer his specific questions. He followed many of the individual student questions and their answers to his questions with clear explanations of the TCOAs being discussed and the reasons for the actions. Alternatively, he would call upon other students to provide that additional information. This dialogue stimulated the students to become actively engaged in the training and to ask numerous questions for clarification. The questions arose from all areas of the large classroom, including the back rows. Almost the entire time period was devoted to this active dialogue with the students.

The instructor also reinforced the importance of employing various error prevention techniques when performing TCOAs. He stressed that there is no need to rush through the actions but rather it is important to employ an informed, disciplined approach to ensure that the TCOAs are performed properly. These error prevention techniques included the following:

- STAR—That is: “Stop, Think, Act, and Review” the actions being performed and the results being achieved.
- Use of place-keeping when following a procedure.
- Use of formal Three-way communication when issuing and receiving a directive. That is:
 - The sender speaks the message.
 - The recipient repeats it back to the sender.
 - The sender affirms: “That is correct” or, if the repeat back is incorrect, the sender says “Wrong” and the process is repeated.
- Use of an abbreviated form of Three-way Communications when affirming a condition. That is:
 - The sender communicates the system or component condition.
 - The recipient repeats it back to the sender.
 - The sender responds and clarifies only if the repeat back is incorrect.

In this same vein the instructor cautioned the students to maintain a disciplined approach when performing TCOAs to counteract the tendency to rush through the process.

Conclusions:

The refresher training on Time Critical Operator Actions (TCOAs) for Licensed and Senior Licensed personnel was an exemplary training session. The instructor was highly knowledgeable and employed a variety of effective training techniques to keep the students engaged throughout the entire training period. Students from all areas of the classroom actively participated in the training. This training session could serve as a model for other refresher training sessions if the need should ever arise.

Recommendations:

None

3.13 Engineering Training on DC Power Systems (125V and 250V)

The DCISC Fact-finding Team observed Engineering Training on 125V and 250 V DC Power Systems conducted by Ralph Ortega, Engineering Training Instructor. The DCISC last reviewed Engineering Training in November 2013 (Reference 6.12), when it concluded:

DCPP’s Engineering Training Group appears to have strengthened the depth and rigor of its program with respect to the many and varied technical disciplines that comprise the Engineering function. As the station has noted, continued attention is needed to address knowledge transfer from the experienced, aging staff to newer engineers. DCISC’s next

review of this topic need be no earlier than the first quarter of 2015.

The training session was extensive and detailed. The introduction included a thorough discussion of the design and structure of the systems including their ability to function during a Design Earthquake, Double Design Earthquake, and Hosgri Earthquake. The introduction also covered the separations and redundancies that are designed into the systems so that a single failure or passive failure will not disable the systems. It was also mentioned that the systems support a safe shutdown of the units from either the Control Room or the Hot Shutdown Panels. Also discussed was the diversity of separation of the three dedicated battery chargers and the two backup chargers for the three DC buses.

What then followed was a lengthy and detailed discussion of the components of the DC Systems. The session, which the DCISC Fact-finding Team understood was designed for one hour, consumed two hours. It was primarily a subdued lecture, with occasional questions being asked by the instructor. Few questions arose independently from the large number of students in the class. The DCISC Fact-finding Team understood this was the instructor's first delivery of this training session. The session was supported by projections on a screen at the front of the class which also could appear on each of the students' laptop computers that were on the tables in front of the students. However, only a small number of the students' individual laptops contained the same images that were displayed on the screen at the front of the class. Rather a number of other images were on the students' computer screens. The observers could not tell whether or not the images on those students' computers were related to the training that was being conducted.

Conclusions:

The engineering training session on DC Power Systems was extensive and detailed. However, the interaction between the new instructor for this topic and the students was subdued, and the training session consumed considerably more time than had been planned for this topic.

Recommendations:

None

3.14 Meeting with PG&E Chief Nuclear Officer (CNO) and DCPD Site Vice President

The DCISC Fact-finding Team, Robert J. Budnitz and David C. Linnen, met with Ed Halpin, PG&E Chief Nuclear Officer, and Barry Allen, DCPD Site Vice President. Discussions involved aspects of DCISC's Fact-finding Visit and other topics of mutual interest.

Conclusions:

The DCISC's meetings with PG&E's Chief Nuclear Officer and other DCPD Senior Managers continue to serve as avenues for exchanging information and sharing perspectives on station priorities.

Recommendations:

None

4.0 Conclusions

4.1

The DCISC acknowledges that DCP's efforts in recent years with regard to human error reduction have resulted in some improvement, although performance has fluctuated. In fact, DCP's most recent performance with respect to NRC's indicators and other performance indicators now appears to be improving again. Although the long-term trend has been somewhat positive, DCP has not achieved the level and consistency that the station itself intends to achieve. Current plans for further remedial action appear to be appropriate. The obvious goal is sustainability. The DCISC should consider conducting its next review of this topic during the first quarter of 2015.

4.2

DCP's nuclear fuel has continued to function without any fuel failures since DCISC's prior review of this topic in November 2011. Implementation of the Electric Power Research Institute's (EPRI) guidelines for nuclear fuel management appears to have contributed positively to nuclear fuel performance and is aiding the continued preparation for transfer of used fuel to the Independent Spent Fuel Storage Installation.

4.3

DCP's program for managing on-line maintenance risk appears to be well-structured, and its implementation appears to be effective. Reported performance has been rated as healthy for the first four months of 2014. DCISC's next review of this topic need not be any earlier than in the fourth quarter of 2015.

4.4

DCP's statistical performance, in general, in refueling outage 1R18 reflects continuing improvement over that of earlier outages. Also, DCP's intended future outage focus on the reliability of electrical equipment appears to be reasonable. In follow-up to some problems that occurred with respect to vendor performance in outage 1R18, DCP might consider examining the processes it follows to monitor vendor performance as the industry continues to mature and highly experienced vendor personnel retire.

4.5

DCISC's discussions with the NRC Resident and Senior Resident Inspectors continue to be informational and beneficial to DCISC.

4.6

The Single Point Vulnerability (SPV) Program continues to be comprehensive and

functional. Recent SPV evaluations performed by knowledgeable contractors appear to be incisive. Station follow-up on out-of-specification test results appears to be thorough and effective.

4.7

DCPP appears to be sustaining its reduction of Critical Event Clock Resets since October 2012. Only two such resets have occurred since that time. The station's approach to minimizing the effects of any noted emerging equipment degradation appears to be appropriate.

4.8

The health of Unit 1's Auxiliary Feedwater (AFW) System has improved to White from Yellow in September 2011. Unit 2's AFW System Health is Green, as it was in 2011. The few existing system health issues do not appear to be significant enough to negatively affect system reliability or plant safety. Considering the significance of this safety system, DCISC should conduct its next review of AFW System no later than the fourth quarter of 2015.

4.9

DCPP's 2013 total liquid and gaseous radiological releases were very small fractions of amounts permitted by regulations and Technical Specifications. The Radiological Environmental Monitoring Program confirmed that the operation of DCPP had no significant radiological impact on the environment in 2013. The results of the program were also compared to preoperational data and showed no unusual trends. Minute and diminishing traces of radioactivity from the radioactive releases that occurred in the March 2011 accident at Japan's Fukushima Nuclear Plant were detected in one of DCPP's four monitoring wells.

4.10

PG&E's Transmission Group has developed what appear to be reasonable plans and schedules for addressing the predicted effect of future load growth on the 230 kV system in the area of DCPP and so that the system can continue to fulfill DCPP's safety requirements. The DCISC should continue to monitor progress on this effort, and DCISC's next review should be no later than the third quarter of 2015.

4.11

The station's approach to avoiding component mispositionings appears to be sound. DCPP has steadily and markedly reduced the number of lower level (Level 3 to 5) component mispositionings since 2008. Continued attention is needed to avoid the more significant mispositionings.

4.12

The refresher training on Time Critical Operator Actions (TCOAs) for Licensed and Senior Licensed personnel was an exemplary training session. The instructor was

highly knowledgeable and employed a variety of effective training techniques to keep the students engaged throughout the entire training period. Students from all areas of the classroom actively participated in the training. This training session could serve as a model for other refresher training sessions if the need should ever arise.

4.13

The engineering training session on DC Power Systems was extensive and detailed. However, the interaction between the new instructor for this topic and the students was subdued, and the training session consumed considerably more time than had been planned for this topic.

4.14

The DCISC's meetings with PG&E's Chief Nuclear Officer and other DCPD Senior Managers continue to serve as avenues for exchanging information and sharing perspectives on station priorities.

5.0 Recommendations:

None

6.0 References

6.1

"Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014", Approved October 14, 2014, Volume II, Exhibit D.6, Section 3.6, "Human Performance Program."

6.2

"Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012", Approved October 10, 2012, Volume II, Exhibit D.4, Section 3.7, "Nuclear Fuel."

6.3

Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014", Approved October 14, 2014, Volume II, Exhibit D.3, Section 3.3, "On-Line Maintenance Program."

6.4

"Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013", Approved October 9, 2013, Volume II, Exhibit D.8, Section 3.5, "Refueling Outage 2R17 Overview."

6.5

"Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012", Approved

October 10, 2012, Volume II, Exhibit D.1, Section 3.5, “Single Point Vulnerabilities.”

6.6

“Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012”, Approved October 10, 2012, Volume II, Exhibit D.3, Section 3.2, “Critical Equipment Clock Resets.”

6.7

“Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012”, Approved October 11, 2012, Volume II, Exhibit D.3, Section 3.4, “Auxiliary Feedwater System Review.”

6.8

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.1, Section 3.1, “2011 Annual Radioactive Effluent Release Report and 2011 Annual Radiological Environmental Operating Report.”

6.9

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.4, Section 3.6, “230 kV System Update.”

6.10

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.2, Section 3.3, “Outage 1R17 Misposition, Clearance, and Safety Monitor Results.”

6.11

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.2, Section 3.7, “Simulator Training on Anticipated Transients without Scram (ATWS).”

6.12

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.4, Section 3.2, “Engineering Training Program.”

25th Annual Report, Volume 2, Exhibit D.2, Diablo Canyon Independent Safety Committee Report on Fact Finding Meeting at DCPD on August 12–13, 2014 by Per F. Peterson, Member, and Ferman Wardell, Consultant

1.0 Summary

The results of the August 12–13, 2014 fact-finding trip to the Diablo Canyon Power Plant in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 include:

1. MIDAS (Meteorological Information and Dose Assessment System)
2. Safety-Security Interface
3. New Spent Fuel Pool Instrumentation
4. Emergency Auxiliary Saltwater System Layout Test
5. Design Quality Effectiveness Evaluation
6. DCPD Review of Reactor Trip Commonalities
7. Seismic Fragility PRA Update
8. NFPA-805 Fire Protection Update
9. Reactivity Management
10. Outage 2R18 Outage Safety Plan
11. Meet with NRC Resident Inspectors
12. DCPD Chemistry Program
13. DCISC Member Meeting with DCPD Site Vice-President Barry Allen

2.0 Introduction

This fact-finding trip to the DCPD 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 DCPD 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 MIDAS (Meteorological Information and Dose Assessment System)

The DCISC Fact-finding Team (FFT) met with Curt Hansen, Emergency Preparedness (EP) Coordinator, for an update on the upgraded MIDAS. The DCISC last reviewed MIDAS in May 2012 (Reference 6.1) when it concluded the following:

DCPP has successfully completed the upgrade of its Meteorological Information and Dose Assessment System (MIDAS), along with seven offsite and two onsite upgraded meteorological towers, two offsite and one onsite Sonic Detection and Ranging (SODAR) units, and one onsite and eight offsite Pressurized Ion Chambers (PICs). The upgraded system should provide more accurate and timely predictions of the direction and intensity of radiological releases from plant accidents. This upgrade brings DCP in line with the industry. It is recommended that the DCISC close its Open Item EP-3 initiated for tracking the MIDAS upgrade but continue to track MIDAS through emergency exercise observations.

For practice emergency exercises or actual accidents involving radioactive material releases radioactive dose assessment begins in the Control Room (CR) (or Control Room Simulator for practice exercises). Operators in the CR use a program named “EPR2net” to make initial calculations of offsite radiological consequences as described in DCP Procedure EP R-2, “Release of Airborne Radioactive Materials Initial Assessment”. The backup for this process is a manual calculation of radiological consequences using templates and pre-determined formulas. When the Unified Dose Assessment Center (UDAC), a joint DCP and San Luis Obispo (SLO) County team, is activated in a practice exercise or an actual emergency, they assume the duty of calculating offsite radiological consequences using EARS (Emergency Assessment Response System) and MIDAS.

MIDAS is used by PG&E to predict the path and magnitude of radiation releases to the surrounding environment caused by an accident at the plant, such that protective action (sheltering, evacuation, etc.) recommendations can be made to protect the public. Inputs to MIDAS include the concentration and height of radioactive releases at the plant from EARS and wind and temperature data from up to seven meteorological towers and several SODAR (Sonic Detection and Ranging) units. The predictions are corroborated by data from roving Field Monitoring Teams and by nine Pressurized Ionization Chambers (PIC radiation detectors) at fixed locations.

DCP originally used only the initial version of MIDAS in the early 1990s with one meteorological tower for wind speed and direction and elevation temperature data. Now DCP uses the second revision of MIDAS along with EARS with seven meteorological towers and several SODAR (Sonic Detection and Ranging) units for more accurate weather data. Beginning December 2014, DCP plans to implement the latest version of MIDAS as a standalone without EARS. The new release of MIDAS is capable of predicting off-site transport for multi-point releases (e.g., simultaneous accidents in both units).

The purpose of the MIDAS second version upgrade was to enhance the capability of PG&E and the County for making appropriate Protective Action Recommendations (PARs) and decisions. Such decisions relate to the need to evacuate or shelter the population in various geographic sectors in the vicinity of DCP in the event of an unplanned radiological release from the site. Typically, the most significant radioisotope initially from a radiological accident is Iodine-131 (with a half-life of approximately 8 days), which may be released in the form of small aerosol particles from fuel damaged in a severe accident, and can be ingested through breathing or eating contaminated food and then concentrated in the thyroid gland. The closest population area to the plant at about six miles is Port San Luis with approximately 180 people. In emergency exercises, the County frequently decides to evacuate this area early in the exercise because of its location and frequent winds in its direction (actual evacuation does not occur, it is only simulated). Historically, during exercises the County has issued orders to evacuate selected population zones and schools well before the joint PG&E/County Unified Dose Assessment

Center (UDAC) has recommended them.

The DCISC FFT observed an example of the EPR2net application and an example of the latest MIDAS version on the computer. The models successfully generated and predicted radiological consequences for selected postulated radiological releases from the plant.

Conclusions:

DCPP appears to have successfully implemented the second version of the Meteorological Information and Dose Assessment System (MIDAS), utilizing seven meteorological towers and several sonic detection and ranging (SODAR) units, which provides more accurate offsite radiation release consequence predictions. DCPP will be implementing the third MIDAS version by the end of 2014 which will provide the capability to accommodate multi-point releases. The DCISC should review the use of the new system in early 2015 and at the next emergency exercise observed by the DCISC.

Recommendations:

None

3.2 Safety-Security Interface

The DCISC Fact-finding Team met with Shawn Kirven, Security Operations Manager, for an update on DCPP's safety-security interface. The DCISC last reviewed this interface in December 2011 (Reference 6.2) when it concluded the following:

The DCPP Safety-Security interface appears to be functioning satisfactorily.

The purpose of the Safety-Security Interface Process is to assess and manage changes to safety and security activities so as to prevent or mitigate potential adverse effects that could negatively impact either plant safety or security. The DCISC Fact-finding Team received and reviewed the DCPP Procedure OM11.ID7, "Safety/Security Interface Program," dated September 4, 2012 and Procedure OM11.DC7, "Conduct of Security," dated July 17, 2014. The first procedure identifies management controls and processes used to establish and maintain an effective interface between nuclear safety and site security. This procedure instructs Design Engineering, Projects, and Security to involve all others in any modifications or changes to the plant physical configuration and procedures. The procedure includes a detailed and comprehensive checklist for each proposed modification or procedure that has potential security or safety impacts.

The first procedure addresses the following:

- Plant Modifications
- Procedure Changes and Emergency Plan Changes
- Emergent Operational Conditions and Maintenance Activities
- Changes to Security Plans
- Safety/Security Programmatic Reviews

The DCISC Fact-finding Team determined that the two procedures were satisfactory in controlling the safety/security interface at DCPP. Mr. Kirven believed that the safety-security interface was being operated satisfactorily at DCPP.

Conclusions:

The Safety-Security Interface appears to be satisfactorily implemented at DCP.

Recommendations:

None

3.3 New Spent Fuel Pool Instrumentation

The DCISC Fact-finding team met with Kathryn Hitchen, Project Manager, Spent Fuel Pool Instrumentation Project; and Pat Nugent, Manager, Fukushima Program Manager, to review the new DCP Spent Fuel Pool (SFP) level instrumentation. The DCISC last reviewed this topic in October 2013 (Reference 6.3).

To assure that similar consequences to those which were experienced at Fukushima never happen at U.S. nuclear power plants, NRC ordered nuclear utilities, including DCP, to implement flexible strategies to cope with beyond design basis events similar to that which took place at Fukushima. Part of the coping strategies addresses the use of installed plant equipment and includes monitoring the Spent Fuel Pools (SFP) levels with new instrumentation and removing spent fuel pool heat by boiling the water in the pools. Boiling would be expected to begin about six hours after loss of forced cooling to the SFPs, which is an acceptable and effective way to remove heat from the pools if normal cooling is not available. Boiling keeps the fuel temperatures well below damage thresholds (well below the temperatures that the fuel operates at inside the reactors), and thus prevents damage and radiological release. There is adequate water inventory in the pools to maintain water levels at least ten feet above the fuel for 30 hours immediately after fuel has been offloaded from a reactor during refueling, and for significantly longer time periods after off-loaded fuel has cooled for a few months. The ten-foot water barrier is important not only from the perspective of cooling the fuel but also for purposes of providing adequate radiation shielding for workers who might be on the SFP decks. DCP is installing new instrumentation to ensure it has the capability at all times to monitor water levels in its SFPs over the full range of possible levels.

Hoses to support SPF make-up would be staged prior to conditions in the building becoming adverse (e.g., the onset of boiling). This will be included in the new FLEX set of procedures. Full implementation of this coping strategy is expected to be complete by Fall 2015 for Unit 1 and by Spring 2016 for Unit 2. Some equipment is already on the site and available for use.

The NRC ordered SFP level instruments installed which meet the following requirements, among others:

- A primary and back-up level instrument that will monitor water level from the normal level to the top of the used fuel rack
- A display in an area accessible following a severe event
- Independent electrical power to each instrument channel and provision of an alternate remote power connection capability

To meet these requirements DCP's instruments have the following design features:

- Two independent instruments located at opposite corners of each of the two SFPs
- Power supplied from different non-vital busses with battery backup power for 72 hours
- Local display in the Fuel Handling Building
- Remote display at the Auxiliary Board with Plant Data Network feed to the Control Room for normal operation

Additionally, the instruments are seismically mounted and reliable in high temperature, humidity and radiation conditions.

The DCPD instruments consist of Westinghouse's guided wave radar system, which uses a microwave beam and variation in di-electric constant at water/air interface to detect level. This process is called domain reflectometry. This system has been satisfactorily tested by Westinghouse and approved by NRC. DCPD plans to have the Unit 1 level system installed by May 28, 2015 and Unit 2 by June 28, 2015.

Another phase of the coping strategies addresses use of onsite portable equipment including the deployment of a diesel-driven emergency SFP make-up pump and providing make-up water to a SFP as water boils off.

Existing instrumentation for SFP level consists of a level indication on the wall of the SFP. This is a visual indication requiring an individual to go into the SFP building. Because access may not be possible in beyond design basis conditions, the new remote monitoring level instrumentation is being installed. [Note: a member of the public had suggested during the October 9-10, 2013 DCISC Public Meeting (Reference 6.4) a video camera near the SFP to view the level. During the fact finding, DCPD explained that this is not feasible due to steaming of the camera lens and other limitations.]

Conclusions:

DCPD appears to be on track in developing and installing its Spent Fuel Level Instrumentation required by the NRC as a result of the Fukushima accident. The use of a video camera to monitor the pool level, as was suggested by a member of the public during the October 9-10, 2013 DCISC Public Meeting, would not be practical due to steam causing fogging of the lens. The DCISC should follow up after the new level measurement systems are installed and tested.

Recommendations:

None

3.4 Emergency Auxiliary Saltwater System Layout Test

The DCISC Fact-finding team met with Scott Maze, Nuclear Projects Supervisor, to review the Emergency Auxiliary Saltwater (EASW) System layout test. The DCISC reviewed EASW Pump testing in August 2012 (Reference 6.5), 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 DCPD Auxiliary Saltwater (ASW) System utilizes four electrically-powered pumps, forming two trains of permanently installed piping and valves for each unit with cross-ties between units. ASW provides ocean water to the plant for emergency cooling of components required to bring and maintain the plant in a safe state for design basis events. It is important to note that the aluminum piping and connections used in the EASW system are of the type routinely used for temporary irrigation piping, and thus are designed to be installed manually. The Fact Finding team (Peterson and Wardell) verified this by lifting a section of the pipe, which was lighter in weight than it initially seemed, due to its aluminum construction.

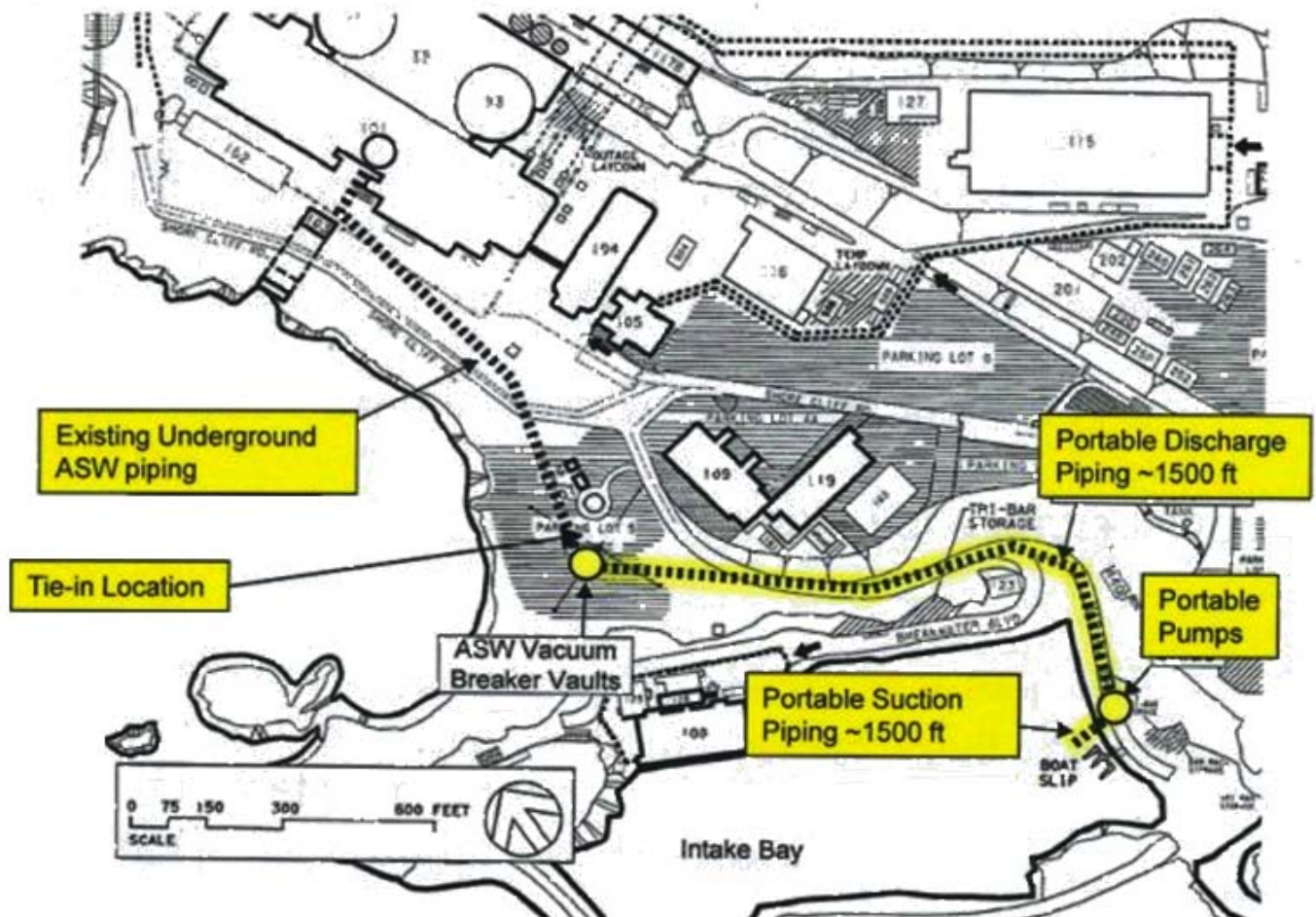
The EASW utilizes one portable Diesel-driven pump train and associated temporary piping per unit, though DCPD maintains components for two full EASW trains per unit. It is used in place of normal ASW for beyond design basis events. The EASW is to be set up prior to the time it is thought to be required.

DCPD tested the process of laying out the EASW system in May 2014. The layout consisted of laying and connecting approximately 1500 feet of suction piping with kelp cage to the intake bay, moving and connecting the portable Diesel-driven EASW Pump, and laying out and connecting approximately 1500 feet of discharge piping to the tie-in location to existing underground ASW piping. DCPD timed all steps and recorded manpower and equipment used. The following items were purposely excluded:

- Suction piping was not lowered into the ocean but was staged over the ocean due to not yet having the environmental permit
- The ASW Vacuum Breaker Vault covers were not removed nor tie-in to existing ASW piping because the plant was in operation
- The EASW Pump was not run due to not yet having the environmental permit

All EASW layout parameters were satisfactorily verified and improvements identified for consideration. One item for improvement is the kelp cage, although it was not tested, but questions remain about its capability. Below are a system layout diagram and photos of the components.

System Layout





Per Peterson and Ferman Wardell inspect EASW piping on trailers.



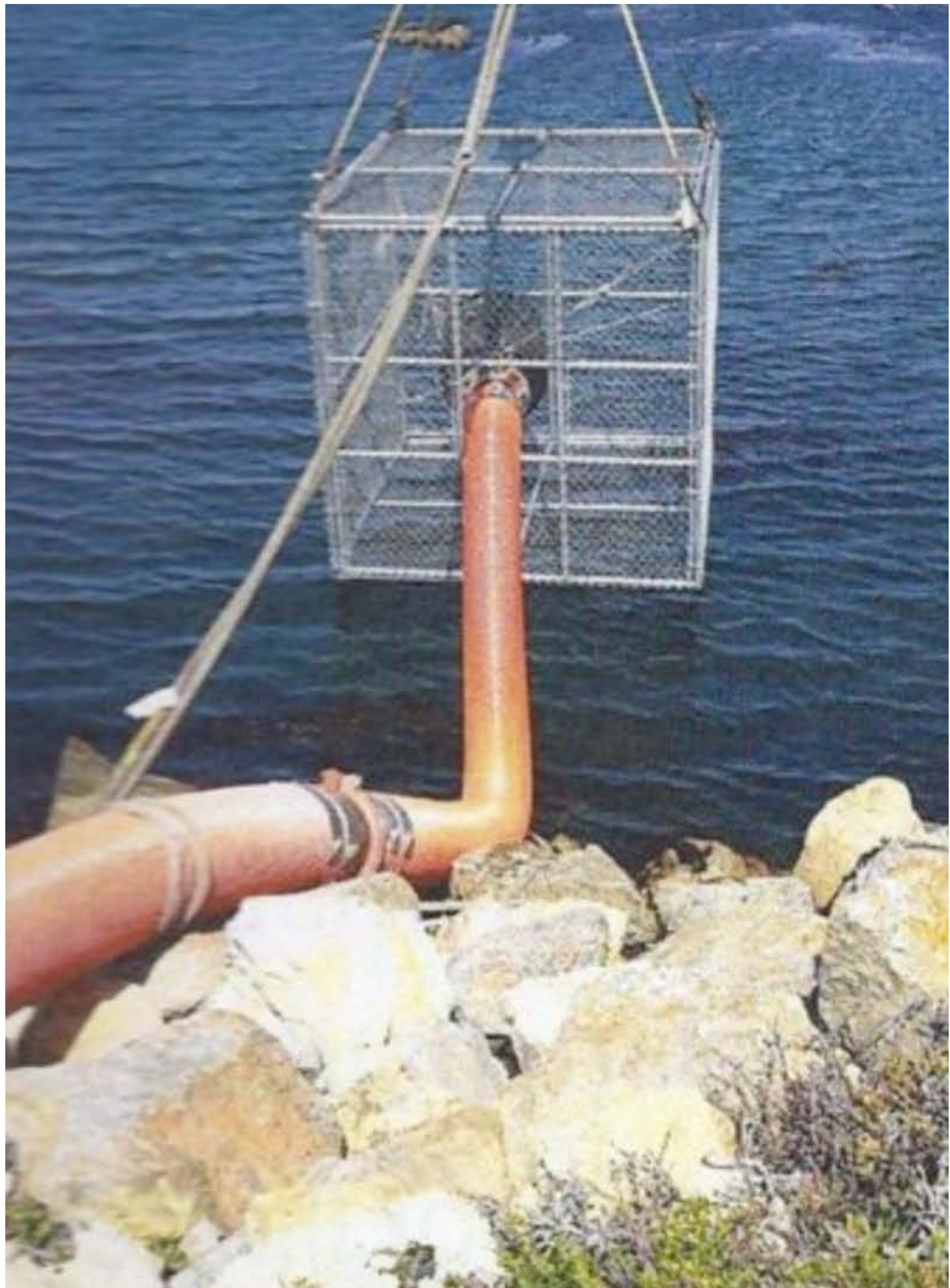
EASW pump mounted on trailer.





EASW suction piping from Intake Bay







EASW kelp cage over Intake Bay

Separately, the four EASW Pumps were tested in June 2014. Two pumps tested satisfactorily; however, the other two were problematic. These were all previously-owned farm irrigation pumps. DCPD will either overhaul or replace the pumps. This is the purpose of component testing—to determine initial and ongoing operability and reliability and to take appropriate steps if there are problems.

Conclusions:

DCPD's Emergency Auxiliary Saltwater (EASW) System layout tests were satisfactory; however, separate EASW Pump testing identified some problems. DCPD will overhaul and/or replace these pumps. The DCISC should continue to follow this issue.

Recommendations:

None

3.5 Design Quality Effectiveness Evaluation

The Fact Finding team met with Bob Waltos, Manager, Project Engineering, to review design quality effectiveness. The DCISC last reviewed design quality in May 2014 (Reference 6.6), concluding the following:

The DCPD Design Quality Effectiveness Evaluation was not yet complete for DCISC review. It is scheduled for completion in mid-June 2014. The DCISC should review the evaluation in July or later. The DCPD Design Change Program Implementation Metric Chart showed the program is White, satisfactory. Some design errors continue to happen; however, they have been dealt with appropriately.

The Design Quality issue is about erroneous designs released for construction. During Refueling Outage 1R17, there were three major modification designs with errors released for implementation. The reason for the error determination was the large number of Field Changes required for the modifications to be implemented. Three design packages were issued incomplete (“managed exceptions” due to vendor issues and late scope additions, counting on the Field Change Process (FCP) to add information to complete the packages; however, the FCP did not include the same discipline and rigor as the full Design Change Process (DCP). Approximately one-third of the FCs were required due to design errors. Adding to the problem was the fact that each of these designs was begun late and performed on a compressed time schedule.

DCPD had investigated the design quality problems and developed a plan of corrective action, which included, in addition to tighter controls of Field Changes, improved project communications, augmented pre-release design reviews, and additional training of engineers on the design change process. A Root Cause Evaluation (RCE) identified the root cause as “... the organization failing to recognize the risk and complexity of this first-time PCS project, and therefore not assuring that an adequate organizational structure and project oversight were in place (i.e., did not designate it as a strategic project or Engineering major project). This ultimately created an environment that promulgated a human error-likely environment.” Corrective actions were implemented and an effectiveness evaluation was performed following Outage 1R18 in June 2014, which was the subject of this fact-finding meeting at DCPD.

The DCISC reviewed the effectiveness evaluation documented in Notification 50495407, “QAAF: RCE Requested

for DCP 1 237 Issues). The conclusion stated, “A review of the performance of modification since implementation of the Process Control System (PCS) Root Cause Evaluation (RCE) has determined that the corrective actions have been effective.” This was based on the successful installation and one cycle of performance of the Process Control System (one of the problematic modifications on Unit 1) upgrade in Outage 2R17 as compared to its installation in Outage 1R17.

The regular measure of Design Quality, included in the monthly Plant Performance Improvement Report (PPIR), showed performance as White, Satisfactory. The measure had been Yellow (Needs Improvement) in May and Green (Good) in April.

Notwithstanding the above positive effectiveness review, there were two problematic modifications out of ten completed for Outage 1R18: Unit 1 Containment Fan Cooler Unit Dampers and Single Point Vulnerability (SPV) on the Main Bank Transformers projects. Reviews of causes for these problems showed that they were unique to these projects and different than the previous 1R17 project problems. These were among the following Green-scoring projects:

- Unit 1 Polar Crane
- Motor Operated Valve Control Circuit Logic
- Assembly Replacement
- Auxiliary Feedwater Vent Line
- And six others

DCPP performed an evaluation of 64 major and minor projects and modifications over the course of the last three refueling outages and determined that approximately 92% were well-devised designs. When problems do occur, DCP uses Root Cause Evaluations, Apparent Cause Evaluations, and Lessons Learned reviews to determine the causes for corrective actions and improvements.

Conclusions:

DCPP’s Design Quality measures show satisfactory performance based on scores of final designs released for installation. There was a small percentage (less than 10%) which were problematic during Outage 1R18, and they have been corrected and evaluated for cause correction to prevent recurrence. The DCISC should continue to monitor design quality.

Recommendations:

None

3.6 DCP Review of Reactor Trip Commonalities

The DCISC Fact-finding Team met with Ryan West, Electrical, I&C, and Digital Systems Manager, to review whether there were common causes of three reactor trips as a result of transformer flashovers. The DCISC last reviewed transformer flashovers in January, 2014 (Reference 6.7), concluding the following:

Unit 1 has had an excellent record of avoiding unplanned reactor trips, with its most recent unplanned automatic trip having occurred on June 3, 2002. All three automatic reactor trips of Unit 2 that have been experienced between January 1, 2011 and December 31, 2013 were avoidable. In all three cases the causal analyses and corrective actions to prevent recurrence appeared reasonable.

The three flashover reactor trip events were as follows:

October 2012

Flashover of Unit 2 CCVT (Capacitive Coupled Voltage Transformer) due to insulator gap short due to gap creepage

July 2013

Flashover of Unit 2 insulator bushings during routine hot wash caused by wind blown moisture over insulator

February 2014

“Flashover” due to failure of Unit 2 lightning arrester during a rainstorm (this insulator was designed to flash over as it did to relieve the electrical force experienced)

DCPP performed a Root Cause Evaluation [reported in the DCISC January 15-16, 2014 Fact-finding Report referenced above]. Also, to determine whether the three events have a common cause and to prevent future events, DCPP hired MPR Associates to review documentation and evaluate the events and provide recommendations for corrective actions. MPR’s June 2014 report concluded that the commonality between the events is “very heavy, non-uniform contamination [salt, dirt and Emergency Diesel Generator combustion products] present on the insulator[s]” following periods of wet and dry weather with Unit 2 being the more affected than Unit 1. Recommendations included the following:

1. Minimize the generation of airborne dust and dirt onsite
2. Characterize the contamination constituents by sampling
3. Conduct insulator breakdown tests
4. Develop a model to characterize the impact of wind conditions
5. Establish an in-service functional performance requirements for bushings and insulators in accordance with industry standards
6. Determine the feasibility of returning to porcelain insulator surge arresters
7. Evaluate alternative actions to prevent future flashover events

DCPP is taking the following actions:

- Performing “Cold” washes during outages instead of “Hot” washes at power on 500 kV Main Bank Transformers
- For high voltage bushings installing polymer bushings, which are better at managing contamination
- Replacing lightning arresters with greased ceramic devices
- Moving the 500 kV CCVT to a more-protected location in the 500 kV switchyard (already completed)

Conclusions:

DCPP is satisfactorily addressing the commonalities among the three reactor trips caused by flashovers of insulators and lightning arresters. The common cause was contamination by dirt, dust and salt. Corrective actions include replacement of susceptible materials and changes to how the contamination is removed.

Recommendations:

None

3.7 Seismic Fragility Probabilistic Risk Assessment (PRA)

The DCISC Fact-finding Team met with Rasool Baradaran, Supervisor, PRA/Appendix R, and Nathan Barber, Seismic PRA Project Manager, for an update on DCP's seismic fragility analysis. The DCISC last reviewed this topic in March 2014 (Reference 6.8), concluding the following:

The DCISC review finds that the current project to develop probabilistic seismic fragilities for the plant's structures and equipment seems to be going well. It is being carried out by a team of outside experts in collaboration with DCP staff engineers. This team has outstanding credentials. The DCISC should continue to follow the progress of this important work.

In 1987-1988, the plant completed a seismic PRA (Reference 6.P), which broke new ground in a number of methodological areas, and was also the first seismic PRA ever performed at a nuclear power plant site with very high seismicity. It is now out-of-date, and over two years ago the plant began an effort to update it. This means (a) updating the probabilistic seismic hazard analysis, being done in a separate project; (b) updating the probabilistic analysis of the seismic fragilities of the structures and components (the topic here); and (c) updating the plant probabilistic systems-analysis model, an effort that is also underway.

The NRC, in a generic letter to all power-reactor licensees under 10 CFR 50.54(f), regarding lessons learned from the Fukushima accident in Japan, has required each power plant to reassess its seismic hazard, and for western plants in high-seismicity areas, like Diablo Canyon, to update the plant's seismic PRA as well. Today this seismic-fragility work is formally being done in response to the NRC's 50.54(f) letter of 2012, but it had begun earlier and would have been undertaken in any event.

A major finding at the time of the 1988 seismic PRA was that the seismic capacity (or "Fragility" of each item of equipment and each structure was strong enough that failures due to seismic causes would only occur for earthquake motions significantly in excess of the plant's design basis earthquake. The objective of the current seismic-fragility effort is to repeat that analysis, but using the current plant configuration (which differs in a few ways from the configuration in 1988.) The fragility analysis will also use the best current information about the seismic hazard at the site and will include a modern analysis of how the seismic energy from a large earthquake would enter the site from below, propagate into the structures, and produce seismic motions at the base of each equipment item or structure being studied.

The status of the analysis is that a team of experts has been placed under contract to perform the analysis, working in conjunction with DCP staff engineers. DCP has also put together an outside group of experts to perform a peer review of the analysis. This group's assignment is to meet regularly throughout the two-year duration of the fragility project to provide feedback and review. DCP considers the contractor analysis team members and the group of outside peer reviewers to be among the top experts nationally in this field.

Components are analyzed at their dominant frequencies (highest failure mode potential), typically in the range 3—8.5 Hertz. The fragility analysis uses time history data which takes duration into account. The PRA focuses on the immediate damage that the earthquake might cause, and thus doesn't take into account Phase 2 and 3 FLEX mitigation strategies or equipment. Because the seismic PRA provides improved information on the most probable plant damage states that could be caused by an earthquake, the DCISC recommends that this information be used in developing the DCP FLEX strategy to respond to beyond design basis earthquakes.

No analysis problems have arisen so far, although it is too early to predict the outcome of the fragility analysis. The fragility analysis at this stage is using the seismic hazard information available earlier, not the new seismic hazard information being developed concurrently by the plant. When that new seismic-hazard information is finally available, it will then be used to update the fragility analysis before finalizing this project.

The current schedule is expected to produce final seismic-PRA results sometime in mid to late 2015. DCPD expects to submit its updated 1988 Seismic PRA to the NRC by 2017.

Conclusions:

DCPD is proceeding satisfactorily with its Seismic Fragility Probability Risk Assessment (SFPPRA) analysis using the latest methodology and seismic response spectra. SFPPRA is a very useful tool, because it provides information about the likelihood of different plant damage states caused by earthquakes. Although early, there have been no problems identified. Because the seismic PRA provides improved information on the most probable plant damage states that could be caused by a beyond-design-basis (BDB) earthquake, the DCISC recommends that this information be used in developing the DCPD FLEX strategy to respond to beyond-design-basis earthquakes. We understand that a seismic analysis of the FLEX equipment for BDB seismic motions is under way and expect to review it sometime soon. We believe that it is equally important that all other factors that could affect the plant staff's ability to implement FLEX procedures effectively following a BDB earthquake, including workspace seismic safety and post-earthquake access/egress for plant staff, also be identified and evaluated. The DCISC should continue to monitor the SFPPRA analysis and review how the DCPD FLEX program uses SFPPRA results and assessments of BDB earthquake impacts on plant staff safety and access/egress capabilities, to develop its FLEX mitigation strategies for BDB earthquakes.

Recommendations:

None

3.8 NFPA-805 Fire Protection Update

The DCISC Fact-finding Team met with Dave Hampshire, Fire Protection Program Owner, for an update on DCPD's transition to National Fire Protection Association (NFPA)-805. The DCISC last reviewed this topic in March 2013 (Reference 6.9), concluding the following:

DCPD's Fire Protection Program and Systems have been considered satisfactory, though not without issues, in the past by NRC and the DCISC. DCPD is strengthening Fire Protection by transitioning to the National Fire Protection Association Standard 805, by reviewing its implementation of regulatory requirements in the DCPD Licensing Basis Verification Project, and by correcting issues found by its Self-Assessment and NRC's Triennial Fire Protection Inspection.

NFPA-805 is an alternative approach to the Fire Protection Program (FPP) standards for nuclear plants that is endorsed by the NRC and incorporated into Federal regulations as 10CFR50.48(c). DCPD is transitioning to NFPA-805 and submitted their License Amendment Request (LAR) to the NRC in June 2013. NRC has sent 40 Requests for Additional Information (RAIs) to DCPD. The NRC approval (Safety Evaluation) is expected by fall of 2015. DCPD would have 180 days to fully implement NFPA-805, which includes compensatory/alternate measures in place until modifications can be installed and operational.

The current "Deterministic" FPP assumes any fire will damage/destroy all cables and equipment within a Fire Area. A Fire Area is a distinct area separated by fire barriers or space in order to contain a fire starting in that area. DCPD has 105 separate and distinct Fire Areas. The new "Risk-Informed" FPP of NFPA-805 takes into account the probability of an event occurring and its potential consequences, based on actual plant design, equipment location, combustibles and other actual, identified fire risks. NFPA-805 continues the deterministic method but adds Risk-Informed, Performance-Based (RIPB) evaluation methods as an acceptable means of demonstrating

compliance.

In addition to the FPP risk analyses, NFPA-805 also requires the following analyses:

- Nuclear Safety Capability Assessment—an at-power evaluation of every Fire Area
- Non-Power Operations Evaluation—similar to the above, but identifies fire impacts during non-power operations (e.g., outages)
- Radioactive Release Evaluation—examination of all Fire Areas to assess the plant’s ability to prevent radiation release due to firefighting efforts.
- Identification of High Risk Areas for at-power and non-power operations

Implementation of NFPA-805 will affect every work group because of new training, new and revised procedures, many program documents and processes, and physical modifications. DCPD is committed to the following eight modifications being completed by 1R20 and 2R20 outages:

1. Unit 1/Unit 2 Electrical Raceway Fire Barrier System
2. Unit /Unit 2 Enhance ability to shut down from Hot Shutdown Panel (HSDP)
3. Unit 1/Unit 2 Incipient Fire Detection: Install incipient fire detection in Cable Spreading Room (CSR) Cabinets and Solid State Protection System Room Cabinets
4. Unit 1/Unit 2 Reactor Coolant Pump Seal Cooling: Reduce the risk from loss of seal cooling loss of coolant accident (replace pump seals with new, improved seals)

NFPA-805 will bring about the following changes to the Main Control Room (MCR):

- New Abnormal Operating Procedure for MCR and CSR non-abandonment scenarios
- Operator actions will be allowed in MCR prior to abandonment
- No more requirement to achieve Cold Shutdown within 72 hours
- Modifications to HSDP as described above

The benefits of NFPA-805 are improved nuclear safety, cost savings in fire watches, and avoidance of expensive modifications to be in compliance with Appendix R, and it helps toward implementing risk-informed Technical Specifications.

Conclusions:

DCPD appears to be appropriately transitioning from its current “Deterministic” Fire Protection Program (FPP) to the new “Deterministic and risk-informed” National Fire Protection Association Standard NFPA-805. The new program brings about benefits in improved nuclear safety, cost savings, and a more realistic fire protection program.

3.9 Reactivity Management

The DCISC Fact-finding Team met with Dave Gouveia, Operations Manager, for an update on the DCPD Reactivity Management Program. The DCISC last reviewed Reactivity Management in January 2013 (Reference 6.10), concluding the following:

The Reactivity Management Program appears healthy, and performance of both units has been

progressing on a generally improving trend in recent years. The DCISC should consider continuing to review this topic approximately every fuel cycle (currently every 18 months).

Reactivity is defined in DCP's RMP procedure 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.

The DCP RMP is controlled by Procedure OP1.ID3, "Reactivity Management Program." The program 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:

- a. Develop and implement reactivity management performance indicators.
- b. Review the following areas for reactivity events, adverse trends, and needed corrective actions or opportunities for Reactivity Management Program improvements:
 - o Notifications and event trend records
 - o Reactivity Management Program performance indicators
 - o Plant and industry operating experience, self-assessment recommendations and benchmarking trip lessons learned
 - o Maintenance schedules and corrective maintenance backlogs
 - o 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.

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

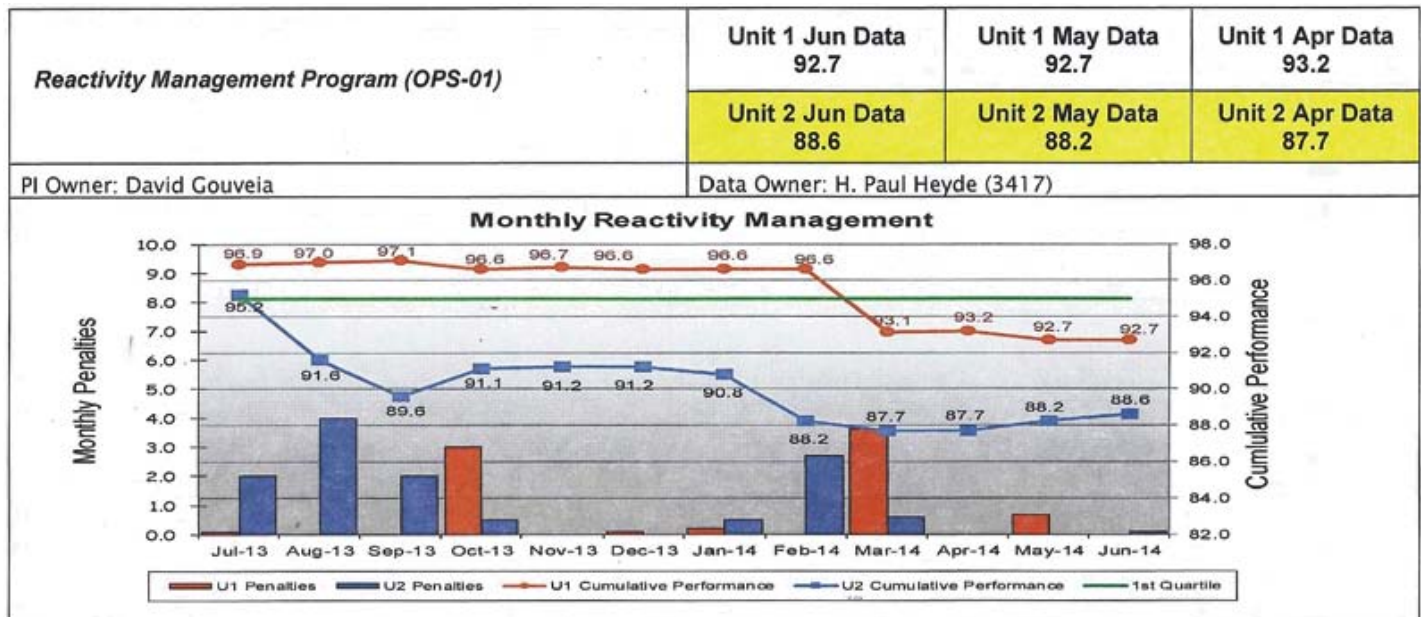
identified and fully understood prior to initiating any action that affects reactivity, (2) closely monitoring appropriate indications for reactivity changes to verify the expected magnitude, direction, and effects, (3) remaining alert for situations that could affect reactivity, and initiating appropriate 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.

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 beginning of a shift reactivity brief 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 2 is Yellow for the last three months because of the three reactor trips in 2013 and 2014 caused by high voltage flashovers as well as two other Significance Level 3 events: Unit 2 Rod Control Urgent Failure and Unit 2 Fuel Handling Error. See Section 3.6 above, "DCPP Review of Reactor Trip Commonalities." Unit 1 continues to be White (Good) as it has for the last three months. DCPP expects Unit 1 to be Green in October 2014 and Unit 2 to be Green in September 2014.



Conclusions:

DCPP maintains tight controls on Reactivity Management, a direct measure of nuclear safety. Unit 1 is in a healthy state according to DCP's measures, and Unit 2 needs improvement; however, Unit 2's lower performance was caused by events other than Reactivity Management per se. They were reactor trips caused by 500 kV switchyard problems, which, though causing reactor trips which significantly affect reactivity, were not directly in the purview of the Reactivity Management Program.

Recommendations:

None

3.10 Outage 2R18 Outage Safety Plan

The DCISC Fact-finding team met with Matt Coward, Outage Management Manager, to review the DCP Outage Safety Plan for Outage 2R18 (September 28 to October 28, 2014). The DCISC last reviewed outage safety plans in December 2013 (Reference 6.11), concluding the following:

The DCP Outage 1R18 Outage Safety Plan is a comprehensive and detailed document describing the schedule and steps in the outage, which are identified as high risks of core boiling or damage as a result of losing electric power and/or cooling to the reactor core and Spent Fuel Pool, and the backup systems that are available. The emphasis is on prevention of incidents, mitigation of accidents and control of radioactive material. With one exception the Outage Safety Plan appears to be well designed to achieve outage safety. The exception is that the new DCP requirement that the Containment Equipment Hatch be closed and secured during fuel movement is not specifically addressed. The DCISC believes it should be specifically addressed in the Outage Safety Plan.

The Fact-finding Team notes that the above exception to the issue of the Containment Equipment Hatch has since been resolved by DCP by modifying the hatch support device to make it seismically qualified.

The DCISC FFT received and reviewed the 2R18 Outage Safety Plan. The purpose of the Outage Safety Plan is to provide information on outage safety requirements and highlight risk areas to plant staff. In order to assess outage safety impact, referral to the Outage Safety Plan and Outage Safety Schedule is to be made prior to

making major schedule changes. The intent of the Outage Safety Plan is to provide a concise document for use in evaluating plant conditions during Modes 5 (Cold Shutdown) and 6 (Refueling) to ensure the key safety functions are satisfied, while maintaining consistency with the Technical Specifications and Equipment Control Guidelines.

DCPP's outage safety program is designed around three major concepts:

1. Prevention of any accident-initiating event
2. Mitigation of an accident before it potentially progresses to core damage
3. Control of radioactive material if a core damage accident should occur

The outage safety plan provides background information for the logic contained in the outage safety checklists. The checklists provide the logic used to develop the outage safety schedule. The schedule and checklists ensure that the equipment and plant conditions assumed in the abnormal procedures shutdown are met. These procedures contain guidance for providing passive core cooling used during and key safety system restoration.

Outage safety planning is based upon the assumption of a worst-case event, which is a loss of all AC power.

The Outage Safety Plan contains the following topics:

- Infrequently Performed Tests or Evolutions
- Contingency Strategies
- Transition Periods and Testing
- Prevention of Accident Initiating Events
- Outage Safety Checklists
 - Mode 5 (Cold Shutdown) Loops Filled
 - Mode 5 Loops Not Filled
 - Mode 6 (Refueling) RCS Level at RV Nozzles
 - Mode 6 Level Below RV Nozzles
 - Core Offloaded
- Containment Closure
- Industry Outage Events

DCPP uses "Safety Monitor", a probabilistic risk analysis tool that recently replaced the older "ORAM-Sentinel" computer program, to analyze the risk of reactor coolant boiling and core damage risk while fuel is in the reactor vessel based upon the outage equipment out-of-service schedule information. Procedure AD8.DC55, "Outage Safety Scheduling", controls the analysis. The resultant Outage Safety Schedule shows the Defense-in-Depth (DID) Status for various states of the following safety functions:

- Decay Heat Removal Capability
- Reactor Coolant System Inventory Control
- Reactivity Control
- Support Systems (Heat Sink)
- Containment Closure

- AC Power Available
- Spent Fuel Pool Cooling
- DC Power
- 120VAC Instrument Power
- Emergency Diesel Generator/Fuel Handling Building/Charging Power Supply

DCPP has a process (Procedure OP Q-38, “Protected Equipment Postings—Outages” to designate and protect equipment required for DID of safety systems during outages. The process includes lists, tags, signage, and physical barriers. The procedure appeared adequate.

An “N+1” defense in depth philosophy, where N generally represents the minimum equipment needed to maintain a key safety function, is utilized to evaluate the status of the key safety functions. Defense-in-Depth (DID) Status is represented by the following four color definitions:

- Green—represents > 1 DID, where N is the minimum equipment needed to maintain a key safety function with more than one backup means of support.
- Yellow—represents N+1 DID, which is considered the normal DID. Key safety functions are fully supported with at least one backup means of support.
- Orange—represents an N condition, where key safety functions are supported, but minimum DID is not met, and compensatory measures must be in place.
- Red—represents a $< N$ condition in which key safety functions are not supported.

DCPP considers a status of Green or Yellow acceptable for planned outage activities because key safety functions are fully supported with DID. No planned activities should result in an Orange condition; however, in the rare case where an Orange condition is necessary, a contingency plan with compensatory actions must be developed and implemented. The contingency plan then provides DID, since it provides a backup safety function if the minimum safety function becomes unavailable. Planned Red conditions are prohibited. The 2R18 Outage Safety Plan contains no Orange or Red conditions and eleven Yellow ones. Significant points in the Outage Safety Plan are as follows:

- The RCS will not be completely drained and no Steam Generator eddy current testing is scheduled; therefore, no nozzle dams will be installed.
- Temporary Containment Penetration 60 will be installed to support the 10-year Reactor Vessel in-service inspection, which requires removing the Lower Internals.
- Integrated Safeguards testing and associated bus transfer testing will be performed in Mode 5 at the beginning of the outage.
- STPs M-13B1, B2, B3, and B4 will be performed at the start of the outage.
- Vital Battery 1-1 cells and DC Distribution Shut Down Panel SD1-1 will be replaced. Prior to clearing SD1-1, a Class 1E temporary modification for 4 kV Bus F relaying and DC control power and Non-Class 1E temporary modification for selected circuits will be installed.
- Vital Bus G will be de-energized for maintenance after the Upper Internals are removed.
- Mode 2 Low Power Physics Testing will be performed.
- The Refueling Cavity will remain filled during the Defueled Window.
- Upgrades to the Process Control System will be performed to address issues of rack power supply

overheating, fiber optic cable protection, HSP annunciator, and software changes.

Outage Safety Checklists are used to verify normal and backup decay heat removal capabilities are maintained. The checklists are provided for each of the five following basic plant outage configurations:

1. Mode 5 - Loops Filled
2. Mode 5 - Loops Not Filled
3. Mode 6 - Reactor Coolant System (RCS) Level $\geq$ 111 foot level
4. Mode 6 - RCS Level 111 foot level
5. Core Offloaded

Outage Safety planning is based upon the assumption of a worst case event, which is a loss of all AC power. Backup decay heat removal capability is maintained during the outage by assuring that the system can take advantage of natural physical laws (natural circulation by gravity or boiling) to maintain passive cooling if Residual Heat Removal (RHR) of Spent Fuel Pool (SFP) cooling is lost. Passive cooling is available to reduce the risk of core damage in the event the normal and backup decay heat removal methods are lost.

The Outage Safety Plan also includes operating experience, i.e., prior outage events at DCPD or other nuclear plants. These are in the form of “Lessons-learned” to prevent these events from reoccurring at DCPD.

Conclusions:

The DCPD 2R18 Outage Safety Plan, used to assure nuclear safety during the outage, appeared comprehensive and clearly written, applying the Defense-in-Depth philosophy to prevent accidents and to mitigate the effects of accidents, if they were to occur.

Recommendations:

None

3.11 Meet with NRC Senior Resident Inspector

The DCISC Fact-finding Team met with Tom Hipschman, Senior Resident NRC Inspector, to discuss items of mutual interest. The DCISC last met with the NRC resident inspectors in April 2014 (Reference 6.12), concluding the following:

DCISC meetings with the NRC Resident or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCPD.

The following items were discussed:

- DCISC evaluation of the Bechtel “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”
- DCPD Seismic Hazard Studies
- Seismic Fragility and PRA
- FLEX and the Emergency Auxiliary Saltwater System Layout Test
- Robert Sewell’s Tsunami Report

Conclusions:

DCISC meetings with the NRC Resident or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCP.

Recommendations:

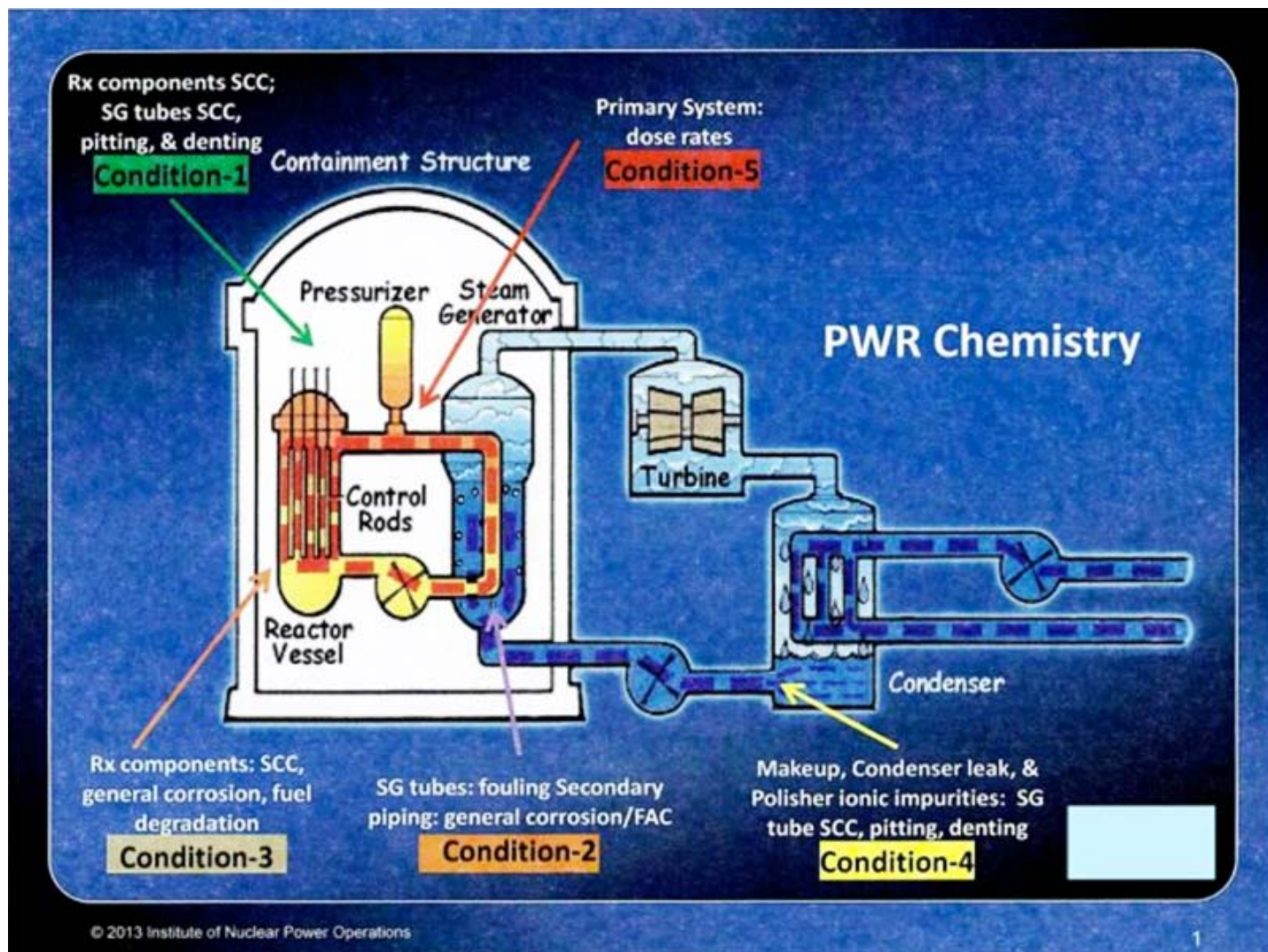
None

3.12 DCP Chemistry Program

The DCISC Fact-finding Team met with Ken Cortese, Chemistry and Environmental Operations Manager, for an update of the DCP Chemistry Program. The DCISC last reviewed the Chemistry Program in August 2013 (Reference 6.13), concluding the following:

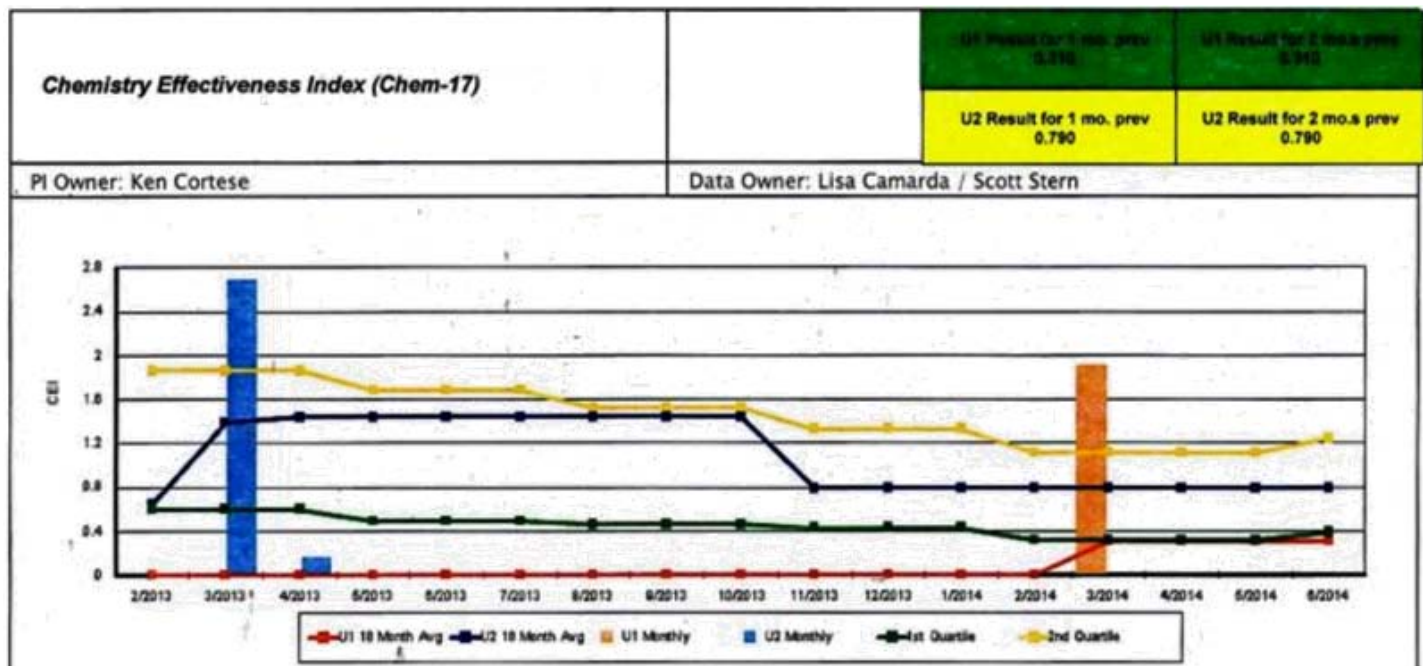
DCP's Chemistry Program implementation was favorably assessed by an experienced and well-staffed team of auditors. There were no findings in the audit, two deficiencies in the radiological chemistry area, and seven non-radiological deficiencies. Chemistry technicians were recognized for their increased use of the Corrective Action Program in identifying, documenting, analyzing, and solving problems. Appropriate management personnel were in attendance at both the pre- and post-audit conferences.

The DCP Chemistry Program maintains proper water chemistry in the plant's primary and secondary systems to minimize corrosion and biofouling and to manage reactor reactivity. The following diagram shows in general the main systems which require chemistry controls. The Chemistry Department is responsible for determining which chemicals, and in what amounts, and processes (e.g., filtration, ion exchange resin, polishing, evaporation, etc.) to use to maintain desired chemistry levels. Chemistry or Operations makes the necessary adjustments to keep system chemistry within tolerances.



Chemistry measures its performance with the DCPD Chemistry Effectiveness Index (CEI) shown below for the month of June 2014. The CEI is a performance measure based on an 18-month rolling composite that is reflective of the time spent operating outside of industry defined action levels and established limiting values for a representative set of primary and secondary chemistry parameters. The CEI range is from 0 representing ideal performance to 100 representing worst performance.

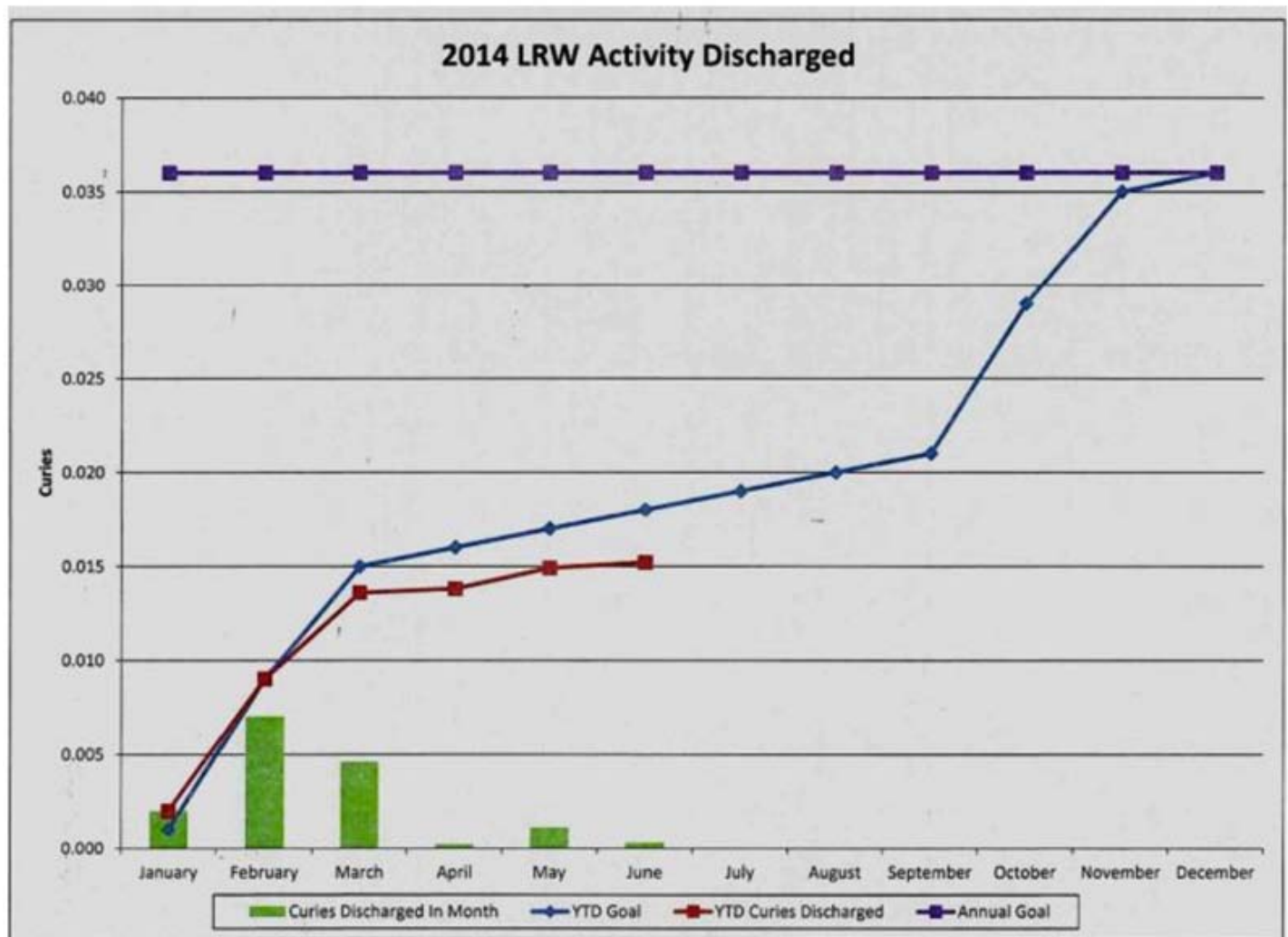
Unit 1 CEI is rated Green (industry first quartile), and Unit 2 is Yellow (second quartile). The factor affecting both ratings is the amount of iron showing up in the Steam Generators (Condition 2 in the diagram above) when coming back to power following refueling outages, specifically Outages 1R18 and 2R17. This is exhibited by the two vertical bars on the chart. DCPD expects Unit 2 iron to drop to approximately 0.050 in September 2014 for an industry top quartile rating.



Other measured Chemistry performance indicators are for the following systems/components:

- Primary (RCS) System:
 - Lithium Hours
 - Hydrogen Hours
 - Radionuclides (Dose Equivalent Iodine 131)
- Secondary (Feedwater/Steam/SG) System:
 - Feedwater Copper and Iron
 - - Steam Generator Sulfate and Sodium
 - Condenser Salt In-leakage
- Closed Cooling Water Systems:
 - Intake Cooling Water
 - Service Cooling Water
 - Component Cooling Water

Chemistry is also responsible for the amount of Liquid Radioactive Waste (LRW) discharged. This amount is limited by DCPD Technical Specifications and NRC Regulations. The amount discharged year-to-date is shown in the chart below. DCPD is below its goal. Additionally, DCPD submits annual reports to NRC describing both the amount of radioactive discharges and the amounts of any radionuclides measured in soils, water, marine life, and vegetation. The DCISC reviews these reports each year and has found that the amounts are far below DCPD Technical Specifications and NRC regulatory limits.



Chemistry's Biofouling Control Team publishes a weekly "DCPP Biofouling Status Report," which included the following information:

- Expected ocean swells and currents
- Ocean conditions for salp/jellyfish
- Intake conduit sodium hypochlorite and sodium bromide injection levels
- Kelp presence and harvesting activities
- Intake bar rack observations

Conclusions:

DCPP's Chemistry Program is effective and achieving good results. Primary and Secondary System chemistry levels are generally within specifications. Discharge of liquid radioactive waste is well within plant and regulatory limits.

3.13 Dr. Peterson Meeting with Barry Allen, Site Vice-President

DCISC Member Per Peterson met with DCPP Site Vice-President Barry Allen to discuss items from the fact-finding meeting and other items of mutual interest.

4.0 Conclusions

4.1

DCPP appears to have successfully implemented the second version of the Meteorological Information and Dose Assessment System (MIDAS), utilizing seven meteorological towers and several sonic detection and ranging (SODAR) units, which provides more accurate offsite radiation release consequence predictions. DCPP will be implementing the third MIDAS version by the end of 2014 which will provide the capability to accommodate multi-point releases. The DCISC should review the use of the new system in early 2015 and at the next emergency exercise observed by the DCISC.

4.2

The Safety-Security Interface appears to be satisfactorily implemented at DCPP.

4.3

DCPP appears to be on track in developing and installing its Spent Fuel Level Instrumentation required by the NRC as a result of the Fukushima accident. The use of a video camera to monitor the pool level, as was suggested by a member of the public during the October 9-10, 2013 DCISC Public Meeting, would not be practical due to steam causing fogging of the lens. The DCISC should follow up after the new level measurement systems are installed and tested.

4.4

DCPP's Emergency Auxiliary Saltwater (EASW) System layout tests were satisfactory; however, separate EASW Pump testing identified some problems. DCPP will overhaul and/or replace these pumps. The DCISC should continue to follow this issue.

4.5

DCPP's Design Quality measures show satisfactory performance based on scores of final designs released for installation. There was a small percentage (less than 10%) which were problematic during Outage 1R18, and they have been corrected and evaluated for cause correction to prevent recurrence. The DCISC should continue to monitor design quality.

4.6

DCPP is satisfactorily addressing the commonalities among the three reactor trips caused by flashovers of insulators and lightning arresters. The common cause was contamination by dirt, dust and salt. Corrective actions include replacement of susceptible materials and changes to how the contamination is removed.

4.7

DCPP is proceeding satisfactorily with its Seismic Fragility Probability Risk Assessment (SFPPRA) analysis using the latest methodology and seismic response spectra. SFPPRA is a very useful tool, because it provides information about the likelihood of different plant damage states caused by earthquakes. Although early, there have been no problems identified. Because the seismic PRA provides improved information on the most probable plant damage states that could be caused by a beyond-design-basis (BDB) earthquake, the DCISC recommends that this information be used in developing the DCPP FLEX strategy to respond to beyond-design-basis earthquakes. We understand that a seismic analysis of the FLEX equipment for BDB seismic motions is under way and expect to review it sometime soon. We believe that it is equally important that all other factors that could affect the plant staff's ability to implement FLEX procedures effectively following a BDB earthquake, including workspace seismic safety and

post-earthquake access/egress for plant staff, also be identified and evaluated. The DCISC should continue to monitor the SFPRA analysis and review how the DCPD FLEX program uses SFPRA results and assessments of BDB earthquake impacts on plant staff safety and access/egress capabilities, to develop its FLEX mitigation strategies for BDB earthquakes.

4.8

DCPD appears to be appropriately transitioning from its current “Deterministic” Fire Protection Program (FPP) to the new “Deterministic and risk-informed” National Fire Protection Association Standard NFPA-805. The new program brings about benefits in improved nuclear safety, cost savings, and a more realistic fire protection program.

4.9

DCPD maintains tight controls on Reactivity Management, a direct measure of nuclear safety. Unit 1 is in a healthy state according to DCPD’s measures, and Unit 2 needs improvement; however, Unit 2’s lower performance was caused by events other than Reactivity Management per se. They were reactor trips caused by 500 kV switchyard problems, which, though causing reactor trips which significantly affect reactivity, were not directly in the purview of the Reactivity Management Program.

4.10

The DCPD 2R18 Outage Safety Plan, used to assure nuclear safety during the outage, appeared comprehensive and clearly written, applying the Defense-in-Depth philosophy to prevent accidents and to mitigate the effects of accidents, if they were to occur.

4.11

DCISC meetings with the NRC Resident or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCPD.

4.12

DCPD’s Chemistry Program is effective and achieving good results. Primary and Secondary System chemistry levels are generally within specifications. Discharge of liquid radioactive waste is well within plant and regulatory limits.

5.0 Recommendations:

None

6.0 References

6.1

“Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012”, Approved October 9, 2012, Volume II, Exhibit D.9, Section 3.1 “Update on Upgraded MIDAS.”

6.2

Ibid., Exhibit D.5, Section 3.11, “Safety Security Interface.”

6.3

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 22, 2014, Volume

II, Exhibit B.3, “New Spent Fuel Pool Instrumentation.”

6.4

Ibid.

6.5

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.2 ,Section 3.5, “Emergency Auxiliary Saltwater Pump Training.”

6.6

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014,” Approved October 22, 2014, Volume II, Exhibit D.9, Section 3.2, “Design Quality Effectiveness Review.”

6.7

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014,” Approved October 22, 2014, Volume II, Exhibit D.6, Section 3.2, “Unplanned Reactor Trips During the Period 2011 Through 2013.”

6.8

Ibid., Exhibit D.7, Section 3.12, “Status of Probabilistic Fragility Analysis for the Seismic PRA.”

6.9

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.7 ,Section 3.8, “Fire Protection: NFPA 805, LBVP and NRC Triennial Audit.”

6.10

Ibid., Exhibit D.6, Section 3.5, “Status of the Reactivity Management Program.”

6.11

Ibid., Exhibit D.13, Section 3.2, “Refueling Outage 1R18 Plan and Outage Safety Plan.”

6.12

Ibid, Exhibit D.8, Section 3.8, “Meeting with NRC Senior Resident Inspector.”

6.13

Ibid., Exhibit D.2, Exhibit 3.10, “QV Audit of Chemistry Program.”

25th Annual Report, Volume 2, Exhibit D.3, Diablo Canyon Independent Safety Committee Report on Fact Finding Meeting at DCPD on September 17–18, 2014 by Peter Lam, Member, and David C. Linnen, Consultant

1.0 Summary

The results of the September 17–18, 2014 fact-finding trip to the Diablo Canyon Power Plant in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Maintenance Department Performance
2. Results of Recent Quality Verification Audits
3. Self-Assessment Program
4. System Engineering Function
5. DC Power System Update
6. Reactor Coolant System Update
7. Vibration Monitoring Program
8. Compressed Air System Health
9. Meeting with NRC Senior Resident Inspector
10. Meeting with DCPD Site Vice President
11. Margin Management Program

2.0 Introduction

This fact-finding trip to the DCPD 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 DCPD 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 Maintenance Department Performance

The DCISC Fact-finding Team met with John MacIntyre, Director, Maintenance Services. The DCISC last reviewed this topic in January 2013 when it concluded:

Actions taken to reduce the number of adverse events due to maintenance are nearing completion. Maintenance performance indicators appear to be improving. Actions are being taken to maintain a well-staffed and trained maintenance workforce and to communicate more openly and effectively with worker level personnel.

Mr. MacIntyre noted that DCPD has been taking substantial action at the manager and director level to achieve and maintain a high level of maintenance performance at the worker level. Station directors and managers each observe workers on a predetermined area of performance associated with a scheduled work activity one day out of every eleven. After the observations are completed these senior personnel later debrief DCPD's Plant Manager and Senior Operations manager regarding the results of their observations. The results of these debriefs can lead to modifying training or taking other corrective actions as needed.

Instances where rework was required are provided to DCPD's Training Group, which incorporates those issues in future training to avoid repeats of problems that lead to the need for rework. Along this line Mr. MacIntyre indicated that important objectives of every maintenance activity are, obviously, to not leave the work area in an undesirable condition after the work is completed and to ensure that the condition of repaired equipment is such that it will be fully operational upon completion of the required maintenance.

Mr. MacIntyre further noted that, after the upcoming Refueling Outage 2R18 (September- October 2014), an evaluation will be conducted of the effectiveness of the training that was delivered to improve maintenance performance. He also stated that such an evaluation is routinely conducted at appropriate times after this type of training is provided.

As background information, Mr. MacIntyre stated that Human Performance, Nuclear Professionalism, and management of Risk and Reliability have been important areas with continuing emphasis throughout the station. Certain events such as the failure of bushings on high voltage systems have further elevated the focus on these aspects of plant operation and maintenance.

It was further noted that Maintenance Services has its own small group of Performance Improvement Coordinators whose members include a Senior Reactor Operator and prior Maintenance Managers. The department also has a Corrective Action Review Board. Both of these groups help to foster a focus on the impact that maintenance can have on plant operation.

The Fact-finding Team was provided with a comparison of Outage Rework Events that focused on the outages since early 2011, as follows:

Refueling Outage	Number of Outage Rework Events
2R16 (Spring 2011)	63
1R17 (Spring 2012)	92
2R17 (Spring 2013)	26
1R18 (Spring 2014)	19

The Fact-finding Team examined a number of station Performance Indicators related to Maintenance as follows:

- Maintenance performance with respect to the station's Corrective Action Program had received a Green (top grade) rating since the beginning of 2014 but had dropped to Yellow (needing improvement) during

June and July. This rating is a composite of 12 related individual indicators, one of which, Corrective Actions to Prevent Recurrence that are greater than 12 months old, was the primary contributor to the Yellow rating of this composite indicator.

- Approved Deferrals of Unit 1 Preventive Maintenance Activities was rated Red (Unsatisfactory) in recent months and was Yellow (Deficient) for Unit 2. All of the deferrals were cited as being outage related.
- Performance has been good with respect to Foreign Material Exclusion (FME), that is, the prevention of unwanted debris and materials from entering open plant systems during maintenance, inspection, or modification activities. The monthly performance ratings have been Green, the highest rating, for every month of the past 12 months except one. The one month exception was February 2014, during which Refueling Outage 1R18 was in progress. Although there were a number of FME events during 1R18, they represented a 60 percent reduction from the number during the preceding refueling outage 2R17.
- The volume of backlogs for Maintenance Procedure Revisions has been rated Green (top grade) throughout most of 2014, including the most current month.

Conclusions:

Considerable management attention is being directed at minimizing the need for maintenance rework, and improvements appear to be emerging in this area. The numbers of rework events during the two most recent refueling outages, 2R17 and 1R18, were considerably lower than in preceding outages. Likewise, Foreign Material Exclusion Events appear to be more effectively avoided. Delays in taking corrective action to prevent recurrence of identified problems appear to have been a recent, short term problem, but should be of continued focus. Soon after DCP's completion and analysis of its upcoming Refueling Outage 2R18, the DCISC should review the outage results, including a focus on Maintenance effectiveness. This could be accomplished during a Fact-finding Visit or through a Maintenance presentation at the February 2015 Public Meeting.

Recommendations:

None

3.2 Recent Quality Verification (QV) Reviews of DCP

The DCISC Fact-finding Team met with Dan Stermer, Shift Manager on rotational assignment to the QV Department from Operations. The DCISC last reviewed QV activities during a presentation by DCP's Director of Quality Verification, Jacquie Hinds, at DCISC's October 9/10, 2013 Public Meeting. The DCISC's last Fact-finding Visit that reviewed QV activities was in August when the DCISC reviewed QV's Audit of Chemistry Program Implementation, when the DCISC concluded:

DCP's Chemistry Program implementation was favorably assessed by an experienced and well-staffed team of auditors. There were no findings in the audit, two deficiencies in the radiological chemistry area, and seven non-radiological deficiencies. Chemistry technicians were recognized for their increased use of the Corrective Action Program in identifying, documenting, analyzing, and solving problems. Appropriate management personnel were in attendance at both the pre- and post-audit conferences.

Mr. Stermer stated that he has been in the on-loan position since November 2013. He has been involved with the assessment group that focuses on work planning and management, problem identification and resolution, Operations, Learning Services, and Engineering. He noted that rotational personnel are serving in QV to assess station performance in various areas while auditors are full-time QV personnel who are devoted to examining compliance with the NRC's requirements in 10CFR50 Part B. He noted further that DCP has received good

feedback from the NRC regarding DCP's performance in its auditing function.

Mr. Stermer noted that assessment consists of reviewing plant status, observing activities, and sorting through applicable Notifications and written observations regarding plant activities and conditions to identify intra-discipline and cross-discipline issues that need to be addressed by station managers and supervisors. Assessors also observe audits to obtain a regulatory perspective that is also helpful for assessing performance. Assessors are able to identify areas and methods for performance improvement that go beyond compliance with Federal regulations. An example of this could be an observed need to strengthen communications between or within work groups. Another cited by Mr. Stermer could be the need for better understanding of the value of a particular approach to a task. He noted that plants that are performing well are also deriving much benefit from their Quality Group.

The Fact-finding Team reviewed the results of the following QV Audits (as Audits these activities assess station performance with respect to Federal Regulations):

- May 16, 2014 Report on DCP's Biennial Audit of DCP's Radiation Protection (RP) Program and the RP Program for DCP's Independent Spent Fuel Storage Installation (ISFSI). The audit concluded that "DCP and the ISFSI RP Programs satisfy applicable regulatory criteria and have been effectively implemented for the period from April 17, 2012 through April 21, 2014." The report also identified what it referred to as "Key takeaways, as follows:
 - Program reviews were untimely.
 - Controls for outdoor storage needed to be strengthened to be consistent with industry best practices.
 - Guidance was recommended for performing radiological risk assessments for work that is not associated with work orders.

A "Positive Performance" was noted in that the radiological risk process is integrated with station risk, and effective measures to reduce radiological risk have been implemented during 1R18 and online operation.

- June 12, 2014 Report on "2014 Operations and Technical Specifications Audit." The audit team concluded that "The implementation of the Diablo Canyon Power Plant (DCP) Operations Program has been effective to ensure the plant was operated in a safe and reliable manner and ensured safety-related and risk significant systems were maintained in an operable condition for the audit period, July 19, 2012 through May 29, 2014." The audit Team also concluded that DCP and its ISFSI "Technical Specifications Program has effectively implemented the programs and processes established to ensure maintenance of and conformance to DCP and ISFSI Technical Specifications, Technical Requirements Manual per 10 CFR 50.36, "Technical specifications," and the Operating License for the audit period, July 15, 2013 through May 29, 2014." The audit had one finding as follows: "DCP performance for LCO (i.e. Limiting Conditions of Operation) entries has been unsatisfactory (red) for all but two months since June 2013." The team further commented: "The team views this as a missed opportunity for Operations to demonstrate leadership and drive resolution of this long-standing adverse trend."

Conclusions:

The station's current staffing approach in which qualified QV staff members are responsible for managing regulatory audits, while DCP line personnel are loaned to QV and are utilized for conducting assessments against best practices, is an insightful and effective approach to fostering the achievement of quality work throughout the station. Also, the participation of DCP's on loan line personnel in regulatory audits not only helps these personnel gain a first-hand understanding of regulatory requirements and processes, but also provides a vehicle for

conveying this information back to their own line organizations within DCP. The QV audits reviewed by the DCISC Fact-finding Team were clear, detailed, and focused.

Recommendations:

None

3.3 Self-Assessment Program

The DCISC Fact-finding Team met with Anne Shatara, Performance Improvement Supervisor. The DCISC last reviewed this topic in November 2011, when it concluded the following:

DCPP's program for performing (and reviewing the effectiveness of its) self-assessments appears to be effective.

The objective of the Self-Assessment Program (S-AP) is to promote continuous improvement. Current performance is compared to management expectations, industry standards of excellence, and regulatory requirements to identify areas needing improvement. Self-assessments also identify strengths applicable to other station groups. DCP has six types of self-assessments:

1. Formal Self-Assessment—an evaluation of a particular program, process, system or potential problem area using a structured methodology involving scheduling, planning, one or more industry peers, a team of DCP personnel, training, documentation in written reports and Notifications, and report-outs to management and follow-through.
2. Independent Assessment—an evaluation of organizations, programs, processes, activities, potential problem areas, etc. that are routinely scheduled and performed by independent oversight groups such as QV, NSOC, etc.
3. Ongoing Self-Assessment—an ongoing evaluation of performance and processes performed on a regular basis to check that standards are being achieved. These activities are performed as specified by the respective program or process requirements. Examples of ongoing self-assessment activities include; management observations, trend analyses, critiques, corrective action effectiveness reviews, etc.
4. Quick Hit Assessment—a narrow, snapshot look at a specific program, process, or issue, usually of one-to-two day duration, typically performed by one or two persons.
5. Recurring Assessment—an assessment having a specified recurrent frequency.
6. Outside Assessment—Assessments at DCP conducted by outside groups. However, a DCP team lead and/or sponsor is/are typically assigned to ensure “DCP ownership” of the process and the final product. This “Ownership” is not intended to influence the objectivity or the determinations of the outside group, but rather to ensure that DCP expectations are met.

The DCP S-AP is described and controlled by Procedure OM15. ID4, “Self-Assessment and Benchmarking.” This procedure describes the various station responsibilities for performing, reviewing, reporting and approving the various types of S-As. It outlines the process and requirements for all types of S-As, especially formal S-As. Formal S-As are subject to effectiveness reviews approximately six months after the final S-A recommendation is complete. The Self-Assessment Review Board (SARB) reviews each effectiveness review to determine if results have been achieved as expected.

The DCP SARB, consisting of the Site Senior Management personnel, sets the number of formal S-As for the upcoming calendar year. DCP typically performs 10-to-15 formal self-assessments per year as well as typically 10 benchmarking trips to other nuclear facilities. The self-assessments are planned in advance for the year ahead

and are carried out in accordance with the S-A procedure milestone schedule. The SA Coordinator keeps track of the progress of each S-A with the milestone schedule. Effectiveness reviews are performed on each S-A upon completion.

DCPP Self-Assessments are monitored and reported in the monthly Plant Performance Improvement Report (PPIR). The report lists all ongoing and planned formal S-As along with the lead organization/manager, milestones progress compared to pre-defined time-tables, and effectiveness review status. As of the date of this Fact-finding meeting, the overall S-AP health was reported as “green,” i.e. Top Rating. There were a number of White ratings, each of which served to indicate that the particular milestone for the S-A had not yet become due, rather than having become delinquent. Therefore, at the time of this review the station had met every predefined milestone for the 2014 Formal Self-assessments.

Ms. Shatara brought a large number of station self-assessment (S-A) reports to the Fact-finding Meeting, and from these the Fact-Finding Team selected several for review. Brief summaries of the station strengths and improvement opportunities as identified in the two reports are listed below:

DCPP S-A Report on Pre-NRC Inspection of Problem Identification and Resolution Function

Pre-NRC Inspection Conducted 4/21/14—4/24/14

Summary of Results

Strengths

- None

Improvement Opportunities

- Weekly audits of equipment deficiencies related to operator workarounds were not regularly logged as required.
- Several Prompt Operability Assessments (POAs) were not updated with required refueling outage exit justifications.
- Active POAs were not always reviewed at daily management meetings.
- Some long term POAs did not meet expectations for resolution timeliness or for documentation of justification for remaining open.
- Operability Determinations were not performed on some components leaking Boric Acid.
- A need to evaluate the administration of Prompt Operability Assessments was cited in the report.
- One reportability determination was not completed within the station’s required period of 30 days.
- The requirement to accompany Extent of Condition evaluations with Operability Determinations was not documented in the governing plant procedure.

DCPP S-A on Foreign Material Exclusion (FME) Program

Summary of Results

Strengths

FME covers for station vent piping surpassed industry standards.

- FME practices at the reactor cavity were recognized as a strength as were the knowledge of the involved personnel and the coaching they provided.

Improvement Opportunities

- Workers in the Spent Fuel Pool area wore loose items under their protective clothing, which is contrary to industry best practices.

Conclusions:

DCPP's Self-Assessment Program appears to be in continuing good health. The program administrators are knowledgeable, highly organized, and efficient. The DCISC should continue to review this on a regular basis, which means about two years hence.

Recommendations:

None

3.4 System Health and System Engineering Function

The DCISC Fact-finding Team met with Ryan West, Instrumentation, Control, and Electrical Systems Engineering Manager. The DCISC last reviewed this topic in March 2011 when it concluded:

Improvements in the System Engineering Program combined with those in the Plant Health Committee process to achieve a better focus on system health have good potential for maintaining DCP systems healthy. DCP system health has improved since these changes were made.

The four levels of system health are as follows:

Healthy

- Green indicates the system has minor or no performance issues.
- White indicates all actions to correct major performance/health issues complete, or interim corrective actions are in place, and performance is trending towards a goal or target.

Unhealthy

- Yellow indicates the system has major performance/health issues with interim and/or final corrective actions scheduled for implementation.
- Red indicates the system has major performance/health issues and actions are being developed, but not approved by the PHC.

The Fact-finding Team was provided with ratings of current system health for Red and Yellow systems, which are shown in the following tables for Unit 1 and Unit 2 respectively. The tables also briefly summarize the actions planned and expected times to return the systems to healthy.

Unit 1

System	Health Color	Months Unhealthy	Expected Return to Healthy	Actions for Healthy

Reactor Coolant System (RCS)	Yellow	6	12/14	Address Increased RCS Leak Rate
Emergency Diesel Generator	Yellow	45	11/15	Increase EDG Load Margin
HVAC--Containment Fan Cooler Unit	Yellow	33	11/15	Address CFCU Coupling Damage
Fire Protection	Red	1	9/14	Repair One Remaining Penetration
500 kV	Yellow	3	1R19	Replace 500 kV Lightning Arresters
120 V	Yellow	13	1R20	Improve Inverter Reliability

Unit 2

System	Health Color	Months Unhealthy	Expected Return to Healthy	Actions for Healthy
Fire Protection	Red	1	9/14	Repair One Remaining Penetration
Emergency Diesel Generator (EDG)	Red	44	11/15	Increase EDG Load Margin
Heating Ventilating and Air Condition	Yellow	33	11/15	CFCU Timer Modification
120 V	Yellow	14	2R19	Improve Inverter Reliability
500 kV	Yellow	6	2R19	Replace 500 kV Lightning Arresters
230 kV	Yellow	3	2R18	Implement Reliability Project

DCPP system engineers are responsible for the following:

- Support Operations and Maintenance
- Resolution of System Problems
- Design Change Process Project Team Member
- Perform Routine Technical Reviews and Evaluations
- System Health Reporting
- Support of the Plant Health Process
- System Performance Monitoring
- System Testing (test lead or test performer)
- System Design and Licensing Basis Owner
- Operating Experience Reviews

System Engineers maintain Health Reports for their respective systems, each of which contains the following

information:

- Scorecard
 - Executive Summary
 - Scores (includes points for each of the following items)
 - Reliability
 - Maintenance
 - Material/Equipment Condition and Corrective Actions
 - Operations Concerns
 - Performance Monitoring
 - Design
 - Score Override Justification
 - Indicator Description
 - Indicator Override Justification
- Indicator Comments (e.g., critical component failures, aging issues, adverse trends, design deficiencies, etc.)
- Action Plan (to return to healthy status—see below)
- Operating Experience
- Predictive Parameters
- Contacts
- Analysis

The Action Plans include the reason for the problem condition, Action Plan Owner, Corrective Action Program (CAP) Notification number, tracking number, action type, status, due date, responsible individual, last updated date, whether required for healthy, and whether in Top 10 plant action items. The reports have proven to be useful tools for tracking system performance, needs, and actions planned and being taken to address those needs.

The usefulness of the above mentioned CAP tools and the initiative taken by the station have been recently reflected in a sharp and significant decrease in the number of Open Engineering Notifications. The decrease has been from over 500 open Notifications in early 2013 to being maintained at about 300 since mid-2014. The station has surpassed its initial goal of reducing the number of open Notifications to 400.

Conclusions:

The System Engineering function continues to provide an effective method for evaluating and tracking system health, for identifying priorities, and for determining, planning, and undertaking needed actions to maintain system health. Also, the significant reduction in Open Engineering Notifications is a reflection of an increased focus by the Engineering Department on addressing identified issues. However, two systems in both Units 1 and 2, Emergency Diesel Generators (EDGs) and Heating Ventilation and Air Conditioning (HVAC) have been rated as being Unhealthy for a considerable period of time. Although both of these systems were

reviewed by the DCISC during the first quarter of 2014, the DCISC should consider conducting a progress check on these systems during the first quarter of 2015.

Recommendations:

None

3.5 DC Power System Update

The DCISC Fact-finding Team met with Ryan West, ICE Systems Engineering Manager, and Gary Segich, System Engineer. The DCISC last reviewed this topic in April 2011, Reference 6.5, when it concluded:

The 125-Volt DCPD Direct Current Power Systems (DCPS) appeared to be appropriately designed and installed for their normal and emergency functions. System Health was Yellow (unacceptable but operable) for Unit 1 and White (acceptable) for Unit 2 with plans to return to Green health. The System Engineer appeared to be knowledgeable of and pro-active for his system.

The battery-powered DCPD 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:

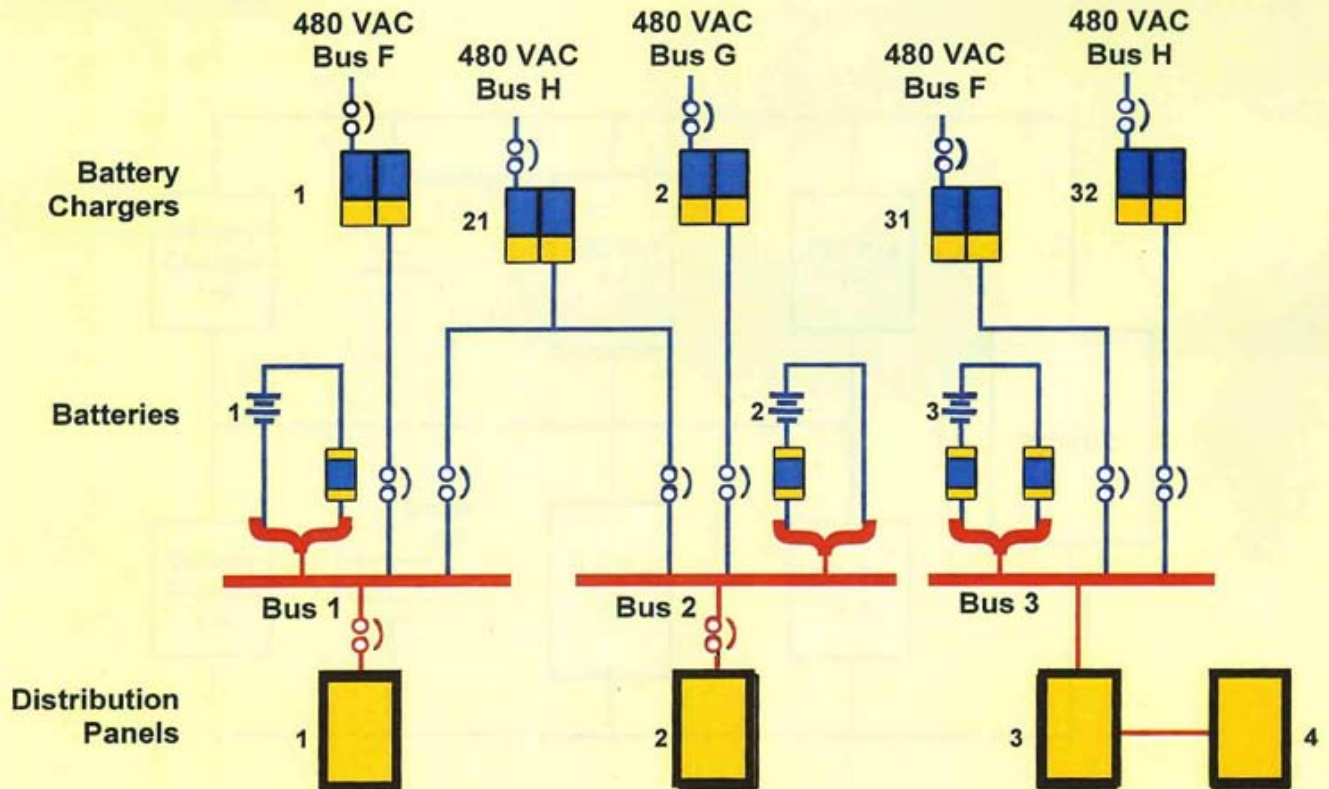
1. Vital 125 VDC
2. Non-vital 125/150 VDC

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.

Vital 125 VDC



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, DCPD 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 that has been determined to be experienced in 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, and the three remaining breakers will be 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 battery manufacturer is recommending analysis of cells to determine if cell or battery replacement is necessary. Replacement cells will be furnished under warranty, and replacement is targeted for refueling outage 2R18.

Conclusions:

The 125-Volt DCPD 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.

Recommendations:

None

3.6 Reactor Coolant System Update

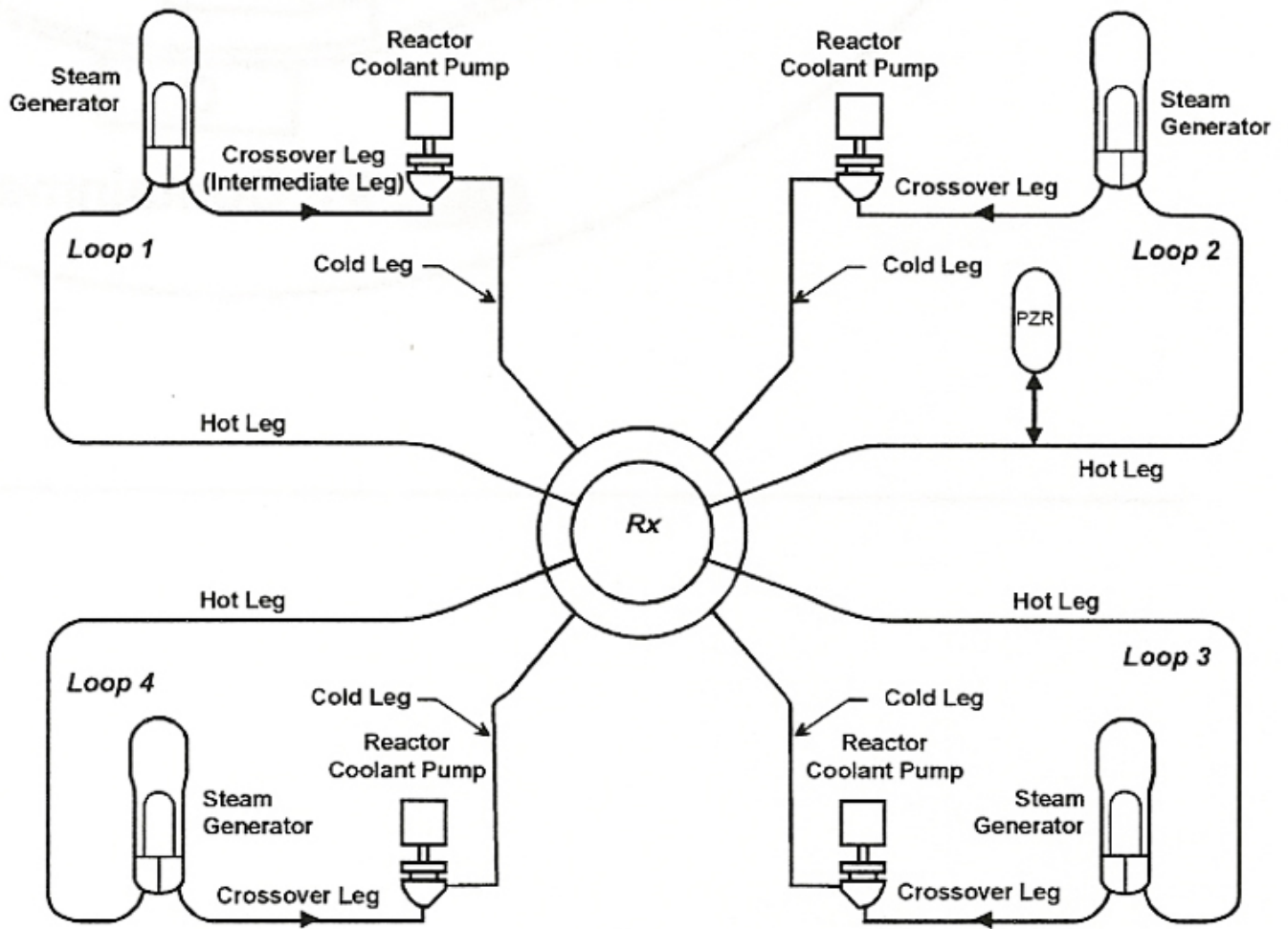
The DCISC Fact-finding Team met with Eric Brackeen, Reactor Coolant System (RCS) System Engineer, and Mike Nowlen, Predictive Maintenance Supervisor, to review the status of the RCS. The DCISC last reviewed the RCS in May 2009 when it concluded the following:

The Reactor Coolant System has been operating well, but the system engineer has downgraded its health from Green to White (satisfactory) due to a problem with the Pressurizer Steam Relief Valves which is being resolved satisfactorily. The System Engineer was knowledgeable about the system and appeared pro-active in keeping it healthy.

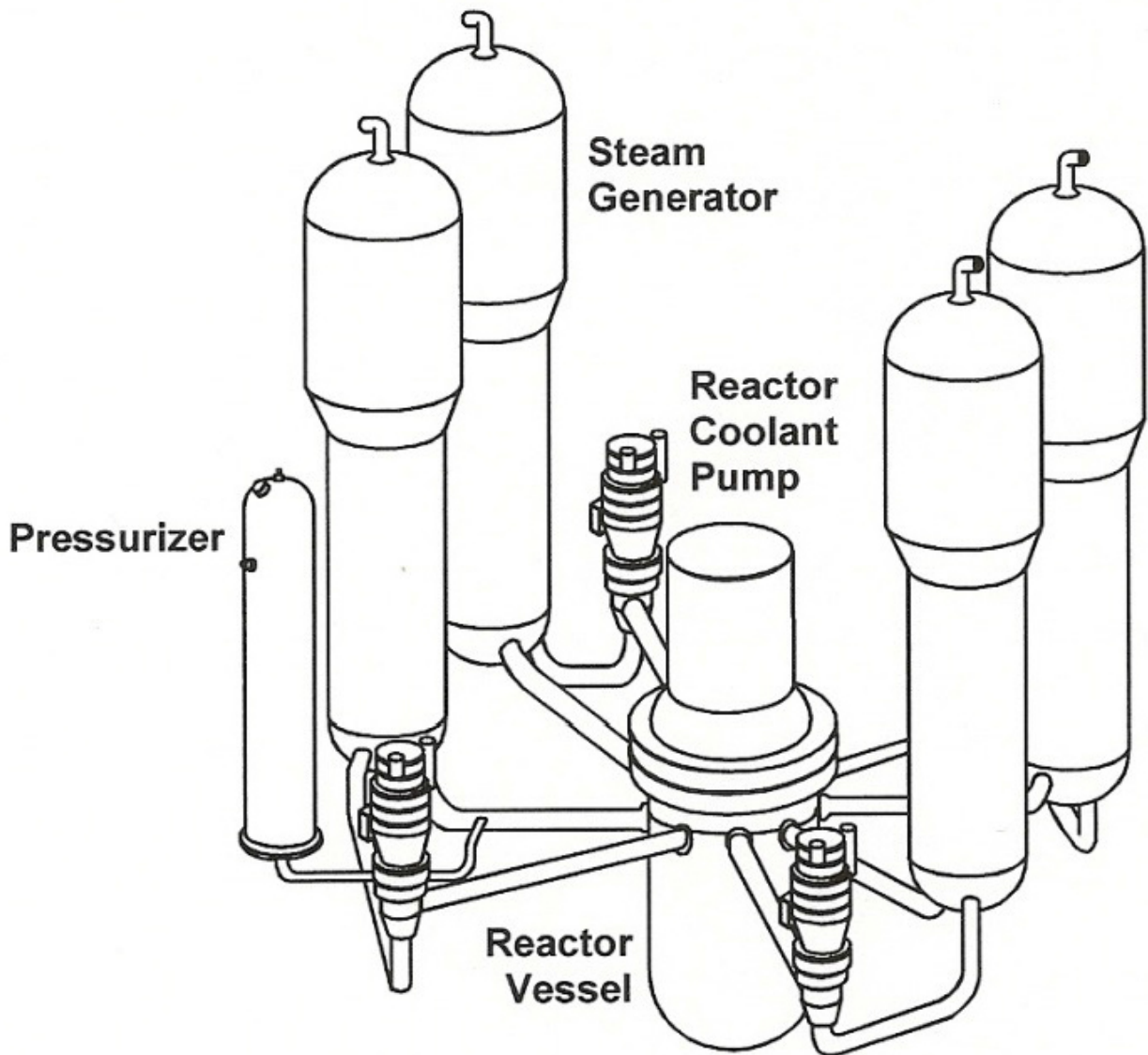
The purpose of the RCS is to transfer heat generated by the fission process in the reactor core to the secondary plant steam system as well as provide coolant pressure boundary, serve as the second barrier against release of fission products, and to promote natural circulation. The system consists of:

- Reactor vessel containing the nuclear core
- Pressurizer connected to the system to maintain pressure
- Four parallel heat transfer loops connected to the reactor vessel with each loop consisting of the following:
 - One steam generator which serves as a heat sink and heat exchanger to transfer heat to the secondary steam plant
 - One reactor coolant pump which circulates the loop water
 - Interconnecting loop piping
 - Taps for parameter (temperature, pressure, flow) measuring instruments

A basic RCS piping flow diagram is shown below:



The physical arrangement of the RCS is as follows:



The RCS is capable of (1) +10% step power changes, (2) 5%/minute ramp from 100% to 15% power, and (3) 95% load rejection. The RCS is able to maintain its integrity during a Design Earthquake, a Double Design Earthquake (0.4g horizontal and 2/3 that for vertical motion), or (3) a Hosgri Earthquake. The RCS can be shutdown from either the Control Room or Hot Shutdown Panel.

At the time prior to DCISC's previous review of this System the health ratings of the RCSs in both Units 1 & 2 were primarily affected by a design problem associated with the Pressurizer Safety Valves. The relief valves were water-seated, and each had a loop seal associated with the valve. The combination of these two designs could have created a water hammer in a segment of downstream piping that is not rated for water hammer. This problem was corrected since DCISC's previous Fact-finding review of this system through replacement of the water seated relief valves with steam seated internals during Refueling Outages 2R15 and 1R16. However, following this conversion, both Unit 1 and Unit 2 valves have experienced weepage (i.e. slight leakage) during unit pressurization in all outages except 2R16. This new condition requires that a minimum of 18 hours of critical path time be allocated each outage to allow a slow ramp rate to normal operating pressure along with multiple hold times at various increasing pressures to thermally soak the Pressurizer Safety Valves. The station is currently working with a consulting firm to analyze whether corrective actions can be taken to assist in reducing these delays in return to power.

Another condition affecting both units was identified during DCP's root cause evaluation of seal failures during 2R17. This is a design deficiency in the #2 seal leakoff lines that can inhibit the lateral movement of the number 2 seal of the 3-stage pump shaft seals. The seals are designed to move laterally with the shaft. Although these movements are extremely small, very small amounts of debris can inhibit this lateral movement, which can lead to higher than desired leakage of Reactor Coolant. The station is in the early stages of determining the approach to take with regard to this issue.

The accident at Fukushima has prompted the U.S. nuclear industry to examine implications for its own plants. One implication pertaining to the Reactor Coolant System has involved actions that could be taken to reduce possible paths for loss of reactor coolant. One impact of this examination is that PG&E has made a regulatory commitment to the NRC to install what are referred to as SHIELD passive thermal shutdown seals in all of DCP's Reactor Coolant Pumps no later than in the two R19 Refueling Outages. These seals would be operated when the pumps are stopped and if both forms of seal cooling are lost, and are they designed to reduce each pump's seal leakage to less than 1 gallon per minute (gpm) compared to the current design leakage of 25 gpm for each pump.

Two notable events occurred during the past two years pertaining to the Reactor Coolant System. Both involved failures or excessive leakage from Reactor Coolant Pump seals. Both were evaluated in depth by the station through formal Root Cause Evaluations. Both were also examined by DCISC during Fact-finding Visits in September 2013 and April 2014 respectively. Brief encapsulations of the two events and of DCISC's Fact-finding write-ups are as follows:

RCP 2-2 Seal Failure in February 2013 While Taking Unit 2 off-line for Refueling Outage 2R17

- All 12 of the seals for the four pumps (three on each pump) had damage that exceeded inspection criteria
- Foreign material had been transported from the Reactor Coolant Drain Tank (RCDT) drain header into the RCP seal packages, damaging the No. 2 and 3 seals in RCP's 2-1 and 2-2.
- Foreign material had been transported into all RCP seal packages from the Seal Injection System (SIS) and/or the Reactor RCS
- The Root Causes of the problems that were determined in a thorough analysis by DCP pertained to inadequate procedural guidance, unclear coordination between alignment procedures, and weak historical Foreign Material Exclusion (FME) practices that allowed foreign material into the Safety Injection System downstream of the seal injection filters

DCISC's September 2013 Fact-finding review of the above event resulted in the following Conclusion:

DCP responded properly to the failure of the seals in its Unit 2 Reactor Coolant Pumps in Outage 2R17 by replacing most seal parts and initiating a Root Cause Evaluation. The evaluation appeared comprehensive, correctly identified the root and contributing causes, and specified appropriate corrective actions to prevent recurrence. The DCISC should follow up on DCP's corrective actions and effectiveness review.

Reactor Coolant Pump 1-3 Seal Leakage

- This problem was experienced in Unit 1's Reactor Coolant Pump 1-3 (RCP 1-3) while starting up and return to power operation following Refueling Outage 1R18 in March 2014. This resulted in the need for a 10-day forced outage (1X19).
- The leakage problem was accompanied by vibration which worsened as the Unit continued in power operation for a few days after startup. This necessitated a plant shutdown.

- The cause was determined to be human error during the realignment of the pump and motor shafts during the outage.

DCISC's April 2014 Fact-finding review of the above event resulted in the following Conclusion:

DCPP's analytical and remedial actions, including the use of vendor expertise and input as well as the experiences of other plants in the industry, appear to have been appropriate and effective. DCP's Quality Verification Group performed an insightful assessment of the key aspects of this event. The resulting twelve-day forced outage appears to have been an avoidable event. The identified root cause of the seal leakage appears reasonable, as do the station's intended follow-up steps to prevent recurrence.

Conclusions:

There are several aspects of DCP's Reactor Coolant Systems that need to be addressed in both Units in order to return the systems of both Units to Green Health status, including:

- The conversion from water seated to steam seated Pressurizer Safety Valves for both Units 1 and Unit 2 has resulted in leakage during startups and the accompanying need for multiple hold points at various increasing pressures during plant startups in order to thermally soak the Pressurizer Safety Valves.
- A design deficiency in the number 2 seal leakoff lines of the Reactor Coolant Pumps in both Units can inhibit the lateral movement of the number 2 seal of the 3-stage pump shaft seals, which can lead to higher than desired leakage of Reactor Coolant.
- A regulatory commitment to the NRC, in follow-up to the accident at Fukushima, needs to be fulfilled to install what are referred to as SHIELD passive thermal shutdown seals. These seals need to be installed in all of DCP's Reactor Coolant Pumps no later than in the two R19 Refueling Outages in order to significantly reduce reactor coolant leakage in post-accident situations.

The DCISC should consider conducting a follow-up Fact-finding review of the Reactor Coolant System in the next twelve months, and the review should be allocated more than the usual time because of the complexities.

Recommendations:

None

3.7 Vibration Monitoring

The DCISC Fact-finding Team met with Mike Nowlen, Predictive Maintenance Supervisor. The DCISC last reviewed Vibration Monitoring, as part of the Predictive Maintenance function, in December 2011, when it concluded:

Vibration analysis is an important tool to help prevent rotating equipment failures. The DCP Machine Vibration Program appeared comprehensive and effective. The process by which non-normal vibration is classified, analyzed, and corrected was found to be systematic and well-defined.

As part of its Reliability Centered Maintenance program DCP has a Predictive Maintenance Program (PMP) controlled by Procedure MA1.DC52, "Predictive Maintenance Program." The stated purpose is to enhance plant safety and reliability through early detection and diagnosis of equipment degradation prior to equipment failure.

The Predictive Maintenance Organization does this through use of installed and portable diagnostic tools, which monitor selected equipment parameters. The organization maintains a data base of identified equipment and parameters for which they establish base lines, set alert points and coordinate predictive maintenance activities. The Engineering Director has overall responsibility for the PMP. The PMP utilizes the following techniques:

- Vibration Monitoring
- Lubrication Analysis
- Infrared Thermography

Three personnel perform the Vibration Monitoring function, a fourth individual supports Lubrication Analysis, and a fifth person supports Infrared Thermography.

DCPP has permanent vibration sensors with remote Control Room readouts on its Reactor Coolant Pumps, Turbine Generators, and Main Feedwater Pumps. Another approximately 300 components are monitored mostly monthly with portable vibration detecting equipment. The latest acquired data are compared with previous data for trends, and if significant degradation exists, a Notification is initiated, and components considered “Degraded” are placed on a “Watch List.” Not only does the Vibration Analyst identify the fault, but is also expected to provide a corrective action Recommendation. Following corrective action by Maintenance, a confirmatory vibration survey is performed to assure the correction was effective.

The DCISC Fact-finding Team was provided a copy of the Predictive Maintenance Watch List dated September 14, 2014. The list contained several dozen various items/conditions that needed to be addressed and that had been identified through Vibration Monitoring, Lubrication Analysis, or Infrared Thermography. Less than a third of the listed items pertained to vibration. The few vibration issues of any significance are listed below:

Item	Date Identified	Estimated Completion
Cyber Diode Limits RCP Vibration Monitoring	2/7/13	10/10/15
Containment Fan Cooler Unit 1–2 Vibration	4/23/14	8/26/14
Main Feed Pump 1–2 Vapor Extractor Vibration	4//29/14	10/1/15
Gland Exhaust Fan 2–1 Vibration Increase	10/30/13	12/22/14

Conclusions:

DCPP appears to have an active and effective vibration monitoring effort as part of its Predictive Maintenance Program. The number of open vibration issues appears to be controlled effectively.

Recommendations:

None

3.8 Compressed Air System

The DCISC Fact-finding Team met with Mike Nowlen, Predictive Maintenance Supervisor, Jason Cook, System Engineer, and Surendra Sabharwal, Senior Advising Engineer. . The DCISC last reviewed the Compressed Air System, in December 2011, when it concluded:

DCPP’s Compressed Air System health is rated Green (healthy) and the system appeared to be running as designed. The System Engineer appeared knowledgeable and proactive about his system.

The Compressed Air System is common to and serves both units and is divided into two Subsystems: Instrument Air System (IAS) and Service Air System (SAS). The IAS is Safety Class 2, having redundancy and high-quality components typical of Class 1, but it is not designed for seismic loads or supplied by emergency electrical power. IAS consists of three primary full-capacity air compressors, Plant Air Compressors (PACs) 5, 6, and 7, which supply clean, dry air pressure primarily to air-operated valves (AOVs) and instruments needed to run the plant and for safe shutdown. Normally one compressor is required for plant operation. These three compressors are rotated in succession to serve the plant with each compressor operating for a week at a time.

Because the IAS is not fully safety-related, the valves required for safe shutdown are supplied with an additional source of assured air from the Backup Air/Nitrogen System (BANS), a Class 1 design. The BANS is a passive pressure system with air or nitrogen accumulators located with and dedicated to each safe-shutdown valve. They are seismically designed to resist earthquakes and require no electrical power. Each is designed with capacity adequate for valve operation to assure safe shutdown.

Four additional full-capacity compressors (PAC 0-1 through 0-4) are maintained on site and are intended to serve the IAS at any time when called upon and are also to serve in a secondary role during refueling outages. During outages, two additional diesel driven air compressors are brought onsite and are the primary source of compressed air during the outages.

At the time of this Fact-finding Visit, the system overall was rated Yellow, deficient. The System Health Report, dated September 17, 2014, that was provided to the Fact-finding Team at the time of the visit, covering the period July 1, 2014 through September 30, 2014, noted that the scoring system actually justified a White rating, needing improvement, and that plans were in place to return to a Green (top) rating. However, the rating was “Defaulted” to Yellow “To add station visibility” to recent reliability issues with three compressors, PACs 05, 06, and 07. The System Health Report contained the following information in support of the above overall Yellow system rating:

- PAC 0-5 failed due to the high pressure element, low pressure element, and bearings reaching the end of their service life and producing abnormal noise while operating. Oil was observed leaking from the breather when the compressor became loaded. The vendor technician performed trouble shooting and found noise coming from the high pressure element bearings. The compressor was rebuilt and returned to service on July 26, 2014. However, during the time that PAC 0-5 was unavailable, PAC 0-7 was also not available for a short time due to an oil leak from a degraded hose that forced both operating units to rely on only one available air compressor, PAC 0-6. The System Health Report noted that this situation was “placing the instrument air system in a highly unreliable condition.”
- On another occasion PAC-0-6 would not shut down automatically on compressor high discharge pressure, which in turn would lift the system relief valves and could cause an Instrument Air Pressure transient. Funding to address this issue has been approved for implementation in 2015.
- PAC 0-7 has had a long history of tripping on elevated Low Pressure Element outlet air temperature during periods of elevated ambient site temperature. The System Health Report noted that troubleshooting by the vendor was scheduled for September 15, 2014. Also, with regard to PAC 0-7, the Health Report noted that the compressor and its instrument panel are located outside the turbine building. In particular, the Instrument and Control Panel is facing in a direction that exposes the panel directly to the sun and also to rain impingement. The report noted that the “Instrumentation, controls, indicating lights, and temperature trip switches are unnecessarily degrading due to harsh environment. The components require frequent replacement.”
- Four full-capacity air compressors PAC 0-1 through 0-4 serve as backup supplies for the Instrument Air System. As stated in the System Health Report dated 9/17/14 the four compressors stay in the AUTO standby mode during normal plant operation and are not required for normal plant operation. As such

these compressors have not operated for the last 15 to 20 years. Primarily because of this deficiency, the System Health indicator pertaining to Material/Equipment Condition and Corrective Actions was Red, i.e. Unsatisfactory. The Health Report noted, however, that if a situation in which excessive outleakage from the plant Instrument Air distribution system were to arise, or if two or more of the normal Instrument Air compressors were to be unavailable, PACs 0-1 through 0-4 would be very useful in providing additional Instrument Air system margin which could prevent Unit trips during emergent situations. In this regard, the System Health Report contains a recommendation that the compressors be test run periodically to assure they perform reliably and thus would provide additional Instrument Air System Margin during emergent situations. The System Health Report also notes that a pending modification is intended to install a permanent connection in the discharge piping of those compressors, with an isolation valve and exhaust muffler in order to facilitate periodic testing of this equipment to ensure system reliability. The Target Date for implementing this recommendation is April 2015.

Conclusions:

Although the Compressed Air System has remained operational, it has experienced a number of problems pertaining to material condition and reliability that have warranted a Yellow (deficient) System Health rating. This includes equipment aging, deterioration, and failure. One of the operating compressors is located in an area outside the plant that is subjected to environmental conditions that have had a negative impact on the reliability of that compressor. Installed equipment that could serve as backups to the preferred equipment has not been operated in about 15 years. DCPD has recognized and reported these issues and has plans to address them, which appear to be satisfactory. The DCISC should continue to monitor this system and revisit this issue in one year.

Recommendations:

None

3.9 Meeting with NRC Senior Resident Inspector

The DCISC Fact-finding Team met with Mr. Thomas Hipschman, DCPD's NRC Senior Resident Inspector. DCISC last met with an NRC Resident Inspector in April 2014 (Reference 6.9), when it concluded:

DCISC meetings with the NRC Resident or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCPD.

Items of mutual interest that were discussed included:

- Presentation and discussion topics planned for the June 2014 Public Meeting.
- PG&E's future plans for further deterministic and probabilistic analyses of the station's seismic environment
- NRC's Recent Inspection of the area of Problem Identification and Resolution
- Status of NRC's 3rd Quarter 2014 Inspection

Conclusions:

Discussions between DCISC members and the DCPD Senior Resident Inspector or Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCPD.

3.10 Meeting Between Peter Lam, DCISC Vice Chairman, and Barry Allen, DCPD Site Vice President

Dr. Peter Lam, DCISC Vice Chairman, met with Mr. Barry Allen, DCPD Site Vice President. Discussion involved items related to this Fact-finding Trip and other topics of mutual interest.

3.11 Margin Management Program

The DCISC Fact Finding Team met with Kevin Braico, Design Engineer and Margin Management Program Owner, and Mark Sharp, Design Engineering Manager. The DCISC last reviewed this topic in January 2011, when it concluded the following:

DCPD's Margin Management Program appears to be functional and healthy. Appropriate personnel have been trained. Margin issues have been identified and prioritized. Responsibilities, actions, and completion dates/horizons have been established for identified issues. The Margin Management Committee appears to be serving as a vehicle, not only for reviewing margin issues, but also for reinforcing margin concepts. The DCISC should defer further review until after the next two DCPD refueling outages unless dictated by station performance issues.

The Fact-finding Team was provided a copy of DCPD's Margin Management procedure, Interdepartmental Procedure (IDAP) TS5.ID2 Rev 4 dated June 20, 2013. Margin is a basic principle of design and operation. It is a complex concept. The following discussion provides a summary level overview. Margin is defined as the conservatism (i.e. safety factor, design factor, buffer, or cushion) included in the design and analysis of every plant system, structure, and component (SSC) in order to accommodate normal wear and aging of every plant system, structure, and component, instrument drift, variations in material properties, differences in maintenance practices, uncertainties in analytic methods, etc. The purpose of DCPD's Margin Management Program (MMP) is to ensure that each SSC is managed with knowledge of margin concepts, such that design and operational margin is not unknowingly diminished over time. The goals of the MMP are the identification and evaluation of Margins that Matter (MTM), i.e. those margin issues having the highest potential for causing negative consequences in plant safety or reliability.

DCPD states that effective margin management relies mainly on the following programs:

- Configuration Management
- Design Control
- Modification Control
- Materials Control
- Setpoint Control
- Nuclear Oversight Program
- Corrective Action Program
- Operations Management

The DCPD System, Structure, Component (SSC) Engineers are responsible for consulting with design engineers, operations, and maintenance personnel so as to understand the identified margin issues. Their assessments, which are referred to as impact evaluation statement should include the following:

- The affected SSC
- The source or standard for the design or operating margin that is challenged
- The degree to which the margin is challenged

- Historical or other pertinent information including any trends that are observed
- Whether the reduction is chronic

When margin issues are identified the SSC Engineers are responsible for working with the plant health organization to formulate remediation plans.

The SSC Engineers are responsible for documenting the current margin for their assigned SSCs on the “Operating and Design Margin Issue Score Sheet” in accordance with a prescribed process and documented in the plant margin reference database. The following documents and resources are used to assess margin:

- Final Safety Analysis Report Update
- Design Criteria Memoranda
- NRC Reactor Oversight Program
- Equipment Control Guidelines
- Technical Specifications
- Engineering Codes and Standards
- Setpoint Documents
- Calculations: (Electrical Load, Seismic and Floor Loading, Fire Loading, Design and Engineering)

The Plant Health Committee provides oversight of the program. At the working level, the Margin Management Subcommittee (MMSC) meets regularly (at least quarterly) and is responsible for reviewing the low margin SSCs, those ranked Red or Yellow, prioritizing issues based on significance for placement on the Top Margin Issues List, and they may assign courses of action to the affected to resolve low margin issues, and maintaining the Top Margin Issues List. The MMC also reviews Margin Management Program (MMP) metrics that are prepared and maintained by the MMP Owner. The MMSC is composed of a broad representation of engineering and operations personnel in order to bring appropriate perspectives to the issues that are reviewed and discussed by the Committee. Each member of the DCPD engineering staff receives training in margin management and system and component engineers receive additional training.

Operators maintain operating margins so that they do not exceed the operating limits specified in Technical Specifications, Equipment Control Guidelines, Operating Procedures, and Surveillance Tests, and they have also received training in margin concepts and management.

The DCISC Fact Finding Team was provided with the Program Health Report for the third quarter 2014, dated September 17, 2014 and a listing of top margin issues including issue owners, high-level summaries of actions needed, and specific completion horizons approved by the Margin Management Subcommittee Committee.

DCPD MMP metrics as provided in the January 4, 2011 Margin Management Program Report and in the agenda for the January 5, 2011 Margin Management Committee meeting are as follows:

Overall Program	Green (healthy)
Program Personnel	Program Owner (White) (fully qualified but new during the past year) Backup Owner (Green)
Program Infrastructure	Green (No findings re: procedures, processes, or personnel in prior two quarters)
Program	Green (no noted implementation problems)

Implementation	
Equipment Cornerstone	Red (Multiple open or active margin Prompt Operability Assessments in last 12 months). Examples: Residual Ht Removal Debris Loading EDG Loading Margin DEG Day Tank Usable Volume (All issues have owner, action plan and funding when needed.)

Conclusions:

DCPP's Margin Management Program appears to be functional and healthy. Appropriate personnel have been trained. Margin issues have been identified and prioritized. The Margin Management Subcommittee appears to be functioning effectively. The DCISC should defer further review of this program until after the next two DCPP refueling outages unless dictated by station performance issues. However, some issues being tracked through the Margin Management Program should be considered by the DCISC for individual follow-up. One example is Emergency Diesel Generator (EDG) Loading Margin which could be reviewed as part of an overall review of DCPP's EDGs.

Recommendations:

None

4.0 Conclusions

4.1

Considerable management attention is being directed at minimizing the need for maintenance rework, and improvements appear to be emerging in this area. The numbers of rework events during the two most recent refueling outages, 2R17 and 1R18, were considerably lower than in preceding outages. Likewise, Foreign Material Exclusion Events appear to be more effectively avoided. Delays in taking corrective action to prevent recurrence of identified problems appear to have been a recent, short term problem, but should be of continued focus. Soon after DCPP's completion and analysis of its upcoming Refueling Outage 2R18, the DCISC should review the outage results, including a focus on Maintenance effectiveness. This could be accomplished during a Fact-finding Visit or through a Maintenance presentation at the February 2015 Public Meeting.

4.2

The station's current staffing approach in which qualified QV staff members are responsible for managing regulatory audits, while DCPP line personnel are loaned to QV and are utilized for conducting assessments against best practices, is an insightful and effective approach to fostering the achievement of quality work throughout the station. Also, the participation of DCPP's on loan line personnel in regulatory audits not only helps these personnel gain a first-hand understanding of regulatory requirements and processes, but also provides a vehicle for conveying this information back to their own line organizations within DCPP. The QV audits reviewed by the DCISC Fact-finding Team were clear, detailed, and focused.

4.3

DCPP's Self-Assessment Program appears to be in continuing good health. The program administrators are knowledgeable, highly organized, and efficient. The DCISC should continue to review this on a regular basis, which means about two years hence.

4.4

The System Engineering function continues to provide an effective method for evaluating and tracking system health, for identifying priorities, and for determining, planning, and undertaking needed actions to maintain system health. Also, the significant reduction in Open Engineering Notifications is a reflection of an increased focus by the Engineering Department on addressing identified issues. However, two systems in both Units 1 and 2, Emergency Diesel Generators (EDGs) and Heating Ventilation and Air Conditioning (HVAC) have been rated as being Unhealthy for a considerable period of time. Although both of these systems were reviewed by the DCISC during the first quarter of 2014, the DCISC should consider conducting a progress check on these systems during the first quarter of 2015.

4.5

The 125-Volt DCPD 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.

4.6

There are several aspects of DCPD's Reactor Coolant Systems that need to be addressed in both Units in order to return the systems of both Units to Green Health status, including:

- The conversion from water seated to steam seated Pressurizer Safety Valves for both Units 1 and Unit 2 has resulted in leakage during startups and the accompanying need for multiple hold points at various increasing pressures during plant startups in order to thermally soak the Pressurizer Safety Valves.
- A design deficiency in the number 2 seal leakoff lines in the Reactor Coolant Pumps in both Units can inhibit the lateral movement of the number 2 seal of the 3-stage pump shaft seals, which can lead to higher than desired leakage of Reactor Coolant.
- A regulatory commitment to the NRC, in follow-up to the accident at Fukushima, needs to be fulfilled to install what are referred to as SHIELD passive thermal shutdown seals. These seals need to be installed in all of DCPD's Reactor Coolant Pumps no later than in the two R19 Refueling Outages in order to significantly reduce reactor coolant leakage in post-accident situations.

The DCISC should consider conducting a follow-up Fact-finding review of the Reactor Coolant System in the next twelve months, and the review should be allocated more than the usual time because of the complexities.

4.7

DCPP appears to have an active and effective vibration monitoring effort as part of its Predictive Maintenance Program. The number of open vibration issues appears to be controlled effectively.

4.8

Although the Compressed Air System has remained operational, it has experienced a number of problems pertaining to material condition and reliability that have warranted a Yellow (deficient) System Health rating. This includes equipment aging, deterioration, and failure. One of the operating compressors is located in an area outside the plant that is subjected to environmental conditions that have had a negative impact on the reliability of that compressor. Installed equipment that could serve as backups to the preferred equipment has not been operated in about 15 years. DCPD has recognized and reported these issues and has plans to address them, which appear to be satisfactory. The DCISC should continue to monitor this system and revisit this issue in one year.

4.9

Discussions between DCISC members and the DCPD Senior Resident Inspector or Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCPD.

4.10

DCPD's Margin Management Program appears to be functional and healthy. Appropriate personnel have been trained. Margin issues have been identified and prioritized. The Margin Management Subcommittee appears to be functioning effectively. The DCISC should defer further review of this program until after the next two DCPD refueling outages unless dictated by station performance issues. However, some issues being tracked through the Margin Management Program should be considered by the DCISC for individual follow-up. One example is Emergency Diesel Generator (EDG) Loading Margin which could be reviewed as part of an overall review of DCPD's EDGs.

5.0 Recommendations:

None

6.0 References

6.1

"Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013", Approved October 9, 2013, Volume II, Exhibit D.6, Section 3.1, "Maintenance Department Performance."

6.2

"Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014", Approved October 14, 2014, Volume I, Exhibit B.3, "Report on the Quality Verification Organization's Perspective on Plant Performance, the Quality Performance Assessment Report (QPAR) and Quality Verification's Top Issues."

6.3

"Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014", Approved October 14, 2014, Volume II, Exhibit D.2, Section 3.10, "QV Audit of Chemistry Program."

6.4

"Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012", Approved October 10, 2012, Volume II,

Exhibit D.4, Section 3.3, “Self-Assessment Program.”

6.5

“Diablo Canyon Independent Safety Committee Twenty-First Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011”, Approved October 5, 2011, Volume II, Exhibit D.9, Section 3.5, “System Engineering Program.”

6.6

“Diablo Canyon Independent Safety Committee Twenty-First Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011”, Approved October 5, 2011, Volume II, Exhibit D.10, Section 3.6, “DC Power System.”

6.7

“Diablo Canyon Independent Safety Committee Nineteenth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2008—June 30, 2009”, Approved October 6, 2009, Volume II, Exhibit D.10, Section 3.4, “System Review with System Engineer, Reactor Coolant System.”

6.8

“Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012”, Approved October 10, 2012, Volume II, Exhibit D.5, Section 3.1, “Machine Vibration Monitoring.”

6.9

“Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012”, Approved October 10, 2012, Volume II, Exhibit D.5, Section 3.3, “Compressed Air System.”

6.10

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.9, Section 3.8, “Meeting with NRC Senior Resident Inspector.”

6.11

“Diablo Canyon Independent Safety Committee Twenty-First Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011”, Approved October 5, 2011, Volume II, Exhibit D.8, Section 3.3, “Margin Management.”

[25th Annual Report](#), [Volume 2](#), Exhibit D.4, Diablo Canyon Independent Safety Committee Report on Fact Finding Meeting at DCPD on November 19–20, 2014 by Robert J. Budnitz, Member, and R. Ferman Wardell, Consultant

1.0 Summary

The results of the November 19–20, 2014 fact-finding trip to the Diablo Canyon Power Plant in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Pressurizer Weld Overlay Issue
2. Containment Fan Cooler Unit Modifications/Issues
3. Fire Doors Update
4. Intake Concrete Inspection and Repairs
5. Safety Systems Functional Failures Update
6. Outage 2R18 Results
7. Radioactive Waste Systems Review and Walkdown
8. Equipment Qualification Program Update
9. Steam Generator Performance and Inspections through Outage 2R18
10. Radiation Monitoring System Long-Term Strategy
11. Observe NSOC Summary Session
12. Meet with NRC Resident Inspector
13. Dr. Budnitz' Meeting with DCPD Chief Nuclear Officer

2.0 Introduction

This fact-finding trip to the DCPD 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 DCPD 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 Pressurizer Weld Overlay Issue

The DCISC Fact-finding Team (FFT) met with Mike Leger, Lead In-service Inspection Specialist, for an update on DCP's Pressurizer Weld Overlay Issue. The DCISC last reviewed this topic at its Fact-finding Meeting in September 2013 (Reference 6.1) and its Public Meeting in October 2013 (Reference 6.2). At its September Fact-finding Meeting the DCISC concluded the following:

DCP's root cause evaluation and resultant corrective actions for the failure to detect small flaws in the Pressurizer nozzle structural weld overlay appear satisfactory. The DCISC should follow up in mid-2014 when actions have been completed, in particular to review the results of any finite element modeling performed to assess the overlay.

An "Indication" is a flaw or crack inside the weld that can be detected by reflections during ultrasonic test (UT). The key safety question for such flaws is whether they are sufficiently small that they would not be expected to grow in size during service. Very small flaws do not grow and do not present a safety hazard. If a flaw is sufficiently large that it could grow, then normally the weld material with the flaw would be removed by grinding and the welding repaired.

DCP had applied pre-emptive structural weld overlays (SWOLs) to the Unit 2 Pressurizer nozzles' dissimilar-metal butt welds during Refueling Outage 2R14 in March 2008. The overlays were applied using a provision from the American Society of Mechanical Engineers (ASME) Section XI In-service Inspection Code known as a relief request. The purpose of the weld overlays, which have been used in other plants, too, was to provide structural reinforcement of the original Alloy 600 SE weld areas, which had experienced Primary Water Stress Corrosion Cracking (PWSCC) elsewhere in the industry. The Unit 1 Pressurizer nozzles do not use Alloy 600 and do not have this issue.

The Pressurizer weld overlays were originally inspected following the welding in March 2008 using conventional UT exams (using several discrete ultrasonic angle beams), and they were inspected again in Outage 2R15 in October 2009 with similar UT exams with the exception that low angle detection was not required. During subsequent inspections in Outage 2R17 in February 2013 using more advanced UT techniques (phased array techniques), several new indications (flaws) were discovered that were outside the ASME Code allowable screening size. These flaws were determined to involve single weld passes, which meant that a Code-required flaw analysis be done, which was performed by AREVA under contract to PG&E. Using conservative assumptions, this analysis found that the flaw sizes were sufficiently small that the structures would be expected to provide satisfactory performance for at least an additional operating cycle. Review of the AREVA

report by the DCISC Fact-finding team revealed that the analysis was satisfactory to demonstrate that no additional growth of the detected flaws would occur and to support continued operation for another operating cycle. An independent Electric Power Research Institute (EPRI) analysis supported this conclusion.

DCPP initiated a Root Cause Evaluation (RCE) to determine the reasons for not detecting the indications originally in Outages 2R14 and 2R15. The root cause was identified as:

A mismatch exists between the conventional UT weld overlay inspection procedure and the Performance Demonstration Initiative qualification process. Although the qualification process successfully demonstrated the ability to detect flaws, the procedure instructions do not adequately constrain the zero-degree scan speed to assure that small cross-section, low angle flaws are consistently detected in the field.

Contributing causes were that inattentive errors were made by vendor examiners for the following reasons:

1. Data indicate that 45-degree angle beam was able to detect indications in the weld overlays, yet the indications were not recorded.
2. Examiners failed to adequately investigate indication responses to determine the actual length of the flaw.
3. Examiners failed to recognize zero-degree angle ergonomic factors necessitating reduced scan speed to maintain optimum search unit coupling.

The Corrective Action to Prevent Recurrence (CAPR) for the root cause was to revise the In-service Inspection Program procedure to not permit the conventional UT technique to be used for weld overlays until the recommendations for the first contributing cause have been addressed. These recommendations are:

For the UT Qualification Process

1. Assure that scan speed, length sizing, and any other essential variables used during qualification testing are conservatively reflected in the examination procedure.
2. Expand the sample set to include Westinghouse pressurizer nozzle configurations.
3. Include more realistic oriented fabrication flaws in the test set.

For the UT Procedure

1. Add guidance on when to reduce scan speed
2. Evaluate the need to increase sensitivity for zero-degree examinations
3. Include instructions related to detection of low-angle flaws

Additionally, DCPD will recommend to EPRI to publish a communiqué to all qualified examiners to review the causes and contributors of the DCPD event.

DCPD had submitted to the NRC a single cycle ASME Code Request for Relief (RFR) based on the initial analysis. This was approved, but NRC would need an additional analysis to support a request for long-term operation, looking at lateral crack growth in addition to the original circumferential cracks. This analysis produced acceptable results and was approved by NRC in an October 14, 2014 letter for continued operation to the year 2045.

DCPD performed re-examinations of the weld overlay in Outage 2R18 in the fall of 2014. The techniques and results were essentially the same as in 2R17, i.e., no crack growth. Additionally, DCPD committed to performing phased array examinations during the next three ISI inspection periods.

The DCISC Fact-finding Team recommends that this issue be closed.

Conclusions:

DCPD has satisfactorily completed its analysis of the Pressurizer weld overlay cracking issue to support continued operation until 2045 as approved by the NRC. The DCISC Fact-finding Team believes that this issue can be closed.

Recommendations:

None

3.2 Containment Fan Cooler Unit (CFCU) Modifications/Issues

The DCISC Fact-finding Team met with Greg Porter, System Engineer for Ventilation Systems, and Lou Fusco, Manager of Mechanical Systems, for an update on the CFCUs. The DCISC last reviewed CFCUs at the June 2014 DCISC Public Meeting (Reference 6.3) and at a Fact-finding Meeting in April 2013 (Reference 6.4) when it concluded the following:

DCPD discovered a damaged coupling on the 2-5 Containment Fan Cooler Unit (CFCU) during Outage 2R17. The damage did not adversely affect the CFCU's safety function. The coupling was replaced, and the unit was returned to service with a temporary modification to restrict its fan speed to low speed while the root cause of the problem is determined. The DCISC should follow up on this issue.

DCPD had added anti-rotation devices to each CFCU to prevent reverse rotation. Reverse rotation is a potential problem because, if it were to occur above a prescribed amount, a start-up of the CFCUs could result in loss of the motors due to over-current. Unit 1 CFCU anti-rotation devices were installed during 2010 with satisfactory performance. A Unit 2 device was installed by May 2011, and by June noisy operation was evident, resulting in replacement with a spare. Shortly afterward two more devices were found to be noisy (ratchet pawls dragging), causing DCPD to write a Prompt Operability Assessment (POA) for justification of operation only at low speed. Performing an

Apparent Cause Evaluation (ACE), DCPD and the vendor determined the devices are rubbing due to machining tolerance issues. Through the end of 2011 all devices were refurbished.

During Refueling Outage 2R17, a routine PM (Preventive Maintenance) inspection of the CFCU 2-5 coupling/anti-reverse rotation device (ARRD), the fan side coupling struts were discovered to have failed and the tension struts had buckled. Even with damage, CFCU 2-5 was determined to still be capable of performing its safety function. No problems were apparent on the remaining Unit 2 CFCUs, and no problems were noticed from inspections of Unit 1 CFCUs in outage 1R17. Thus there was no common failure. Following vendor inspection and analysis, it was determined that this damage could only have occurred due to application of reverse torque. The CFCU 2-5 damaged coupling was replaced with a spare.

DCPD hired a consultant to perform a failure analysis. The consultant concluded that the coupling failed due to a tensile overload resulting from a torque applied in the reverse direction, which was most likely caused by a shift of the CFCU motor from High to Low speed while the fan was rotating at more than the low speed of 600 revolutions per minute (rpm). DCPD performed a temporary modification to restrict the 2-5 CFCU to low speed while the investigation continues into the cause of the damaging speed change. The CFCU safety function, cooling of Containment following a loss of coolant accident, uses low speed. High speed is used for normal Containment cooling, and compensatory measures have been taken to assure that function is maintained.

There is more work to be done on the CFCUs including adjusting the timing sequence to address the anti-rotation device problem. In the meantime the CFCUs are run only in low speed. Design changes are also required to the CFCU cooling coils to upgrade and replace the current coils. Along with replacing the cooling coils, the plant will implement design changes to the inlet dampers to the CFCUs to meet the requirements of the cooling coils.

The anti-rotation devices are currently working well. The fan/motor couplings are not designed for instant slowdown from 1200 to 600 rpm in going from high to low speed. A design change is being issued to improve the delay time for speed changes and to implement a sequencing scheme when on emergency power. These design changes are scheduled for completion by mid-2015.

Some CFCUs had experienced high vibration at higher speeds due to damper changes to reduce air flow to reduce the potential for Component Cooling Water (CCW) overheating. DCPD will replace the cooling coils and modify the dampers to accommodate the reduced airflows. Finally, DCPD has a CFCU coil replacement program due to aging and corrosion. The Unit 1 and 2 coils are scheduled for replacement in Outages 1R19 and 2R19, respectively.

Conclusions:

DCPD appears to have satisfactory solutions to problems with its Containment Fan Cooler Unit Fans. The DCIAC should continue to follow this issue after each refueling outage.

Recommendations:

None

3.3 Fire Doors Update

The DCISC Fact-finding team met with Dave Hampshire, Fire Protection Supervisor; Alex Arsene, Appendix R Program Engineer; and Al Clark, Civil Engineering Door Systems Engineer, for an update on impaired fire doors. The DCISC last reviewed Fire Doors in March 2014 (Reference 6.5), concluding 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.

At the March 25, 2014 Plant Health Committee meeting the Appendix R Program Manager reported that this fire protection program health was Red, unsatisfactory, due to the following:

Excessive Critical Component Failure/Adverse Equipment Trend (one or more critical component failures without an action plan) because of 16 impaired fire doors for several years due to financing deferrals. The impaired doors require fire watches, an unsatisfactory long-term substitute for fully functional fire doors. DCPD has an action plan to replace/repair these doors, but funding has been deferred through 2016. This deferral was a concern to the DCISC, and the earlier Fact-finding Team recommended that the DCISC look further into the deferrals.

There are a total of 94 doors needing replacement. Of these, nine are Appendix R fire doors with compensatory measures in place consisting of roving fire watches. An additional 31 doors are in the DCPD Equipment Control Guidelines (ECGs) as doors which cannot be repaired and require replacement. The funding for these doors in the original Door Replacement Program had been deferred from 2012 until 2017, which appeared unacceptable to the DCISC. Six of these 16 doors have now been repaired or replaced, leaving 10 doors needing resolution. These ten remaining doors have been included as highest priority in the Plant Door Life Cycle Management Plan.

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.

The Project Review Committee, in its July 15, 2014 meeting, approved including the 2015 Power Block Project scope in the DCPD Five Year Plan and review additional funding in the future.

Conclusions:

The DCISC concern regarding the needed, but delayed, replacement of fire doors and other safety function doors has been somewhat alleviated by DCPD funding for the new Power Block Project high-priority doors for 2015 and consideration of additional funding for future years. The DCISC notes that 6 of the 16 highest priority fire doors have been replaced. The DCISC should continue to monitor the replacement of DCPD fire and other safety function doors.

Recommendations:

None

3.4 Intake Concrete Inspections and Repairs

The DCISC Fact-finding team met with Behrooz Shakibnia, Civil Engineering Supervisor; John Fonturbel, Civil Engineer; and Tom Voss, Consulting Concrete Inspector, for an update on DCPD Intake Structure concrete inspections and repairs. The DCISC last reviewed Intake Concrete in June 2013 (Reference 6.6), concluding the following:

DCPD's concrete repair procedure and repairs of concrete in the Intake Structure appeared satisfactory.

Because of the saltwater environment, the concrete intake structure can deteriorate when corrosion of rebar occurs, which causes swelling of the rebar and concrete spalling, which then further exposes the steel reinforcing bar, causing the degradation to accelerate. This reduces structural integrity. DCPD has a program to inspect and repair the damage to assure structural integrity. During Outage 2R17, the repair work consisted of the following:

- Auxiliary Saltwater System seismic support corrosion repair, which consisted of removing corrosion and re-coating
- Digging out damaged concrete, exposing the reinforcing bar, removing corrosion, and re-coating it
- Repairing the pedestal for an Intake Cooling Pump
- Repairing electrical pull boxes.

The PG&E Applied Technology Services Group performs inspections and soundings of the concrete, identifying areas needing repair. The Saltwater Structural Engineering Group makes determinations of the soundness of structures. The Intake Repair Program Group makes the repairs specified by the other two groups.

DCPD's Procedure MIP C-7.0, "grouting and Repair of Concrete Defects," Revision 3 governs the repair process. In addition to providing definitions and responsibilities, the procedure specifies the following:

- Design Drawings

- Grout Application
- Materials
- Surface Preparation
- Compressive Strength
- Grout Mixing, Installation and Curing
- Grouting Through-Bolts, Anchor Bolts and Reinforcing Steel Dowels
- Concrete Repair

The DCISC found the procedure to be comprehensive and detailed.

In this November 2014 visit the DCISC was interested in concrete inspections and repairs during Refueling Outages 1R18 and 2R18. In these outages work was focused on the common walls between Unit 1 and 2 Circulating Water Conduits and the Auxiliary Saltwater (ASW) System Pump bypass walls. In 1R18 89 square feet of concrete was repaired, but repair of a section of 29 square feet was not currently necessary and was deferred to the future. In 2R18 similar inspections were made, but no repairs were necessary. The DCISC reviewed the resulting inspection and repair reports, which were satisfactory.

Conclusions:

DCPP's inspections and repairs of the Intake Structure concrete appeared appropriate to assure continued operation of the structure for normal and emergency functions.

Recommendations:

None

3.5 Safety System Functional Failures Update

The DCISC met with Tom Baldwin, Manager of Regulatory Services, for an update on DCPP Safety System Functional Failures (SSFFs). The DCISC last reviewed SSFFs in March 2014 (Reference 6.7), concluding the following:

DCPP's performance on reducing or eliminating Safety System Functional Failures (SSFFs) has not improved despite implementation of a corrective action plan. This is a DCISC concern. A new plan has been developed, and the DCISC should review this item in the third quarter of 2014.

A Safety System Functional Failure (SSFF) is defined as "The failure of or the loss of the ability of a system safety function to shut down the reactor and maintain it in a safe shutdown condition, remove residual heat, control the release of radioactive materials, or mitigate the consequences of an accident." Therefore, a safety system may meet a Technical Specification (TS) limiting condition

for operation (LCO), but exhibit an SSFF at the same time.

The recent history of this issue began in 2001 when the Nuclear Regulatory Commission (NRC) changed the significance of a SSFF event when it established a new Reactor Oversight Program (ROP) that, among other things, uses performance indicators for key parameters, including SSFFs. Depending on the number of SSFFs that a plant experiences, the plant will receive a varying level of regulatory oversight. For, example, if a plant experiences five SSFFs within a rolling four quarter period, the plant will move into the White regulatory response column and receive greater NRC oversight.

Between July 1, 2010 and August 31, 2011, DCPD Units 1 and 2 experienced a combined total of 12 SSFFs. Of these 12 SSFFs, four were common to both units. There was considerable variety in the nature of the SSFFs. Some examples include the following:

- Non-conservative Technical Specification (TS) First Level Undervoltage Relay (FLUR)/Second Level Undervoltage Relay (SLUR) results in loss of power to Emergency Diesel Generator (EDG) start instrumentation, Units 1 and 2
- 230 kV allowed outage time exceeded when cross-tied between Units 1 and 2
- Mode 3 Entry with AFW Pump 1-1 inoperable
- Auxiliary Building Ventilation System single failure, Units 1 and 2
- Three Losses of Offsite Power during Refueling Outage 2R16, Unit 1

DCPD's Root Cause Evaluation (RCE) Report of these SSFFs further notes that, beginning with the discovery of incorrect open limit switch settings on motor-operated Emergency Core Cooling System (ECCS) sump suction valves in 2009, "DCPD experienced multiple events that resulted in the loss of a system safety function to shut down the reactor and maintain it in a safe shutdown condition, remove residual heat, control the release of radioactive materials or mitigate the consequences of an accident."

DCPD's examination of this issue in its Root Cause Evaluation (RCE) was extensive and detailed, and included reviews of operating experience within the industry. The examination concluded that DCPD lacked clear standards for risk assessment, risk evaluations, and risk mitigation activities that could, and did, result in SSFFs. It further concluded that, when reviewing evaluations, the station had a tendency to justify and accept the evaluations rather than to provide a healthy challenge to them. It also noted that opportunities had been missed to reinforce high standards, that resolutions of identified risks were sometimes incomplete, and that there was sometimes no means or expectation for identifying risk significant activities. A contributing cause identified by the station was that "station personnel had insufficient understanding of the definition of an SSFF, resulting in failure to recognize that adherence to station procedures and plant Technical Specification action requirements does not prevent SSFFs."

To address the root and contributory causes of this adverse trend in SSFFs, DCPD developed 30 planned actions, which collectively comprise one of the eight areas for improvement in a broader

“Regulatory Excellence Action Plan.” The first major component of the Action Plan to address Safety System Functional Failures involved completing the RCE which resulted in its March 7, 2012 Action Plan, which contained 30 major and supporting actions.

The purpose of the March 2014 fact-finding visit was to assess DCP’s progress on reducing the number of SSFFs. The RCE effectiveness evaluation concluded that the corrective actions in the Action Plan were not effective because of an increased number of SSFFs. Prior to the RCE, all SSFF events were designated as preventable. Following the RCE, five of nine events were designated as preventable, and the remaining four would have been preventable had the corrective actions been effectively implemented. DCP found no commonality of causes. DCP has taken new, augmented corrective actions to the Corrective Action Review Board, which contained processes to preclude SSFFs from happening from initiating events. These new corrective actions include the following:

1. Update the applicable procedure to include all modes of operation and expand the list of Single Failure Vulnerable Systems to include shared portions of systems that create a single point vulnerability.
2. Establish risk mitigation actions for any condition, which reduces vulnerability to SSFF to loss of a single component, power supply, or train.
3. Establish the Station Focus Area that includes the top five human performance error prevention tools (the “High Five”).
4. Post Systems, Structures, and Components (SSCs) where the loss of the component would result in loss of SSF, and revise the Operations Policy to reflect this standard.
5. Require Outage Scope Review Team (OSRT) identification of SSFF vulnerabilities and establishment of risk-commensurate mitigations when repair will be delayed or deferred.
6. Develop and proceduralize a clear standard for evaluations of conformance to licensing basis and SSFF vulnerability to be implemented in Operating Experience Assessments, plant modifications, design and licensing basis reviews, NRC communications, and Licensing Basis Verification Program processes.
7. Educate station Senior Reactor Operators, managers, senior leadership team, and engineers such that they can recognize a SSFF or potential SSFF challenge.
8. Communicate to station to achieve plant-wide recognition of DCP SSFF Performance Indicator vulnerability, including:
 - a. Current station SSFF performance
 - b. Bottom industry decile standing
 - c. How to recognize an SSFF vulnerability
 - d. Expectations to reduce risk of SSFF events
 - e. Broad range of situations whereby plant staff can create a possible SSFF event.

With the relatively high number of SSFFs recently, DCP needs strong, effective correction action to

reverse the degrading trend of SSFFs. The DCISC should follow this issue closely with quarterly reviews to assess the effectiveness of corrective action.

The trend of SSFFs for the last two years at DCPD is as follows:

Quarter	Unit 1 SSFFs	Unit 2 SSFFs
1Q13	3	3
2Q13	3	4
3Q13	3	4
4Q13	3	3
1Q14	4	2
2Q14	5	2
3Q14	3	1
4Q14	3	2

NRC's four-quarter Performance Indicator for DCPD's SSFI is currently Green based on the following data:

		Unit	
No. of SSFIs	NRC White Threshold	DCPD Goal	
1	4	> 5	0
2	2	> 5	0

Conclusions:

It appears to the DCISC Fact-finding Team that there has been little improvement in DCPD System Functional Failures (SSFFs) since July 2010, when originally reviewed. This has been and is still a concern to the DCISC. The DCISC should review the SSFF status in mid-2015.

Recommendations:

It is recommended that DCPD review again the causes of its Safety System Functional Failures (SSFFs) and develop and implement corrective action which will eliminate or significantly reduce the number of SSFFs.

Basis for Recommendation:

Since March 2010, when the DCISC began its review of DCPD SSFFs, DCPD has made little progress in reducing the numbers of its SSFFs as shown below for the last two years:

Quarter	Unit 1 SSFFs	Unit 2 SSFFs
1Q13	3	3

2Q13	3	4
3Q13	3	4
4Q13	3	3
1Q14	4	2
2Q14	5	2
3Q14	3	1
4Q14	3	2

Although the numbers are small, the DCISC believes the number should be close to zero. DCPD is working on its second action plan; however, there have been little or no positive results to date.

3.6 Outage 2R18 Results

The Fact Finding team met with Matt Coward, Outage Manager, to review the results of DCPD's 2R18 Refueling Outage, which began on September 28 and ended slightly ahead of schedule on October 31, 2014. The DCISC last reviewed refueling outages in May 2014 (Reference 6.8), when it concluded the following:

DCPD's Outage 1R18 results were positive with the one exception of temporary loss of the Unit 1 Spent Fuel Pool Cooling Pump due to an electric grid disturbance. Operators restarted the pump, and there were no safety consequences of the event.

Outage goals and results were as follows:

Performance Category	Goal	Actual
Recordable & Disabling Injuries	0	0
Nuclear Safety Events	0	0
Human Events Clock Resets	0	0
Outage Duration (days)	≤ 33	32.4
Dose Goal (Person-Rem)	32	30.37
Significant Foreign Material Events (FME)	0	0
Power Ascension (days)	≤ 5	4.7
Reliable Run at 100% (days)	≥ 90	TBD

Major Reliability Scope items include the following:

- Lightning Arrestors (200 kV and 500 kV)
- CFCU Inlet Dampers
- SG Eddy Current and Sludge Lance
- 13 CETs Replaced

- RCP 202 Motor and RCP 2-3 Seal
- CWP 2-2 Motor Overhaul
- Extraction Steam Expansion Bellows
- 480 V Bus G Breaker Replacement
- 500 kV Yard Relay and Breaker Project

Conclusions:

DCPP's 2R18 Refueling Outage met essentially all goals and was considered a success by DCPP. The DCISC considers it a success from a nuclear safety perspective.

Recommendations:

None

3.7 Radioactive Waste Management Systems Review and Walkdown

The DCISC Fact-finding Team met with Clint Miller, Solid and Liquid Radwaste System Engineer, and Surendra Sabharwal, Gaseous Radwaste System Engineer, for a review of the status of DCPP's Radioactive Waste (Radwaste) Management Systems. The DCISC has not reviewed these systems recently.

The DCISC Fact-finding Team (FFT) reviewed the design and operation of the three radwaste systems and toured the accessible portions of the liquid and gaseous systems. The systems appeared to be in good working order, and the plant conditions in these areas appeared to be acceptable.

Gaseous Radwaste System (GRWS) Status

The GRWS collects and processes radioactive gases from various plant systems and includes two large waste gas decay tanks which hold radioactive gases for time to decay to low levels of radioactivity. The GRWS then discharges small amounts of gaseous radioactivity to the environment via the Plant Vent System. These discharges are monitored by a pre-set radiation detector, and, if too high, the discharges are automatically terminated. Annual reports of radioactive gas discharges have all shown that discharges are very small fractions of DCPP Technical Specifications and NRC regulatory limits.

The GRWS is healthy (White) according to the System Health Report. The major issue is Waste Gas Sampling Subsystem inoperability, which is due to obsolescent system components preventing continuous monitoring of oxygen levels upstream of the gas compressor when the compressor is shutdown, because the oxygen analyzer is located downstream. Manual samples are taken as a compensatory measure. Funding has been on hold until January 2015 due to budget constraints. It is expected that design, procurement and installation will commence in 2015 and be complete by the end of 2016.

Liquid Radwaste System (LRWS) Status

Liquid radwaste is processed and reduced by way of filters, demineralizers and evaporators. The clean water is recycled back into plant systems, and the spent resins and filters are input to the Solid Radwaste System. Small remaining amounts of radioactive liquids are diluted, measured for radioactivity, and discharged into the Pacific Ocean via the Auxiliary Saltwater System discharge. Annual reports of liquid radioactive releases have all shown that releases are very small fractions of DCPD Technical Specifications and NRC regulatory limits.

The LRWS is healthy (White) according to the System Health Report. The major issues are the nitrogen supply to the Reactor Coolant Drain Tank and level detectors for the Spent Resin Storage Tanks (SRSTs). New level probes for the SRSTs are scheduled to be installed during 2015.

Solid Radwaste System

The Solid Radwaste System (SRWS) collects and processes (decontamination, drying, compaction and packaging) solid radioactive materials for eventual shipment to licensed burial facilities. The solids are mostly spent resins, used filter media, and miscellaneous paper, cloth and other solids. The radioactive solids are handled remotely in shielded facilities. There are no solid radioactive wastes discharged into the environment.

SRWS health is White—healthy. There are a variety of issues needed for Green status. These are typically crane parts, lights, cooling fans, shielding, etc., whose repair, upgrading, or replacement is not central to achieving safe operation.

Conclusions:

The DCPD radioactive gas, liquid, and solid waste management systems are all healthy (White) each with minor issues which are being addressed.

Recommendations:

None

3.8 Equipment Qualification Program Update

The DCISC Fact-finding Team met with Kyle Millenaar, Engineer in Instrumentation & Controls Engineering and Equipment Qualification Program (EQP) Coordinator, for an update on the DCPD Equipment Qualification Program. The DCISC last reviewed the EQP in November 2012 (Reference 6.9) when it concluded the following:

The DCPD Environmental Qualification (EQ) program appears to be healthy. The self-assessment of the program conducted during the third quarter of 2012 was extremely thorough and found no maintenance deficiencies that challenge the environmental qualification of equipment. Minor deficiencies identified in the self assessment are being

addressed through DCP's Corrective Action Program. Although no significant problems exist, the number of open Notifications has been increasing in recent years, and the expected attrition of knowledgeable individuals could aggravate this situation, along with having a potentially negative impact on the Program. The DCISC should continue examining the EQ program at least every two years.

The EQ Program is part of the Electrical Engineering Department. It is an industry-wide program; and at DCP it is controlled by Procedure CF3.ID3, "Environmental Qualification (EQ) Program," 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, conditions, 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 DCISC learned that the only current I&C (Instrumentation and Controls) engineer qualified for EQ determinations had retired and his replacement had also left, and a new engineer was in training to become fully qualified prior to the retirement. Mr. Millenaar shared with the Team the two following training documents:

1. Task Qualification Guide "Perform Tasks Associated with Performing Environmental Qualification (EQ) Related Engineering Activities"

2. Task Qualification Guide “Perform EQ Maintenance Activities”

The guide includes all aspects of EQ, e.g., EQP scope, EQ Master List, requirements for various equipment, vendor qualification, EQ-related calculations, and EQ files. These two guides, which included both training and mentoring by a qualified engineer, appeared comprehensive and appropriate.

Some current activities underway include the following:

1. Testing and evaluation is being conducted to qualify switchgear in the 4 kV Switchgear Room for High Energy Line Break (Main Steam Line Break) conditions, primarily steam and high humidity. This is a legacy issue.
2. Rosemount Transmitters are being replaced because they are near their end of life. DCPD is qualifying the new transmitters for particular environmental conditions.
3. As part of the Life Extension Program, Raychem splices are being reviewed for replacement. Although their end-of-life is not close, they are being replaced along with the particular end-of-life component which incorporates them.

The Unit 1 EQ life extension review has been completed and report being written. The DCISC should review the report in a future fact-finding meeting.

The EQ Program requires the EQ Program Coordinator to prepare a self-assessment (S-A) report following each Unit 2 refueling outage. The most recent report dated March 18, 2014 covers the period October 4, 2012 through January 13, 2014. The S-A serves as the program “Health card.” The report focused on significant work items “Replaced/reworked due to corrective maintenance” rather than recurring items such as transmitter calibrations and scheduled EQ component or equipment replacements such as position switches and solenoid valves. The S-A concluded that

“... there were no identified adverse trends in the qualification or in the maintenance of EQ equipment.” The S-A also concluded that the program complies with the NRC EQ regulation 10CFR50.49 regulation. The following major issues were identified:

- EQ trained personnel have reduced to two qualified personnel in Design Engineering due to staff reduction and re-assignments and an additional two qualified personnel in other plant assignments.
- System engineering EQ qualified component engineers have reduced to one qualified Electrical Engineering engineer and non I&C component engineers.
- There were 23 open Notifications that have EQ related issues or EQ file maintenance activities. None was considered urgent.

DCPD believes that they will need to develop a “Field Guideline for EQ Inspection and Walkdown” for the younger, less experienced engineers as the experienced engineers are retiring. Developing the field guide will be resource intensive.

One significant challenge for EQ involves the Containment Fan Cooler Unit (CFCU) cooling coils. The CFCU's function is to cool the Containment during normal operation and accident conditions. The coils will be replaced between the 2R18 and 2R20 refueling outages. Replacement of the coils will change the Containment environment temperature, which may require re-qualification of instruments inside Containment. This work will be performed by a contractor.

Also, the CFCU fan motors need replacement because their mechanical capability is considered poor. Qualified motors are available but will require an economic and engineering evaluation and an executive decision to move forward.

The following are S-A identified and reviewed EQ devices replaced or reworked due to corrective maintenance:

1. Reactor Vessel Vent Valve RCS-2-8078C&D exhibited a failed seat leak test during a shop test and was repaired.
2. Reactor Coolant System (RCS) Loop 1 Temperature Monitor TM-413A failed low reading, and a temporary modification was issued until the Resistance Temperature Detector was replaced in Outage 1R18.
3. RCS Loop 3 temperature element TE-433A exhibited an erratic reading, and a temporary modification was issued until TE-433A was replaced in Outage 1R18.
4. Rebuild of the valves on RCS-SOV-5 spool piece was performed because the valves failed their stroke test. A repaired spool piece was installed in Outage 2R17.

The S-A concluded that the above activities were properly performed.

Conclusions:

The DCPPE Equipment Qualification Program appeared satisfactory. Because of an upcoming retirement, a new engineer is being qualified for the process.

Recommendations:

None

3.9 Steam Generator Performance and Inspections through Outage 2R18

The DCISC Fact-finding team met with John Ahar, DCPPE Steam Generator (SG) System Engineer, for an update on SG performance and health and results of inspections in refueling outages 1R18 and 2R18. The DCISC last reviewed SGs in August 2013 (Reference 6.10), when it concluded the following:

DCPP has established high performance goals for feedwater and steam generator chemistry and appears to be exercising effective control of feedwater and steam generator water chemistry. A few recent issues related to Unit 1 Steam Generator sulfates

and Feedwater iron appear to have been effectively addressed. This topic continues to be a reliability issue rather than a safety issue. Results in DCP's new steam generators indicate no impact on reliability. Unless problems emerge in this area, the DCISC should defer its next review of this topic until at least mid-2015.

The four DCP 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 outages 1R18 and 2R18 resulted in 15 tubes showing minor indications. After evaluation, all were left in place. The next inspections are required to be in 1R21 and 2R21.

Sludge lancing of mineral build-up on the tubes resulted in a very small (three pounds) amount of material per unit.

DCP'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 2R18 inspections, none of the SG performance criteria were exceeded since the last ECT inspection in 2R15. That is, the three cycle operating period between the start of the Unit 2 Cycle 1 and the end of Unit 2 Cycle 18. The operational assessment (OA) concludes that there is reasonable assurance that operation of the DCP Unit 2 SGs until the next scheduled ECT inspection in 2R21 (three operating cycles) will not cause any of the SG performance criteria to be exceeded.

There was a similar assessment written for Unit 1 following outage 1R18.

Conclusions:

The DCP 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

3.10 Radiation Monitoring System Long-Term Strategy

The DCISC Fact-finding Team met with Kevin O'Neil, I&C Supervisor and Radiation Monitoring System Engineer, for a review of the DCP Radiation Monitoring System health and Long-Term

Strategy. The DCISC learned about the long-term strategy at a Plant Health Committee meeting in December 2013 (Reference 6.11) as follows:

The Radiation Monitoring System health is White (satisfactory) for Unit 1 and Yellow (unsatisfactory) for Unit 2 due to equipment reliability problems due to the age of components; however, obsolescence is not considered a problem because spare parts are readily available. Unit 2 additionally has had operability problems with the Plant Vent and Containment air particulate monitors. An integrated system asset replacement initiative will be performed concurrent with the DCPD Unit Relicense period; meanwhile, DCPD is developing a plan to manage and improve system health in the interim. A long-term strategy is scheduled for presentation to the PHC in mid-2014. [It was learned subsequently that the PHC approved funding.]

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 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, there have been enough maintenance and reliability and availability problems for DCPD to develop a long-term radiation monitoring strategy. DCPD believes the performance of the system is acceptable, and the system is rated Healthy (White). With corrective actions both the reliability and availability improved noticeably in the fourth quarter of 2013 and have been very good during 2014.

The DCPD long-term RM strategy is under way in Engineering with an April 1, 2015 completion date. The purpose is to improve reliability and reduce the maintenance burdens. A presentation to the Plant Health Committee is set for July 1, 2015. The DCISC should review the strategy in mid-2015.

Conclusions:

The DCPD Radiation Monitoring System, consisting of both analog and digital components dating back to the 1970s, 1980s, and 1990s, has had availability and reliability problems up until the fourth quarter of 2013, when corrective actions resulted in noticeable improvements. For sustained improvements DCPD Engineering is developing a Long-Term Radiation Monitoring Strategy scheduled for completion in mid-2015. The DCISC should review that strategy at that time.

Recommendations:

None

3.11 Nuclear Safety Oversight Committee (NSOC) Summary Meeting

The DCISC has an agreement with DCPD to maintain NSOC information confidential, thus only limited information is presented here.

The DCISC Fact-finding Team attended the DCPD NSOC summary session with plant management. The summary session followed three-and-a-half days of NSOC subcommittee

meetings with plant personnel and observations of plant activities. The DCISC last attended an NSOC meeting in January 2011 and reported the following at its February 15, 2012 Public Meeting (Reference 6.12):

Dr. Budnitz reported he attended the January 19, 2011 NSOC meeting and commented there was a good deal of discussion about security questions which are outside the purview of the DCISC. Dr. Budnitz stated he was impressed by the thoroughness and quality of the NSOC team and he remarked he has been acquainted with two current members of NSOC for 35 years. Mr. David reported that the day prior to a NSOC meeting is devoted to meetings of the NSOC subcommittees, which include DCPD director and manager level personnel.

The NSOC subcommittees consisted of the following functional areas:

NSOC Functional Areas

- Organizational Effectiveness
- Safety Culture
- Security
- Performance Improvement
- Regulatory Services

- Operations
- Chemistry
- Quality Verification

- Engineering
- Risk Assessment
- Major Projects
- Equipment Reliability

- Maintenance
- Work Management
- Outage
- Industrial Safety
- Learning Services

- Radiation Protection
- Emergency Planning

The DCISC fact-finding team found that attending the NSOC review meeting was useful to the DCISC, because several of the issues that the NSOC reviewed are similar to issues that the DCISC reviews.

Conclusions:

Attending NSOC meetings is an excellent way for the DCISC to learn about various plant issues, and therefore the DCISC should plan to attend them regularly.

Recommendations:

None

3.12 Meeting with NRC Resident Inspector

The DCISC Fact-finding Team met with John Reynoso, NRC Resident Inspector at DCP. The DCISC last met with the NRC in April 2014 (Reference 6.13) and concluded the following:

DCISC meetings with the NRC Resident or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCP.

The discussion centered on the following subjects:

- Sewell report on Tsunamis
- DCP Seismic Analysis underway
- Main Steam relief valve replacement event

Conclusions:

DCISC meetings with NRC resident inspectors continue to be useful for sharing concerns and for reporting the results of reviews and activities.

Recommendations:

None

3.13 Dr. Budnitz Meeting with DCP Chief Nuclear Officer

Dr. Budnitz met with DCP Chief Nuclear Officer, Ed Halpin, to discuss items from this fact-finding and other items of mutual interest.

4.0 Conclusions

4.1

DCPP has satisfactorily completed its analysis of the Pressurizer weld overlay cracking issue to support continued operation until 2045 as approved by the NRC. The DCISC Fact-finding Team believes that this issue can be closed.

4.2

DCPP arrears to have satisfactory solutions to problems with its Containment Fan Cooler Unit Fans. The DCIAC should continue to follow this issue after each refueling outage.

4.3

The DCISC concern regarding the needed, but delayed replacement of fire doors and other safety function doors has been somewhat alleviated by DCPD funding for the new Power Block Project high-priority doors for 2015 and consideration of additional funding for future years. The DCISC notes that six of the highest priority 16 fire doors have been replaced. The DCISC should continue to monitor the replacement of DCPD fire and other safety function doors.

4.4

DCPD's inspections and repairs of the Intake Structure concrete appeared appropriate to assure continued operation of the structure for normal and emergency functions.

4.5

It appears to the DCISC Fact-finding Team that there has been little improvement in DCPD System Functional Failures (SFFs) since July 2010, when originally reviewed. This has been and is still a concern to the DCISC. The DCISC should review the SFF status in mid-2015.

4.6

DCPD's 2R18 Refueling Outage met essentially all goals and was considered a success by DCPD. The DCISC considers it a success from a nuclear safety perspective.

4.7

The DCPD radioactive gas, liquid, and solid waste management systems are all healthy (White) each with minor issues which are being addressed.

4.8

The DCPD Equipment Qualification Program appeared satisfactory. Because of an upcoming retirement, a new engineer is being qualified for the process.

4.9

The DCPD 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.

4.10

The DCPD Radiation Monitoring System, consisting of both analog and digital components dating back to the 1970s, 1980s, and 1990s, has had availability and reliability problems up until the fourth quarter of 2013, when corrective actions resulted in noticeable improvements. For sustained improvements DCPD Engineering is developing a Long-Term Radiation Monitoring Strategy scheduled for completion in mid-2015. The DCISC should review that strategy at that time.

4.11

The Nuclear Safety Oversight Committee summary meeting with DCPD management was focused on achieving excellence. The NSOC concerns and recommendations appeared appropriate.

4.12

DCISC meetings with NRC resident inspectors continue to be useful for sharing concerns and for reporting the results of reviews and activities.

5.0 Recommendations:

5.1:

It is recommended that DCPD review again the causes of its Safety System Functional Failures (SSFFs) and develop and implement corrective action which will eliminate or significantly reduce the number of SSFFs.

Basis for Recommendation:

Since March 2010, when the DCISC began its review of DCPD SSFFs, DCPD has made little progress in reducing the numbers of its SSFFs as shown below for the last two years:

Quarter	Unit 1 SSFFs	Unit 2 SSFFs
1Q13	3	3
2Q13	3	4
3Q13	3	4
4Q13	3	3
1Q14	4	2
2Q14	5	2
3Q14	3	1
4Q14	3	2

6.0 References

6.1

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.3, Section 3.11, “Pressurizer Weld Overlay Indication Update.”

6.2

Ibid., Volume II, Exhibit B.63, “Pressurizer Weld Overlay Indication Update.”

6.3

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 22, 2014, Volume II, Exhibit B.9, “Containment Fan Cooler Unit.”

6.4

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.8, Section 3.6, “Containment Fan Cooler Unit Anti-Rotation Couplings.”

6.5

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 22, 2014, Volume II, Exhibit D.7, Section 3.5, “Fire Door Issues.”

6.6

Ibid., Exhibit D.1, Section 3.13, “2R17 Intake Concrete Work.”

6.7

Ibid., Exhibit D.7, Section 3.7, “Safety System Functional Failures.”

6.8

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014,” Approved October 22, 2014, Volume II, Exhibit D.9, Section 3.4, “Outage 1R18 Performance Results.”

6.9

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.4, Section 3.3, “Environmental Qualification (EQ) Program Update.”

6.10

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015,” Approved October 20, 2015, Volume II, Exhibit D.2, Section 3.9, “Feedwater Chemistry and Steam Generator Health.”

6.11

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014,” Approved October 22, 2014, Volume II, Exhibit D.5. Section 3.1, “Observe Plant Health Committee Meeting.”

6.12

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011,” Approved October 22, 2011, Volume II, Exhibit B.6, “Report on Attendance at NSOC Meeting.”

6.13

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014,” Approved October 22, 2014, Volume II, Exhibit D.8, Section 3.8, “Meeting with NRC Senior Resident Inspector.”

25th Annual Report, Volume 2, Exhibit D.5, Diablo Canyon Independent Safety Committee Report on Fact Finding Meeting at DCPD on December 2–3, 2014 by Per F. Peterson, Member, and David C. Linnen, Consultant

1.0 Summary

The results of the December 2–3, 2014 fact-finding trip to the Diablo Canyon Power Plant in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Status of Large Station Transformers
2. Foreign Material Exclusion Program
3. Follow-up on Responses to California State Water Resources Control Board SWRCB) Initiative on Closed Loop Cooling
4. Office/Personnel Seismic Safety
5. Residual Heat Removal System
6. Maintenance Training Program
7. Update on Tsunami Hazard
8. Meeting with NRC Senior Resident Inspector
9. Management Observation Program
10. Status of the Independent Spent Fuel Storage Installation (ISFSI)
11. Flexible Power Operations
12. DCISC Chairman Meeting with PG&E Chief Nuclear Officer

2.0 Introduction

This fact-finding trip to the DCPD 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 DCPD 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 Status of Large Station Transformers

The DCISC Fact-finding Team (FFT) met with Manuel Munoz, System Engineer for Large Station Transformers. The DCISC last reviewed this topic in April 2013 (Reference 6.1) when it concluded:

DCPP is resolving their large transformer issues and expects both units of the 230 kV System to improve from Yellow to White by February 28, 2014 with actions submitted for approval to move from White to Green. Unit 2 of the 500 kV System is Green, and DCPP expects to improve Unit 1 from Yellow to Green by the third quarter of 2013. DCPP's schedule for installing protective walls between the three phases of the Main Bank Transformers has slipped considerably, which is a concern to the DCISC though not a safety issue.

Since the April 2013 Fact-finding Meeting, the station has experienced several upsets (i.e. flashovers to ground) in its high voltage systems that are external to, but near to the plant. Careful examination of these events has determined that the contributor to the flashovers is buildup of contamination, including sea-salt aerosols, on the affected components from the atmosphere around the plant. Recent prolonged dry spells, during which build-up occurs, interspersed with periods of light rain, which is insufficient to wash contamination away but increases the electrical conductivity of the deposits, have further aggravated the situation. The problem has been determined to be more severe for Unit 2 equipment that is located near the southeast corner of the turbine building due to the effect of onshore wind entraining the mist from the station's outfall, which is carried between the Turbine and Administration Buildings and deposits preferentially in this area where the Unit 2 transformers are located. This Fact-finding Visit focused on the status of and plans for DCPP's Large Transformers as continuing follow-up to Fact-finding Visits that were conducted in April 2013 and earlier.

The DCISC FFT was provided the most recent System Health Reports for the 230 kV and 500 kV Systems. The information pertaining to the transformers in those systems is as follows:

230 kV System

- The System Health Reports noted that loss of this system provides a 5% contribution to Core Damage Frequency.
- Replacement of Unit 1 230 kV Startup Transformer 1-1 (230/12 kV) bushings with bushings of silicone rubber is scheduled for Refueling Outage 1R19 (October/November 2015).
- It was noted that Unit 2 Startup Transformer 2-1 bushings and lightning arrestors have been replaced with arrestors that have silicone rubber components.
- It was noted that Unit unavailability criteria have been routinely exceeded due to maintenance activities that require periodic cleaning of the 230 kV Startup Transformers.

500 kV System

- An adverse trend was noted regarding Unit 1 Main Bank Transformers. Oil sampling has indicated long term degradation of the insulation of the transformer windings. The Plant Review Committee authorized replacing the oil pumps to provide increased recirculation flow of the oil. Pump replacements are scheduled for Refueling Outage 1R19 (October/November 2015). It was further noted that the cooling setpoint was lowered, and this has helped reduce the gas generation.
- From the Unit 2 500 kV Report:
 - Margin Management Program: Undersized motor starters, Main Bank Transformer C phase

- U2 Main Bank Transformer A & B phases, Cooler Breaker AIC (Amps Interrupting Capacity) Rating undersized. (AIC Rating is the maximum number of surge amps that can be served to the equipment and still safely trip off when the amperage gets too high.)
- Although the following information extracted from DCPD Unit 2's 500 kV System Health Report is not directly related to transformer health, it became of interest to the DCISC FFT. The information pertains to a design change that may be needed to improve 500 kV backfeed time. The information in the above mentioned Health Report notes that DCPD's Final Safety Analysis Report (FSAR) states that 500 kV backfeed can be achieved in 30 minutes after a Unit Trip, compared to the original time of 30 seconds that was established in the original Safety Analysis Report (SAR). As mentioned in the System Health Report, this may raise a question regarding the design basis documentation of Diablo Canyon's compliance with 10 CFR 50 Appendix A General Design Criteria (GDC) 17 (Electric Power Systems) with respect to the 30 minute vs 30 second time criterion for 500 kV back feed.

As extracted from the DCISC's April 2013 Fact-finding Report, the station has recognized that if a fire were to occur on any of the Main Bank Transformers and spread to adjacent transformers, the affected Operating Unit could be shut down for over a year in order to replace the transformers. At the time of the April 2013 Fact-finding Visit, DCPD planned to construct walls between these transformers in the R21 outages (which had been rescheduled from the R18 outages) to meet Long Term Plan targets. Though not a safety issue per se, the April 2013 DCISC FFT expressed concern that the schedule had been delayed for over four years. This current December 2014 FFT also notes the potential impact of this issue.

Conclusions:

DCPD is continuing to pursue transformer improvements and preventive measures that are designed to strengthen the capabilities of this equipment to better withstand the effects of high salinity in the local atmosphere and as aggravated by prolonged dry spells that have been interspersed with periods of light rain. Station actions in this area appear to be appropriate and aggressive. Since the most recent PG&E presentation on transformer health at a DCISC Public Meeting was in November 2010, the DCISC should consider scheduling a PG&E presentation on transformer health at a Public Meeting in the near future. The DCISC should separately pursue the issue of 500 kV backfeed time that was noted during this Fact-finding Visit.

Recommendations:

None

3.2 Foreign Material Exclusion Program

The DCISC Fact-finding Team (FFT) met with Craig Stolz, Foreign Material Exclusion (FME) Coordinator and Seismically Induced Systems Interaction (SISI) Program Coordinator, for an update. The DCISC last reviewed this topic in January 2012 (Reference 6.2) when it concluded:

Station Performance appears to be improving with respect to the Foreign Material Exclusion Program. Efforts to achieve this improvement have increased noticeably. The DCISC should continue to follow progress, especially after refueling outages. This progress check may not need to be part of a Fact-finding visit, but could be included in DCPD's briefings at Public Meetings.

The purpose of the FME Program is to prevent the undesired and potentially harmful intrusion of foreign materials into closed systems or other plant environments. 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 occur during plant outages when many system repairs, modifications, inspections, and tests are performed. Mr. Stolz noted that DCPD has incorporated aspects of FME techniques in DCPD's Human Performance Training that is conducted in a training facility specifically designed to address human performance issues. Various scenarios are presented to the students that expose the students to challenges in FME, among other aspects, as a part of the work/training activities in which the trainees are engaged.

In addition, personnel are encouraged to report any conditions or aspects of performing their work in the plant that they feel need to be addressed, including those from an FME standpoint. One example is that the welding on an open system can result in very thin, scale-like byproducts that can adhere to the internals of the pipe. This was identified during boroscopic examination of the piping internals. Another involved tube plugging of tubes in the main condenser where the "pop-it" tube plug positioner and washer had been installed on the insertion tool while the worker was inside the main condenser. This led to a worker dropping the positioner and washer into the lower part of the condenser, requiring hours of lost time to recover the items. One solution was to install those devices on the positioner prior to entry into the condenser. Another was to install a "Catcher" throughout the condenser, whereas the "Catcher" had previously been installed around the specific work area. Other areas in which FME issues have arisen have involved work on Feedwater Heaters and Moisture Separator Reheaters. Steam Generator inspections have also identified small pieces of foreign material (about 1/8 inch in diameter) that have come from the gaskets of feedwater heater divider plates.

Mr. Stolz noted that this increased emphasis in reporting has received great support by and participation of station workers. At first a temporary increase occurred in reported FME issues, but this was accompanied by more detailed worker input on the nature of the FME issue. Mr. Stolz noted that of the 16 FME issues that were reported during the most recent refueling outage, 2R18, only 5 or 6 were caused by human performance, while the others were caused by equipment/system issues.

Station performance is reported and tracked in the monthly Plant Performance Improvement Report (PPIR). The indicator is based on the number and significance of FME events each month. Significance is reflected on a point scale agreed upon throughout the nuclear industry as follows:

- FME Significant Event (Level 1) = 21 points
- FME Threat (Level 2) = 10 points
- FME Condition (Level 3) = 1 point

The overall health of the FME program is then measured by the Key Performance Indicator (KPI) for the station, given by:

$$KPI = 100 - n(21 \times \# \text{ Significant Events} + 10 \times \# \text{ Threats} + 1 \times \# \text{ Conditions})$$

In the above formula, $n = 0.5$ for DCPD to make the KPI a "per unit indicator for DCPD. Overall, FME performance is then graded on the following scale:

- Green = 95 to 100
- White = 90 to > 95
- Yellow = 80 to > 90

- Red = Below 80

From the above tables and the KPI grading formula, it can be seen that for the station to earn a Green rating in a given month, it must have zero significant FME Events; and if it experiences one FME Threat in a month, it must experience no FME Conditions in that month to earn a Green rating. Also, one FME Significant Event in a month would drive the overall performance indicator to Yellow for that month. Because the vast majority of FME issues occur during outages, FME performance is also graded and graphed over rolling 6 month periods.

At the time of this Fact-finding Visit, the most recent FME Performance Report was for the monthly periods including October 2013 through October 2014. During this period, the rolling six-month FME indicator was Green for all but three of the months and that indicator was White for the three other months. This compares to a nine month period, March 2011 through November 2011, (which was examined during the DCISC's prior review of this topic), where the rolling six-month indicator fell to Yellow or White during four of the nine months.

As would be expected, the vast majority of FME issues occur during refueling outages, when plant systems are opened for maintenance or modification. Mr. Stoltz indicated that DCPD has been actively engaging the work force in this regard. Workers have been strongly encouraged to report impediments to error free work. Mr. Stoltz noted that, when a problem emerges, the challenge becomes to identify why the problem arose. One example was the corrective action taken with respect to the tube plug positioner discussed earlier in this section of the Report with respect to work in the Main Condenser.

Conclusions:

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.

Recommendations:

None

3.3 Follow-up on Responses to California State Water Resources Control Board SWRCB) Initiative on Closed Loop Cooling

The DCISC Fact-finding Team (FFT) met with Brian Cunningham, Supervisor of Environmental Operations. The DCISC has been studying this issue since December 2010, and conducted its previous discussion of this topic with DCPD in May 2014 (Reference 6.3) when it concluded the following:

The use of salt water for closed-cycle cooling, and the location of cooling towers to the south of the DCPD plant, will have greater adverse safety impacts compared to northern siting of cooling towers using fresh water. The use of salt water for cooling towers is problematic, due to very large increases in the rate of salt deposition on equipment during periods of adverse weather that may result in failures of key safety-important systems, in particular off-site power supplies and emergency diesel generators. Both northern and southern siting will have large impacts on underground utilities, including safety-related Auxiliary Salt Water systems and underground fuel tanks for emergency diesel generators, and detailed design information will be needed to fully assess these impacts. Southern siting has a much larger impact on site access and emergency response capabilities during construction than northern siting, although acceptable site access appears possible for both options after construction is complete. The DCISC should continue to follow studies of alternatives to Once Through Cooling closely, particularly if salt-water cooling towers are selected.

The above Conclusion was drawn from DCISC's review of additional studies that Bechtel had been directed to perform with regard to the potential installation of salt-water, rather than fresh-water, cooling towers and located to the south of the plant.

Subsequent to the DCISC's Fact-finding Trip in May 2014, the DCISC continued to refine its examination of this issue. On July 3, 2014 the DCISC received a copy of Bechtel's draft Addendum on the use of salt water cooling towers south of DCPD and on August 6, 2014, DCISC posted its draft evaluation of Bechtel's report. On August 8, 2014, DCISC held a public meeting to review comments received from the Public. The comment period was then extended further, and 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 of Modification 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." DCISC's Preliminary Evaluation was provided for the SWRCB's consideration at its meeting on November 18, 2014. The DCISC also specifically noted in its report that it would continue to study the safety implications of alternatives to once-through cooling, recognizing that additional information might be developed concerning these issues by Bechtel and/or PG&E. Therefore, it was (and is) possible that DCISC might modify its own evaluations of these open issues.

Some of the major issues noted by DCISC's review are as follows:

- Although the majority of construction work would occur during a 6.3 to 6.5 year period during which plant operation would continue, both units would need to be offline during the final 2.3 years of construction.
- Two major safety-related systems are impacted substantially: Auxiliary Salt Water, (ASW), which provides safety related heat-removal for the reactors, spent fuel pools, and other safety-related equipment; and the Emergency Diesel Generators (EDG), which provide the last supply of electricity to the plant. The ASW piping must be rerouted and replaced with underground piping; and two 50,000 gallon underground diesel fuel tanks must be removed and replaced.)
- Although the plant training facility and the security facility would remain continuously available during the entire construction period, twenty-two buildings would need to be demolished and reconstructed, including the fire department building and the fire operations garage
- A new service water system to provide once-through-cooling is anticipated to be needed.
- 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-911 security changes

In summary, the DCISC's October 14, 2014 report contained a number of Conclusions and Recommendations: *(The Conclusions are listed in their respective section at the end of this topic of the Fact-finding Report. DCISC's Recommendations are listed immediately below. They are included as documentation of DCISC's Recommendations in its October 17, 2014 Report to the California State Water Resources Control Board and, therefore, do not require a Response or action by PG&E at this time. Therefore, these Recommendations will not be included in the "Recommendations" Section of this Fact-finding Report.)*

DCISC Recommendation 1: An evaluation should be performed to understand the impact of southern-sited cooling towers on plant security and emergency response capabilities.

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 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.

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.

DCISC's October 14, 2014 report also reflected on other earlier major DCPD construction projects that have affected plant access, most notably the major post 9/11 security upgrades, where all of the plant security modifications were assessed for their safety impacts, where temporary security measures were implemented, and where the modifications were examined with respect to their effect on operations and maintenance.

In addition, DCISC's October 14, 2014 report to California SWRCB revisited DCISC's earlier review and assessment of Bechtel's initial study of closed cooling tower options as well as DCISC's conclusions regarding that Bechtel study, as contained in DCISC's May 25/26, 2014 Fact-finding Report. Since DCISC's specific four major conclusions for this earlier review have already been documented and discussed in DCISC's May 2014 Fact-finding Report, they will not be duplicated in this December 2014 Fact-finding Report. However, this December 2014 Fact-finding notes that those four major conclusions remain valid.

The DCISC Fact-finding Team also briefly toured the 85-foot level of the Turbine Building to inspect potential flooding hazards associated with the turbine condensers located at this elevation. This "85-foot" level is actually "ground level" which is 85 feet above the Pacific Ocean. With cooling towers, the large-diameter circulating water piping, water boxes, and condenser tubes would operate at higher pressure, with their water supply located above the condensers rather than below. The key concerns for flooding involve the emergency diesel generators and safety related electrical switchgear that are at the same elevation and adjacent to the condensers. This equipment is housed in rooms separate from the condenser area, so the primary flooding risks would come from the doors that connect these areas. Any large-scale flooding from the condensers would most likely flow out exits from the west side of the turbine building, but a detailed flooding assessment will be needed to confirm this.

To reduce the size of the cooling towers in order 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 cooling towers being considered are sized to operate with higher circulating water temperature than the earlier design that was considered. This results in a somewhat higher condenser back pressure and somewhat lower output from the plant turbines. However, the turbine vendor has indicated that these low pressure turbines can operate reliably at a higher condenser pressure of 4 to 5 inches Hg.

Conclusions:

The impacts of southern siting of cooling towers on plant access during construction, and the 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.

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.

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 will 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. The 85-foot elevation is “ground level” for the Turbine Building because the plant is on a cliff that is 85 feet above the Pacific Ocean. Southern siting would also require redesign and replacement of the underground Auxiliary Saltwater System piping, which, when modified by DCPD 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.

The design of the proposed temporary emergency diesel generators will require very careful review to assure that safety can be maintained.

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.

The use of salt water cooling towers could result in an increase in the rate of deposition of salt on DCPD 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 Independent Spent Fuel Storage Installation (ISFSI), although these effects should be much less because of the longer distance from the ocean to the ISFSI.

Operation of the DCPD condensers at a higher pressure of 4 to 5 inches Hg is unlikely to affect plant safety significantly.

Recommendations:

None

3.4 Office/Personnel Seismic Safety

The DCISC Fact-finding Team met with Ken Pazdan, Manager of Construction Management, for an update on DCPD’s Workplace Seismic Safety Program. The DCISC last reviewed this topic in December 2013 (Reference 6.4) when it concluded the following:

DCPD’s progress on resolving its Workplace Personnel Seismic Safety Issues has been satisfactory and responsive to the DCISC’s concerns

DCPD initially had in place a program called Seismically Induced Systems Interaction (SISI) Housekeeping Program,

which is used to assure that safety- and non-safety-related components cannot adversely interact with safety-related components during an earthquake. The DCISC last reviewed that program in May 2011 (Reference 6.5) and concluded:

Performance appears to have improved considerably in the area of DCP's Seismically Induced Systems Interaction Housekeeping Program since the DCISC Fact-finding Team's last review of this topic in July 2010. Recognizing that increased effort and attention to detail on this issue will be needed as a result of the accidents at Fukushima, the DCISC should review this topic on a periodic basis through Fact-finding trips and/or through DCP presentations at Public Meetings.

DCP's SISI program is designed to protect plant equipment needed for safe operation and shutdown. However, DCP did not have a similar program to protect plant personnel in office spaces and other workspaces from tall furniture which could be toppled by an earthquake and injure them or block their safe egress, so they can then gain access to critical plant areas. The DCISC began getting the plant's attention on this issue in May 2010 (Reference 6.6), and DCP management began taking ownership of this issue shortly after that time. Subsequent DCISC Fact-finding Visit Teams observed that DCP was steadily addressing this issue, and station emphasis on the issue increased over time. During DCISC's most recent progress check in December 2013 the Fact-finding Team determined that DCP had made substantial progress, and DCP noted that all remaining deficiencies would be identified and documented for tracking of resolution by June 2014 and that all deficiencies would be resolved by December 2014.

The purpose of this Fact-finding Meeting was to determine what additional progress had been made and the status of the previously planned activities. Mr. Pazdan noted that all planned actions had been completed and there were no more open items. At that point, Dr. Petersen, DCISC Chairman, and Mr. Linnen devoted a few minutes to inspecting the west corridor of the Training Building's 2nd Floor (immediately outside DCISC's meeting room). During that brief period, Dr. Peterson identified a planter box resting unsecured at the top of a six-foot high office/corridor divider and an unsecured, heavy, six-foot high hutch standing against a wall inside an office on the north end of that corridor. Prior to the conclusion of that day, Mr. Pazdan notified the DCISC Fact-finding Team that both items had been secured.

Conclusions:

DCP has been making good faith efforts in recent years with regard to Office/Personnel Seismic Safety. Much progress has been made, and status is at the point where an Action Plan is no longer needed. However, it is likely that some potential hazards may have been overlooked and could pose a risk to employees and/or might impede employee response to an earthquake. DCP should consider ways to encourage its employees to self-report items of potential risk. Also, PG&E's methods of responding in its corporate offices in San Francisco after the 1989 Loma Prieta earthquake, which shook all of San Francisco and environs and caused dozens of deaths, might be helpful to DCP. The DCISC's next review of this topic should consist of touring station office spaces.

Recommendations:

None

3.5 Residual Heat Removal System

The DCISC Fact-finding Team met with Jaime Salazar, System Engineer for the Residual Heat Removal (RHR) and Containment Spray (CS) Systems, and Eric Brackeen, System Engineer for the Reactor Coolant System (RCS). The DCISC last reviewed the RHR System in April 2011 (Reference 6.6) when it concluded:

It appears that the DCPD Residual Heat Removal Check Valve Inspection and Testing Program is appropriate to assure the check valves remain functional and meet their design and operating requirements.

The RHR System is one of a number of systems whose purpose is to remove heat from the Reactor Coolant System (RCS). During normal operation the Main Steam and Feedwater Systems work in combination to perform this function. When normal feedwater is not available and the operating unit is shutdown, the Auxiliary Feedwater (AFW) System performs this function to maintain or reduce RCS temperature until the RHR System is placed in service.

The RHR System is a safety related system, and one of its purposes is to add water and remove heat from the RCS in the event of a Loss of Coolant Accident (LOCA). In such an event, initially two high head (i.e. high discharge pressure) Safety Injection Pumps, which are not part of the RHR System, are designed and installed to resupply water into the RCS from Boric Acid Makeup Tanks and then from a Refueling Water Storage Tank in order to maintain cooling of the nuclear fuel. As RCS pressure decreases the RHR pumps can then be called upon to operate in place of those high-head pumps. These RHR pumps are each rated at 3,000 gallons per minute (gpm) at a differential pressure of 155 pounds per square inch differential (psid). They take their suction from a 245,000 gallon Refueling Water Storage Tank until the tank nears depletion, at which time their suction supply is transferred to the Containment Building Sump which would have been collecting coolant resulting from the LOCA.

The Fact-finding Team was provided with copies of the RHR System Health Reports for both Unit 1 and Unit 2 for the period October 1, 2014 to December 31, 2014. The last time these systems were reviewed by DCPD's Plant Health Committee was in September 2013 for Unit 1 and May 2013 for Unit 2. Both Health Reports indicated the intent to have the systems next reviewed by the Plant Health Committee by May 2015.

The RHR System Health for Unit 1 was rated White and for Unit 2 was rated Green. System Health is rated on a descending scale of Green, White, Yellow, and Red, where Yellow and Red are considered to be Unhealthy, Green is Healthy, and White reflects a condition where certain actions are in place to return the system to the most desired condition, and the timing of those actions is considered to be acceptable.

In addition to the overall health rating, each system is rated separately on each of several dozen performance category groupings, as follows: Reliability, Material and Equipment Condition, Conformance with the NRC's Maintenance Rule, Operations Concerns, Performance Monitoring, and Design. All of these performance groupings were rated Green for both Units.

Nevertheless, within the performance category grouping of Material and Equipment Condition both Units 1 and 2, both Units share two issues:

- One relates to the potential situation described earlier, where RHR might be called upon to shift suction to the Containment Sump in the event of a LOCA. Such a postulated accident could result in debris impinging on the suction screens in that Sump, which would tend to impede the supply of coolant to the RHR Pumps. Some issues need to be resolved at the test lab regarding the testing that has been performed with respect to this situation.
- The second issue, which is related to the situation described immediately above, pertains to a reduction in the calculated margin for the pumps' Net Positive Suction Head due to a revision in the calculated determination of an increase in the pumps required Net Positive Suction Head.

The issue that distinguishes Unit 1 as White compared to Unit 2's Green overall rating is that a weld on the stem pipe to a Unit 1 relief valve had cracked slightly resulting in a loss of barrier integrity of the pipe. This small leak was indicated by a small buildup of boric acid on the pipe. The indication of this leak was discovered in June 2013, and the Unit was then shut down for repairs. The weld was repaired soon after shutting down the Unit, and plans are to install a new rigid lateral support during Unit 1 refueling outage 1R19 to reduce the chances of piping vibration which was determined to be the likely cause of the crack and leak. Although the leak was repaired, Unit 1's Health will not be returned to Green until this lateral support is installed, to better assure that this previous cracking will not recur.

Conclusions:

The Residual Heat Removal Systems of both Units 1 and 2 appear to be in good health. The DCPD System Engineer appeared to be highly knowledgeable of various conditions that impact the health of his systems. The System Health Reports provide a good assessment of system health and of plans to address identified issues. The scheduling of the next Plant Health Committee Review of this system in May 2015 appears to be appropriate.

Recommendations:

None

3.6 Maintenance Training Program

The DCISC Fact-finding Team (FFT) met with Jeff Harker, Manager of Maintenance and Technical Training. This is DCISC's first review that focused on maintenance training as an entire program. However, the DCISC has periodically observed Maintenance Training activities, the most recent of which was in September 2013, during the conduct of a Mechanical Power Transmission Class (Reference 6.7), when the DCISC FFT concluded:

The DCPD Mechanical Maintenance Course on Mechanical Power Transmission appeared to be well prepared with good materials, appropriate for the type of students enrolled, and effectively instructed.

Mr. Harker outlined the organizational structure of Maintenance Learning Services. Each of the Mechanical, Electrical, and Instrumentation and Control training sections in the department is headed by a training supervisor and staffed with full-time training instructors for the respective technical disciplines. In addition, the department has separate sections that provide training to Chemistry and Engineering personnel as well as General Employee Training, both of which are not the subjects of this Fact-finding topic.

Mr. Harker noted that station personnel need to be formally qualified to perform various work activities in one of the three maintenance disciplines mentioned above. It is possible that some personnel who are hired to work at DCPD have already been qualified for certain activities upon arrival on site. However, they need to provide documentation of this current, transferable qualification from their previous employer. If there is any doubt as to the transferability of the previous qualification, the individual will be provided the required training by DCPD staff.

The approach to each training topic is affected by the Difficulty, Importance, and Frequency of the activity. Also, two broad classifications of training at DCPD are initial training and continuing training. Continuing training may consist of a refresher course or elements of a broader topic, or it may focus on selected aspects of a particular area, based on station operating experience.

Mr. Harker further noted that refinements to training can be driven by observations of training by managers and supervisors, by DCPD's Quality Verification personnel, or by peer reviewers from the industry. In addition, a comprehensive training self-assessment is conducted every other year. Focused self-assessments of training are

conducted on particular aspects of training, and student feedback is also used as input for assessing the effectiveness of training.

Mr. Harker provided the DCISC Fact-finding Team with one example of a “Program of Instruction” for a maintenance discipline: a 76-page document pertaining to and identifying the elements of the Initial Training for Mechanical Maintenance Personnel. The Table of Contents lists 14 training topics pertaining to qualification in “Fundamentals,” another eight topics pertaining to “Basic Qualifications,” and 12 more pertaining to “Selected Qualifications Courses,” such as Reactor Coolant Pump Seals, Safety and Relief Valve Repair, Couplings Maintenance, Air Compressors, Freeze Seals, etc. Each of those “Topical” pages in the Program of Instruction then contains listings of the various prerequisites for the specific topical qualification as well as the specific training courses and evaluations that are required in order to be qualified for that particular component or piece of equipment.

One example topic is Safety and Relief Valve Repair. The qualification page for this topic lists 13 prerequisite topics on which the trainee must first be qualified and then lists three more courses beyond “Safety and Relief Valve Repair” that the trainee must pass in order to become qualified to perform repair of safety and relief valves.

Another additional source of input that is used to help identify the potential need for additional training in any given area comes from the industry’s sharing of its events, issues, and activities. DCP’s Performance Improvement group reviews such information and relays it appropriately within the station.

During the first half of 2014 DCP performed a self-assessment of its maintenance and technical training programs. The following listing is a summary of the conclusions related to the structuring and performance of training:

- In a few cases plant modifications that affected training were not sufficiently evaluated.
- In some cases adherence to task retraining was not sufficiently reinforced.
- A strength was noted in DCP’s maintenance and technical labs where the station has been using innovative mockups to provide the training. This strength is consistent with DCISC’s assessment several years ago when visiting DCP’s facility for training personnel in the area of human performance.
- A positive comment was made regarding the station’s rigor in implementing on-the-job training and task performance evaluations.

Conclusions:

DCISC’s Maintenance Training Program is extensive and rigorous. The number and variety of inputs to training, both in-house and external to DCP, contribute to the rigor of this program. DCISC’s next review of this topic from a programmatic overview should occur about two years hence. DCISC’s future focus should be on individual, or related, issues that arise at DCP and may have ties to training.

Recommendations:

None

3.7 Update on Tsunami Hazard Analysis

The DCISC Fact-finding Team met with Pat Nugent, Nuclear Projects Fukushima Manager, Terry Grebel, Nuclear Projects Licensing Renewal Manager, Stuart Nishenko, Senior Seismologist from PG&E’s Geosciences Department, and Scott Maze and Brendan Dooher of the DCP staff to discuss the recent progress on

understanding the issue of the hazard at the DCPD site from tsunamis. Grebel, Fukushima Project Manager, was the leader of this discussion on the DCPD side.

The DCISC last reviewed the tsunami hazard issue in November 2013 (Reference 6.8) when it concluded the following:

PG&E's technical work on tsunami hazards at the DCPD site is well-planned, proceeding very well so far, and working on the correct set of problems. The work is in fact moving rapidly toward achieving the needed understanding, and the technical quality seems to be excellent. The DCISC should continue to follow this work over the next few years.

This review is an update on the project whose prior DCISC review was conducted in November 2013 by DCISC Member, Dr. Robert J. Budnitz, and DCISC Consultant, Mr. R. Ferman Wardell. That review provides a detailed account of the history and status of this issue through November 2013. The purpose of this Fact-finding Meeting was to obtain an updated status of PG&E's reassessment of DCPD tsunami hazards.

At its June public meeting, the DCISC learned from a comment by a member of the public that a 2003 report by Dr. Robert Sewell on tsunami hazards at the DCPD site, developed with NRC support, had never been publicly released by the NRC. Until then, the DCISC had not been aware of that report. After that public meeting, the DCISC first asked the NRC resident inspector at Diablo Canyon to help obtain the report (in late June), and then filed a Freedom of Information Act request with the NRC in September 2014. The Sewell report was finally released to the public by the NRC on November 6, 2014.

The DCISC is currently reviewing the Sewell report and will continue to do so in the context of its broader evaluation of the tsunami hazard at the DCPD site.

The DCISC understands that, following discussion during its public meetings and with Dr. Sewell, the Committee's inquiries and its discussion with the NRC Resident Inspector concerning the release of the report, together with the Freedom of Information Request made by the DCISC, were principal factors in the NRC's decision to release the 2003 report.

For several years PG&E has been performing a reanalysis of the DCPD tsunami hazard, including tsunamis originating from distant seismic sources, as well as near-source tsunamis induced by submarine mass failure (e.g., and underwater landslide). These studies are not yet complete, but will be documented in the PG&E Hazards Assessment that is scheduled to be submitted to the Nuclear Regulatory Commission on March 15, 2015. The tsunami modeling will use the 3-dimensional NHWAVE hydrodynamic model for modeling bottom motion of the sea floor. This tsunami source will be propagated using the FUNWAVE-TVD model. Key phenomena that will be assessed include wave run-up, inundation and drawdown analysis, hydrostatic and hydrodynamic force analysis, debris and water-borne projectile analysis, and sediment erosion and deposition.

The detailed modeling and simulation will be completed in January and February of 2015, using bathymetry data from the 2006 PG&E Geosciences report and high-resolution numerical modeling. The DCISC should review this work in a future Fact Finding meeting.

Conclusions:

PG&E's technical work on tsunami hazards will be completed in March, 2015. The DCISC should review this work, and its relationship to the Sewell report, in a future Fact Finding meeting.

Recommendations:

None

3.8 Meeting with NRC Senior Resident Inspector

The DCISC Fact-finding Team met with Mr. Thomas Hipschman, DCP's NRC Senior Resident Inspector. DCISC last met with an NRC Resident Inspector in November 2014 (Reference 6.9), when it concluded:

DCISC meetings with NRC resident inspectors continue to be useful for sharing concerns and for reporting the results of reviews and activities.

Items of mutual interest that were discussed focused almost exclusively on Seismic and Tsunami issues. These included:

- Work being undertaken by PG&E to characterize the nature and extent of potential hazards with regard to both earthquakes and tsunamis utilizing the most current data identified by PG&E.
- PG&E's development of hydrodynamic models that can be applied to near and distant sources.
- PG&E's intent to submit a 10CFR50.54 report to the NRC in March 2014.
- Impact of frequencies on wave attenuation.
- Application of the seismic PRA to the determination of how equipment will be affected, which will lead to the determination of appropriate response actions.
- Progress made during recent years with regard to seismic bracing of tall cabinets and furniture, and the degree to which an earthquake can affect the ability of personnel to respond to an accompanying plant event.

Also discussed were flashovers and the impact of significant weather changes on the degree of vulnerability of the high voltage systems.

Conclusions:

DCISC meetings with the NRC Resident or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCISC.

Recommendations:

None

3.9 Update on Management Observation Program

The DCISC Fact-finding Team met with John Hart, Human Performance Supervisor, to discuss the status of DCP's Management Observation Program. The DCISC last reviewed this topic in December 2011 (Reference 6.10) when it concluded:

The DCISC concluded that the DCP Observation and Coaching Program is comprehensive, appropriately developed to meet station needs, and implemented satisfactorily.

This particular DCISC review of DCP's Management Observation Program was selected as a periodic check-up of the program, rather than having been prompted by any particular issues.

The DCP Observation and Coaching Program is controlled by DCP procedure OM15.ID3, "Observation and

Coaching,” which describes it as a robust, effective program consisting of three fundamental sub-processes...”:

1. Monitor Performance
2. Analyze Trends and Determine Action
3. Implement Improvement

The program is intended to provide an opportunity to observe, learn from, and coach someone in how they go about doing their job. The program is considered a low-level reporting tool, providing real time documentation and indications used to identify and correct latent weaknesses that exist in the organization. Among others, the observations are intended to:

- Identify organizational and human performance issues and provide insight and behaviors, tools, and resources needed to help workers accomplish their jobs
- Foster two-way communication between management and their employees and provide management interaction with personnel as they do their work
- Solve problems and remove barriers for more efficient work
- Communicate management performance standard expectations
- Provide a forum to monitor and improve human performance

The procedure provides guidance and expectations on quality and quantity of observations, feedback and coaching, analysis and trending of observations, and attributes of a good observation with “Do’s” and “Don’ts.” It is not intended to be used for “positive discipline.” The DCISC Fact-finding Team believes that the procedure is comprehensive. Observations are routinely reviewed by the next-higher level of management and at periodic Management Observation Meetings.

Mr. Hart noted that the station has changed its approach to the conduct of observations. Although the program had previously been aimed at identifying problems for the purpose of achieving improvements, as opposed to simply critiquing and criticizing, the revised approach has been even more oriented toward positive engagement, assistance, coaching, and identifying barriers as means of achieving error free work. This approach also focuses not only on the worker’s behavior but also the conditions in the working environments that can have an effect on the worker’s performance. In essence, the purpose is to help the worker rather than to criticize. The program is entitled the “Field Engagement and Assistant Program.” The changes resulted from “grass roots” meetings and Employee Advisory Council Meetings with DCP’s Senior Leadership Team (SLT). The program essentially reflects a change in philosophy from “Checking up on employees” to “Checking in with employees.”

Each affected manager is expected to spend one day each month observing work and providing feedback/assistance. This also includes engineering personnel who may be involved in testing, modifications, etc. Conditions noted in the field that can affect worker performance have been photographed, as appropriate, for use in developing the appropriate corrective action. Leadership training also includes aspects of implementing this enhanced program. Paired observations are even conducted where one observer views the worker, and a second observer views the first observer. This has been found to identify areas in which the observation process itself can be improved.

The program has resulted in identifying barriers to error free work. These barriers include aspects of worker performance, procedural and documentation aspects, and conditions at the work site. DCISC’s Fact-finding Team was provided with a listing of over three dozen such barriers. The following are a few examples:

Housekeeping at the job site

- Changing conditions
- Inadequate signage
- Distractions/interruptions
- Working surfaces wet or contain hazards
- Noise levels
- Staging of material
- Use of checklist
- Teamwork
- Documentation of status
- Insufficient detail

The intent is not only to eliminate barriers to the extent possible, but also to gain worker recognition of barriers that could affect the work being performed and of the accompanying need to address or compensate for those barriers.

The Fact-finding Team was also provided with an example of DCP's Daily Brief Sheet, which contained a Section on Safety Focus. This particular brief sheet discussed techniques that can be employed to avoid slips, trips, and falls. It also discussed the effect of potential distractions to personnel during the upcoming Holiday period, and also how to deal with situations likely to lead to errors, such as inadequate lighting around a particular component.

Conclusions:

Considerable attention and effort have been devoted during 2014 to enhancing DCP's Management Observation Program. This includes changing the basic approach from being somewhat critical of observed workers to being more supportive. The cooperative aspect of this program thus far has resulted in the identification of barriers to error free work, which can either be eliminated or addressed during the performance of work. This enhanced program is still in too early a stage to accurately evaluate its effectiveness with respect to worker performance. The results from DCP Refueling Outage 2R18, which should be available in early 2015, may provide preliminary indications.

Recommendations:

None

3.10 Status of Independent Spent Fuel Storage Installation (ISFSI) Expansion

The DCISC Fact-finding Team met with Rich Hagler, Supervising Project Engineer, to review the status of DCP's Independent Spent Fuel Storage Installation (ISFSI). DCISC last reviewed the physical characteristics of the ISFSI, including the process of transferring spent fuel from the plant Spent Fuel Pools to the ISFSI in March 2010 (Reference 6.11) when the DCISC concluded:

The 22-minute draft video of movement of spent fuel from the DCP Spent Fuel Pool to the DCP Independent Spent fuel Storage Installation (ISFSI) was well done and would be appropriate for the DCP to show at DCISC public meetings and public tours. Shortening of some segments such as canister

welding is recommended.

DCISC's spent nuclear fuel is stored in large metal Multi-purpose Canisters (MPCs), which are loaded into air-cooled Holtec Hi-Integrity Storage Modules that are transported to and loaded onto storage pads on a hill overlooking the power plant. The dry cask storage system that PG&E uses at the Diablo Canyon ISFSI is the Holtec International HI-STORM 100 System. The HI-STORM 100 System is a canister-based storage system that stores spent nuclear fuel in a vertical orientation (the outer cask, inner canister and the fuel rods inside are, in effect, standing up). It is a passive system that does not rely on any active cooling systems to remove decay heat from the spent nuclear fuel.

To withstand potential seismic forces, the HI-STORM 100 casks are anchored to the reinforced concrete storage pads, rather than simply resting on the pads. This anchoring is unique to DCPD and was implemented voluntarily in response to public concerns rather than being required by regulation.

The entire process of transferring used nuclear fuel from DCPD's Spent Fuel Pools (SFP) to the ISFSI is intended to preserve the integrity of the fuel and to protect the environment. To accomplish this, a rigorous process is followed with respect to every step of the activity. These steps are outlined as follows:

- A Multi-Purpose Canister (MPC-32), designed to store 32 used nuclear fuel assemblies, is loaded into a High-integrity Transfer Cask (HI-TRAC), which is then lowered into the Spent Fuel Pool (SFP).
- 32 used fuel assemblies are each loaded individually underwater in the Spent Fuel Pool into the MPC-32, which is in the HI-TRAC.
- The HI-TRAC is then removed from the pool, decontaminated while over the pool, and moved to the Cask Washdown area.
- A lid is then welded onto the MPC-32, which is then moved to the Forced Helium Dehydration Skid where the MPC-32 is drained and then flushed and filled with helium gas to remove moisture, after which a cover plate is welded on the MPC and the HI-TRAC lid is installed.
- The HI-TRAC is then moved out of the Fuel Handling Building via a Low Profile Transporter (LPT), and the HI-TRAC is then transferred to a larger Transporter, which carries the MPC-32 up the hill to the Cask Transfer Facility (CTF).
- At the CTF, which is near the final ISFSI storage pads, a very large cask referred to as the Hi-Integrity Storage Module (HI-STORM) becomes the container for MPC-32. A mating device is fastened to the top of the HI-STORM, and this mating device will be used to connect the bottom of the HI-TRAC to the top of the HI-STORM. The HI-STORM is then placed in a pre-constructed cavity in the ground and the bottom of the HI-TRAC (containing the MPC-32 with its 32 used fuel assemblies) is fastened to the mating device at the top of the HI-STORM.
- The top and bottom lids are then removed from the HI-TRAC, and the MPC-32, containing the 32 used fuel assemblies, is lowered into the HI-STORM.
- The HI-TRAC is then removed from the mating device, and a lid is installed on the HI-STORM.
- The Low Profile Transporter (LPT), which was used to transport the MPC-32 up the hill from the Fuel Handling Building, lifts the HI-STORM (now containing the MPC-32) out of the ground and moves the HI-STORM to its assigned location on the ISFSI pad, where the HI-STORM is bolted to its storage pad.
- The HI-STORM, allows for convection cooling of the MPC-32 and the configuration is designed to prevent overheating of the spent fuel assemblies, given the decay heat requirements for the used fuel that is permitted to be transported to the ISFSI.

Due to the current lack of an approved permanent repository for the nation's used nuclear fuel and to the storage limitations of nuclear plant Spent Fuel Pools, domestic nuclear power plants are finding it necessary to expand the capacity of their outdoor storage sites. DCPD is currently engaged in this activity. Currently DCPD has two ISFSI storage pads available and is in the process of constructing five more. Each of the seven pads will be able to store 20 HI-STORMs. Thus, there will eventually be room for storing 140 HI-STORMs. However, in order to accommodate the possible future need to move a HI-STORM, two cask locations will need to remain vacant. Therefore the total capacity of the ISFSI will be:

$(7 \text{ pads} \times 20 \text{ cask locations/pad} - 2 \text{ locations}) \times (32 \text{ fuel assemblies/cask location}) = 4,416 \text{ fuel assemblies}$

As shown in the photograph below, construction of the storage pads is an impressive activity. Each pad is composed of approximately 2,000 cubic yards of concrete reinforced with rebar. The pads are 8 feet thick. Each pad is created with a continuous pour of concrete that lasts 14 hours. Two concrete batching plants are on site, one wet and one dry. The five pads currently under construction were originally within the same Security zone as the two that are currently functional. Consequently, the Security fence needed to be moved to surround only the two functional pads in order for construction to be performed on the additional five pads in a non-Security area. That fence move began in January 2014, digging of the new beds commenced in mid-March 2014, and the laying of the bed-bars for the final pad was being performed at the time of this Fact-finding Visit, after which the concrete pour will commence.



Geologically, the ISFSI stands on the same “rock” as the plant; therefore, the ISFSI is exposed to the same seismic effects as the plant itself.

A recent issue that may have implications for ISFSIs has emerged and gained the attention of the DCISC after completion of this Fact-finding Visit. The issue pertains to whether there is a potential for stainless steel to be susceptible to chloride stress corrosion cracking, pitting corrosion, and crevice corrosion when exposed to certain environmental conditions, and for accelerated corrosion of the carbon-steel jackets of the canister overpacks to occur. Since chloride aerosols are transported in the atmosphere around any facility bordering the oceans, the DCISC intends to pursue this issue further, with respect to potential implications for DCP, including the used fuel stored in the ISFSI.

Conclusions:

Construction of the additional ISFSI pads appears to be proceeding in a well-managed manner. The DCISC should, and will, pursue the potential impact of atmospheric chlorides on carbon steel and stainless steel structures used in the ISFSI canisters and overpack, as well as other equipment at the DCP site.

Recommendations:

None

3.11 DCP Flexible Operations Update

The DCISC Fact-finding Team met with Jeff Summy, Senior Director Engineering and Projects. This was a follow-up to DCISC’s first review of this topic in December 2013 (Reference 6.12) when it concluded the following:

Flexible operation is used routinely in France; flexible operation could likely also be implemented at DCP if needed but would require further study.. Because flexible operations have the potential to affect plant reliability and safety, the DCISC should review results from any feasibility studies that are performed and continue to follow this topic closely.

The term “FLExible operation” refers to varying the output of an electric generating plant in response to the varying electric loads on the electric grid. This is distinguished from the current method of operating DCP, as well as operating many other U.S. commercial nuclear power plants, which involves operating consistently at full 100% power to serve the “Base load” on the electric grid.

At this time PG&E has made no decision to change its operations of DCP; it is their largest base load generation facility. Nevertheless, a contractor has examined the performance of some German plants, and a plant in the state of Washington has been engaged in varying power output to what appears to be a limited extent. Also, the French electric power system relies on nuclear power for a majority of its total electricity needs.

Currently, during high demand periods, some transmission lines can become congested and some generation can be paid substantially higher prices. Conversely, during low-demand periods of the year, transmission lines are relatively open and free of congestion, and all generators are paid similar price ranges. Nevertheless, during extremely low-demand periods there may be excessive generation, and some generation may be paid negative prices (i.e. the generator pays the user) if they cannot reduce generation output. For California, periods of low demand can be expected to be particularly common during the spring, when substantial hydroelectric generation may be available during non-drought years. Also, the contribution of fossil plants to flexible operations

diminishes the need for nuclear to modify its approach toward flexible operation.

Westinghouse pressurized water reactors can be cycled up and down in power, and DCPD has had experience with periodically curtailing power to 50% for short periods of time during winter storms as a precautionary measure. However, routine cycling of power raises potential issues with the reliability of the plant. Also, flexible operations will result in greater demands on water treatment (e.g. boration and deboration) and chemical polisher operation.

In addition, the cycling of nuclear power plants can cause thermal and other stresses on plant equipment, and make it more difficult to detect changes in plant parameters that can provide early indication of emerging equipment and system problems, such as detecting coolant inventory changes caused by small leaks. Also, there would be an expected impact on a plant's nuclear fuel cycle, and on the timing of refueling outages. Therefore, the implementation of flexible operations must be performed carefully to avoid negative impacts on plant reliability and safety.

Conclusions:

Although DCPD has expressed no intent to implement flexible power operation at this time, it has been examining the potential impacts that could arise from such a change to its operating practices, safety, and reliability. Experiences at other stations, including those in France, have provided input to this examination. Flexible operation will have a different impact on plant safety and reliability than does steady state operation. The DCISC will continue to follow this topic.

Recommendations:

None

3.12 Meeting Between DCISC Member and PG&E Chief Nuclear Officer

DCISC Member, Per Peterson, met with PG&E's Chief Nuclear Officer, Ed Halpin. Discussion included topics pertaining to this Fact-finding Visit and other items of mutual interest.

4.0 Conclusions

4.1

DCPD is continuing to pursue transformer improvements and preventive measures that are designed to strengthen the capabilities of this equipment to better withstand the effects of high salinity in the local atmosphere and as aggravated by prolonged dry spells that have been interspersed with periods of light rain. Station actions in this area appear to be appropriate and aggressive. Since the most recent PG&E presentation on transformer health at a DCISC Public Meeting was in November 2010, the DCISC should consider scheduling a PG&E presentation on transformer health at a Public Meeting in the near future. The DCISC should separately pursue the issue of 500 kV backfeed time that was noted during this Fact-finding Visit.

4.2

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.

4.3

The impacts of southern siting of cooling towers on plant access during construction, and the 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.

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.

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 will 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. The 85-foot elevation is “ground level” for the Turbine Building because the plant is on a cliff that is 85 feet above the Pacific Ocean. Southern siting would also require redesign and replacement of the underground Auxiliary Saltwater System piping, which, when modified by DCPD 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.

The design of the proposed temporary emergency diesel generators will require very careful review to assure that safety can be maintained.

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.

The use of salt water cooling towers could result in an increase in the rate of deposition of salt on DCPD 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 Independent Spent Fuel Storage Installation (ISFSI), although these effects should be much less because of the longer distance from the ocean to the ISFSI.

Operation of the DCPD condensers at a higher pressure of 4 to 5 inches Hg is unlikely to affect plant safety significantly.

4.4

DCPD has been making good faith efforts in recent years with regard to Office/Personnel

Seismic Safety. Much progress has been made, and status is at the point where an Action Plan is no longer needed. However, it is likely that some potential hazards may have been overlooked and could pose a risk to employees and/or might impede employee response to an earthquake. DCPD might consider ways to encourage its employees to self-report items of potential risk. Also, PG&E's methods of responding in its corporate offices in San Francisco after the 1989 Loma Prieta earthquake, which shook all of San Francisco and environs and caused dozens of deaths, might be helpful to DCPD. The DCISC's next review of this topic should consist of touring station office spaces.

4.5

The Residual Heat Removal Systems of both Units 1 and 2 appear to be in good health. The DCPD System Engineer appeared to be highly knowledgeable of various conditions that impact the health of his systems. The System Health Reports provide a good assessment of system health and of plans to address identified issues. The scheduling of the next Plant Health Committee Review of this system in May 2015 appears to be appropriate.

4.6

DCISC's Maintenance Training Program is extensive and rigorous. The number and variety of inputs to training, both in-house and external to DCPD, contribute to the rigor of this program. DCISC's next review of this topic from a programmatic overview should occur about two years hence. DCISC's future focus should be on individual, or related, issues that arise at DCPD and may have ties to training.

4.7

PG&E's technical work on tsunami hazards will be completed in March, 2015. The DCISC should review this work, and its relationship to the Sewell report, in a future Fact Finding meeting.

4.8

DCISC meetings with the NRC Resident or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCPD.

4.9

Considerable attention and effort have been devoted during 2014 to enhancing DCPD's Management Observation Program. This includes changing the basic approach from being somewhat critical of observed workers to being more supportive. The cooperative aspect of this program thus far has resulted in the identification of barriers to error free work, which can either be eliminated or addressed during the performance of work. This enhanced program is still in too early a stage to accurately evaluate its effectiveness with respect to worker performance. The results from DCPD Refueling Outage 2R18, which should be available in early 2015, may provide preliminary indications.

4.10

Construction of the additional ISFSI pads appears to be proceeding in a well-managed manner. The DCISC should, and will, pursue the potential impact of atmospheric chlorides on carbon steel and stainless steel structures used in the ISFSI canisters and overpack, as well as other equipment at the DCPD site.

4.11

Although DCPD has expressed no intent to implement flexible power operation at this time, it has been examining the potential impacts that could arise from such a change to its operating practices, safety, and reliability. Experiences at other stations, including those in France, have provided input to this examination. Flexible operation will have a different impact on plant safety and reliability than does steady state operation. The DCISC will continue to follow this topic.

5.0 Recommendations:

None

6.0 References

6.1

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.8, Section 3.3 “Large Transformer Update.”

6.2

“Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012”, Approved October 10, 2012, Volume II, Exhibit D.6, Section 3.5, “Foreign Material Exclusion Issues/Trends.”

6.3

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 22, 2014, Volume II, Exhibit D.9, Section 3.5, “Cooling Tower Study.”

6.4

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.5, Section 3.6, “Workplace Seismic Safety.”

6.5

“Diablo Canyon Independent Safety Committee Twenty-First Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011”, Approved October 5, 2011, Volume II, Exhibit D.11, Section 3.6, “Seismically Induced Systems Interaction (SISI) Housekeeping Program.”

6.6

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011”, Approved October 5, 2011, Volume II, Exhibit D.10, Section 3.4, “Residual Heat Removal System Check Valve Maintenance and Testing.”

6.7

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 22, 2014, Volume II, Exhibit D.3, Section 3.8, “Training Observation: Mechanical Power Transmission Class.”

6.8

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.4, Section 3.4, “Update on Tsunami Hazard Analysis.”

6.9

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.4, Section 3.??, “Not Issued Yet.”

6.10

“Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012”, Approved October 10, 2012, Volume II, Exhibit D.5, Section 3.6, “Observation and Coaching Program.”

6.11

“Diablo Canyon Independent Safety Committee Twentieth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2009—June 30, 2010”, November 17, 2010, Volume II, Exhibit D.7, Section 3.10, “Independent Spent Fuel Storage Installation (ISFSI) Video.”

6.12

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.5, Section 3.11, “Load Follow Update.”

25th Annual Report, Volume 2, Exhibit D.6, Diablo Canyon Independent Safety Committee Report on Fact Finding Meeting at DCPD on January 21–22, 2015 by Peter Lam, Member, and R. Ferman Wardell, Consultant

1.0 Summary

The results of the January 21–22, 2015 fact-finding trip to the Diablo Canyon Power Plant in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. FLEX and Spent Fuel Pool Instrumentation Quick Hit Self-Assessment
2. DCPD Seismic Studies and Submittals to NRC
3. Performance Improvement Program Status
4. Clearance Performance in Outages 1R18 and 2R18
5. Reactor Coolant Pump Review with System Engineer
6. Reactor Vessel Material Specimens and Pressurized Thermal Shock
7. Trouble Shooting Program and Examples
8. DCPD State of the Plant
9. Untimely Corrective Action on Potential Gas Intrusion into Containment Spray System
10. Meeting with NRC Senior Resident Inspector
11. DCISC Member Meeting with Chief Nuclear Officer
12. Single Point Vulnerability Program Update

2.0 Introduction

This fact-finding trip to the DCPD 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 DCPD 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 FLEX and Spent Fuel Pool Instrumentation Quick Hit Self-Assessment

The DCISC Fact-finding Team (FFT) met with Pat Nugent, Fukushima/FLEX Program Manager, for a report on the DCPD FLEX and Spent Fuel Pool Instrumentation Quick Hit Self-Assessment (QHSA). The DCISC last reviewed DCPD FLEX in August 2014 (Reference 6.1), when it concluded the following:

DCPD appears to be on track in developing and installing its Spent Fuel Level Instrumentation required by the NRC as a result of the Fukushima accident. The use of a video camera to monitor the pool level, as was suggested by a member of the public during the October 9-10, 2013 DCISC Public Meeting, would not be practical due to steam causing fogging of the lens. The DCISC should follow up after the new level measurement systems are installed and tested.

This QHSA was conducted in late September 2014 and report approved November 5, 2014. The objectives of the QHSA were as follows:

- Simulate an NRC inspection using NRC's draft temporary inspection instruction
- Develop an electronic "Binder" of documentation to support a future NRC inspection
- Review the Overall Integrated Plan (OIP) to assure that it is up-to-date
- Compare DCPD responses and implementation plans to industry guidance documents
- Verify that the top DCPD procedure requirements are being satisfied

The QHSA Team included three DCPD FLEX personnel, the Westinghouse Project Manager, and an external industry consultant.

Overall, the QHSA concluded that DCPD's program is in compliance with NEI-1206, "FLEX Mitigating Strategies for Beyond Design Basis External Events," which was endorsed by the U.S. Nuclear Regulatory Commission (NRC) to meet the requirements of its post-Fukushima Order EA-12-049. Additionally, there were some clarifications and additional documentation recommended, mostly in the training and procedures areas. Specific results of the QHSA are as follows:

1. Clarify the site strategy for portable lighting and communications in a FLEX master procedure.
2. Establish a list of operator actions for the first eight hours of an event and review the Seismically Induced System Interactions Program (SISIP) to assure FLEX routes would be available for operators to access selected areas of the plant.
3. Develop a method to control equipment/material on FLEX routes.
4. Combine Pressurized Water Reactor Owners Group (PWROG) FSGs 14/15 into the new FLEX master procedure.
5. Develop a Corrective Action Program (CAP) Notification for acceptance of Warehouse B calculation.
6. Complete the plan to identify tow vehicles and parking locations.

Each of the above recommendations had been entered into a separate CAP Notification to begin the evaluation of the appropriate course of action. DCPD plans to complete resolution of the recommendations by the end of June 2015 to meet their planned FLEX implementation dates of October 2015 for Unit 1 and May 2016 for Unit 2.

The DCISC Fact-finding Team (FFT) reviewed the QHSA and found it to be comprehensive and thorough. Included in the six recommendations above were specific items needing to be addressed. Many of them were actions which DCPD had already planned to address, such as the detailed SFP instrumentation design, which is currently

underway.

NRC performed a remote FLEX audit in December 2013 based on DCPD submittals and was satisfied with DCPD's progress and actions. They will perform a pre-implementation audit in August 2015 and a full inspection about December 2016 following DCPD full FLEX implementation in May 2016.

The DCPD FLEX Project is also performing a tsunami and seismic hazard evaluation in response to NRC's 10CFR 50.54(f) regulation (Reference 6.2). This evaluation will be submitted to the NRC by March 12, 2015. The DCISC should obtain that report and review it in a fact-finding meeting.

Conclusions:

DCPD appears to have satisfactorily performed its Quick Hit Self-Assessment of its FLEX Program and Spent Fuel Pool Instrumentation Project. The overall conclusion was that the FLEX Program was in compliance with industry and NRC guidance with specific recommendations for program enhancements and remaining work. The DCISC Fact-finding Team concluded that the Assessment and resulting action plans were appropriate. The DCPD FLEX program is on-schedule for on-time completion.

Recommendations:

None

3.2 DCPD Seismic Studies and Submittal to NRC

The DCISC Fact-finding Team met with Nozar Jahangir, Engineering Manager for the Seismic Program Update, for an update on the status of DCPD's upcoming seismic study submittal to NRC. The DCISC last reviewed these studies at its February 2014 Public Meeting (Reference 6.2).

This purpose of this fact-finding meeting was to follow up on Dr. Lam's statement on the following item from the June 2014 DCISC Public Meeting minutes:

Mr. Geesman stated that based upon the SSHAC workshop and the DCISC's discussion today it is clear that PG&E intends to submit a final seismic report to the NRC's Atomic Safety and Licensing Board (ASLB), on the matter of relicensing, sometime this month and yet the SSHAC and the 10 CFR 50.54(f) processes are not anticipated to be complete until March 2015. Dr. Budnitz stated that he is unconcerned about the regulatory process as it does not go to the safety of the plant and although he has not seen a submission by PG&E to the ASLB any such submission could not be considered to be final. Dr. Budnitz stated the DCISC was not in a position or charged with the task of reviewing NRC regulations but rather was charged to develop its independent understanding and assessment of the safety of DCPD. He concluded by stating the DCISC would, together with others, review the results of the SSHAC process as developed in the workshops. Dr. Lam stated he believed Mr. Geesman's concerns about how PG&E as the NRC's licensee is interacting with the federal regulator were well placed to the extent that it is worthy of further inquiry by the DCISC.

Upon reviewing the above, it was determined that there is no DCPD submittal planned to the NRC Atomic Safety and Licensing Board (ASLB); however, DCPD does plan to submit its response by March 12, 2015 to NRC's March 12, 2012 10CFR50.54(f) regulation regarding the 2011 Fukushima earthquake event. Work for this submittal is currently underway at DCPD. This work consists of analyzing and updating the DCPD seismic hazard using the NRC-specified Level 3 Senior Seismic Hazard Analysis Committee (SSHAC) expert peer review process. The analysis is also being independently reviewed by the California Independent Peer Review Panel (IPRP). This effort entails the use of the

more comprehensive Probabilistic Seismic Hazard Approach (PSHA) in accordance with the current NRC guidance for developing a state-of-the-art estimate of seismic hazard. As part of its evaluation, PG&E will use a logic tree approach to incorporate alternative models and parameters to determine the local site amplification for the DCPD site. In addition, the PSHA will also develop hazard curves that factor in the activity rates of all potential earthquakes on each of the local faults, which are not considered for a deterministic analysis. The hazard curves from the PSHA are then used to evaluate the plant risk. PG&E is scheduled to complete its reevaluation in March 2015.

Results of the deterministic review of existing faults and 3D analysis as required by California Assembly Bill AB-1632 are used as inputs to the March 12, 2015 seismic hazard submittal. Based on the California Assembly Bill, the California Energy Commission compiled a report in 2008 which included the recommendation that Pacific Gas & Electric (PG&E) perform additional seismic studies to supplement the original and ongoing seismic studies performed as part of DCPD's Long Term Seismic Program (LTSP), and that those studies be conducted using advanced technologies such as three-dimensional seismic-reflection mapping. From 2010 through 2014, DCPD conducted the recommended studies, performed further data analysis, and compiled a report titled the "Central Coastal California Seismic Imaging Project" (CCCSIP). Based upon new seismic information contained within the report, DCPD performed a subsequent operability determination evaluation that was completed on August 21, 2014.

On September 10, 2014, DCPD formally submitted the CCCSIP Report to the State of California. On the same date, PG&E provided a copy of the CCCSIP Report to the NRC consistent with guidance previously provided to PG&E in an NRC letter dated October 12, 2012.

Following the March 12, 2015 submittal, DCPD will be analyzing and submitting (by June 2017) an updated probabilistic ground motion study and updated seismic effect on DCPD buildings and equipment.

The DCISC FFT concluded that DCPD's seismic analyses, peer reviews and submittals were being performed and handled properly.

Conclusions:

DCPD's seismic and tsunami analyses appear to be performed appropriately for submittal to the NRC.

Recommendations:

None

3.3 Performance Improvement Program Status

The DCISC Fact-finding team met with Mark Frauenheim, Performance Improvement Program (PIP) Manager, for this review. The DCISC last reviewed the PIP at the June 2014 DCISC Public Meeting (Reference 6.3).

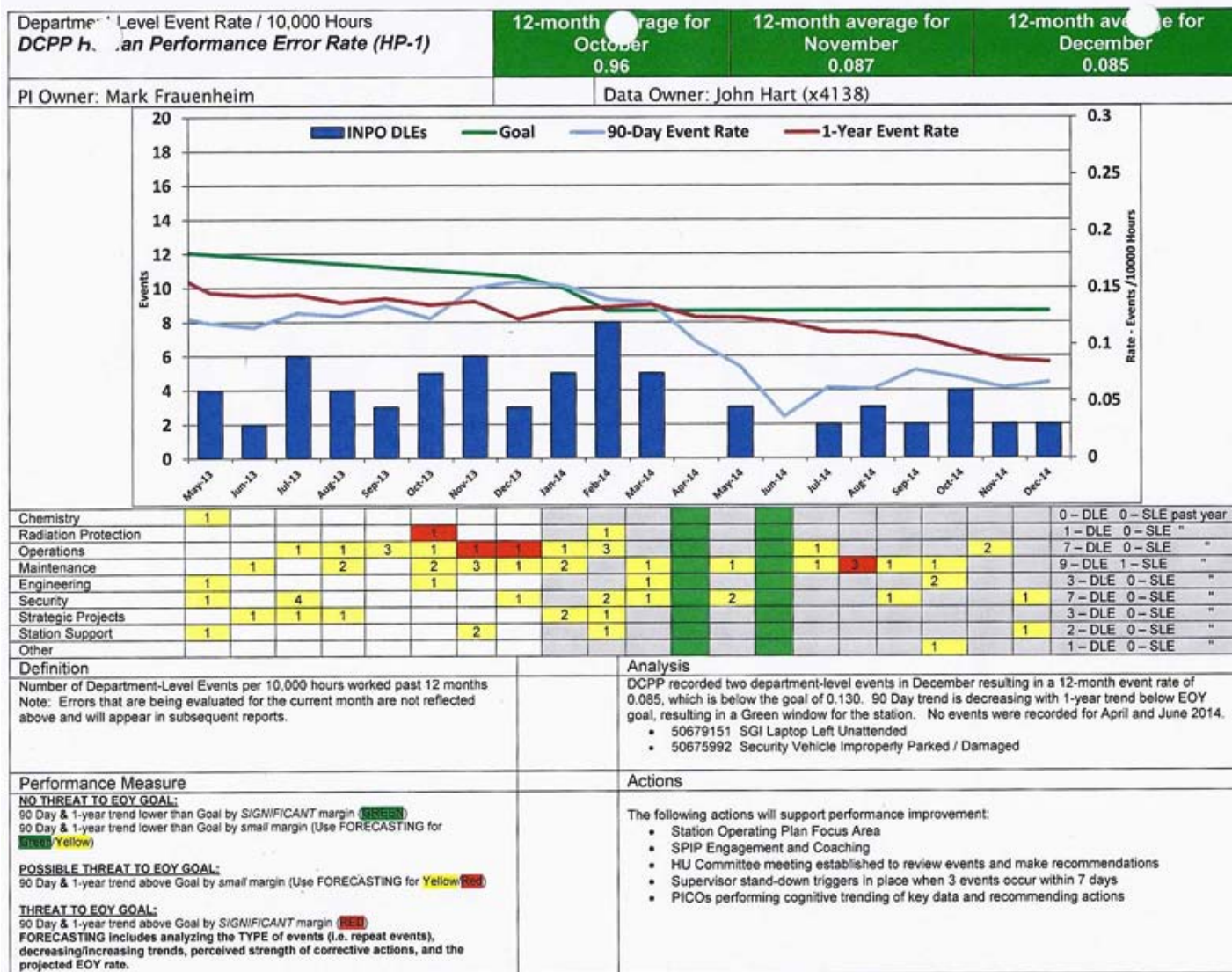
As its name states the PIP is a program of performance improvement instituted to achieve excellence in nuclear plant operation and safety. DCPD and all other domestic nuclear power plants have had their individual PIPs for a long time. The nuclear industry, via INPO, issued in October 2014 a new guideline, "Conduct of Performance Improvement." The new guideline, a significant change in the behaviors and practices for PIPs was prepared and issued to focus on prevention and to reduce unnecessary administrative requirements and take a more practical approach to PI. The new NRC-approved guideline establishes a Performance Improvement Model with the following attributes:

Engage, Identify, Prevent—establishing a culture wherein engaged employees seek to correct adverse behaviors and conditions before problems occur as well as having a low threshold for problem identification.

- Screening—screening by a cross-functional team to identify and address the more significant issues in the existing formal Corrective Action Program (CAP) and lower-level issues would be addressed more informally by line managers.
- Management Action, Approved Process, and Corrective Action—three processes or methods to address issues (1) formally (CAP) and less formally, (2) an “Approved process,” and (3) management action as the issue significance directs.
- Performance Monitoring—methods to monitor performance including self-assessments, benchmarking, observation/coaching and performance indicators to facilitate identification of problems before consequential events occur. Included here would be corrective action effectiveness reviews

DCPP has revised its overall PIP Procedure OM15.ID5, “DCPP Performance Improvement Program, Revision 9, Effective October 30, 2014,” to comply with the new guidelines. The FFT discussed with Mr. Fraueheim and reviewed the updated procedure and found that it appropriately complied with the new industry guide. Lower-level implementing procedures are also being revised. This, along with other actions are included in a comprehensive DCPP Performance Improvement 2015 Next-Level Actions document, which the DCISC should monitor. The FFT believes the new streamlined approach focused on prevention will be an improvement in reducing problems at DCPP.

Related to PIP, the DCPP human error rate and the number of Station Level Human Performance Clock Resets have been improving steadily since February 2014. The 90-day and one-year event rates are well below DCPP goals, and are rated Green. This has been due primarily to an augmented management observation program, employee engagement sessions, establishment of a Human Performance Committee to review events and make recommendations, and work stand-downs when events occur. See the human performance trend chart below.



Also, the Station Level Clock Resets, though not currently meeting goal, are showing improvement.

Conclusions:

The DCISC FFT believes the new streamlined and prevention-based Performance Improvement Program (PIP) approach will be an improvement in reducing problems at DCP. Human performance has improved steadily since February 2014 primarily due to augmented management observations, coaching and counseling, employee engagement, a new Human Performance Committee, and work stand-downs following events. The DCISC should continue to follow DCP's PIP, especially the PI 2015 Next-Level Actions document.

Recommendations:

None

3.4 Clearance Performance in Outages 1R18 and 2R18

The DCISC Fact-finding team met with Chris O'Conner, Clearance Coordination Supervisor, to review clearance performance in Outages 1R18 and 2R18. The DCISC last reviewed clearances in August 2012 (Reference 6.4), when it concluded the following:

The DCPD Plant Status Control and Clearance Programs appeared satisfactory. DCPD is working to minimize mispositioned component events using the Corrective Action Program to document, track, investigate, and correct events, leading to prevention of recurrence. DCPD's misposition trend shows improvement, especially in Outage 1R17 compared to past outages. There were only two low-level clearance errors in Outage 1R17, which was improved performance from previous outages. The clearance error trend shows improvement. DCPD reported successful use of Safety Monitor, a predictive probabilistic risk analysis tool used to support nuclear safety for removing components from service for maintenance and testing.

DCPD's Clearance System is used to isolate complete systems or portions of systems so that components within the isolated section(s) can be worked on without posing a risk to the safety station personnel or to plant operation. The system uses eSOMS clearance and tagging software, a computer based system which is easier to use than completely manual systems and it also displays applicable Technical Specifications. As such it is helpful from a human performance standpoint in that, based on the applicable Technical Specification, it can refer the user to applicable Limiting Conditions of Operation (LCOs).

Also, eSOMS is more efficient than completely manual tagging systems in that multiple tags do not have to be hung on the same component for multiple tagouts. Rather, the same physical tag can apply to more than one electronic tagout, each of which is referenced in the computer as affecting that one component. When one electronic tagout is being cleared, eSOMS will note the components that have other tagouts applying to them. Therefore, the physical tags are not removed from those particular components.

In Outages 1R18 and 2R18 there were several low level errors, except for one higher-level error in Outage 2R18 on a Maintenance Red Tag concerning confusion about removing the tag based on a clerical error. Although this did not affect personnel safety directly, it is receiving attention to prevent recurrence and more significant errors.

Conclusions:

DCPD has a good clearance program, which continues to show effective protection to personnel and components.

Recommendations:

None

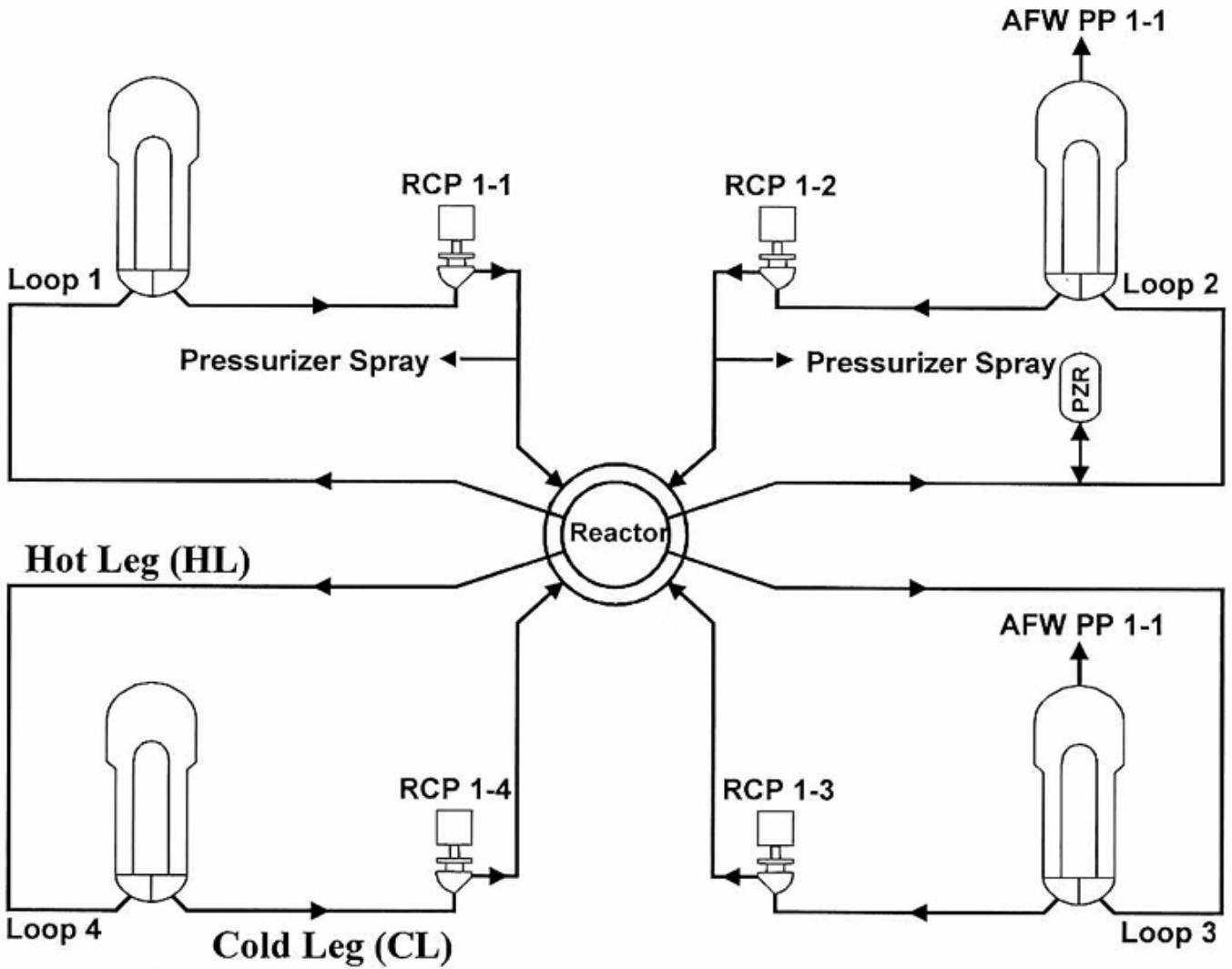
3.5 Reactor Coolant Pump Review with System Engineer

The DCISC met with Eric Brackeen, Reactor Coolant System (RCS) Engineer, for a status report on the Reactor Coolant Pumps (RCPs). The DCISC last reviewed this item in September 2013 (Reference 6.5), when it concluded the following:

DCPD responded properly to the failure of the seals in its Unit 2 Reactor Coolant Pumps in Outage 2R17 by replacing most seal parts and initiating a Root Cause Evaluation. The evaluation appeared comprehensive, correctly identified the root and contributing causes, and specified appropriate corrective actions to prevent recurrence. The DCISC should follow up on DCPD's corrective actions and effectiveness review.

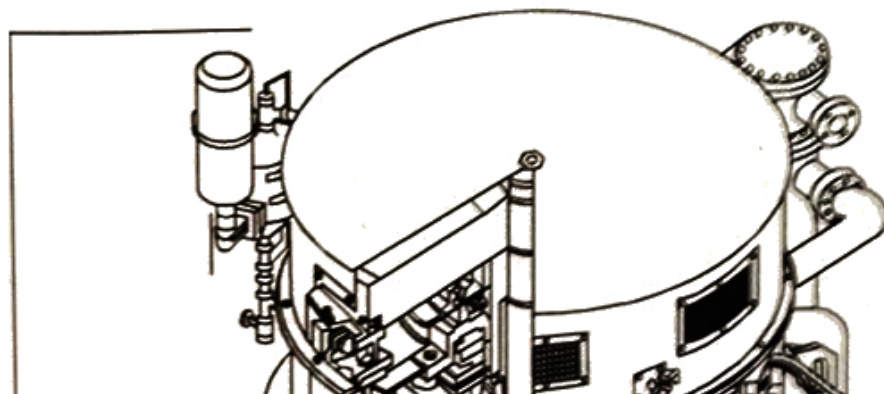
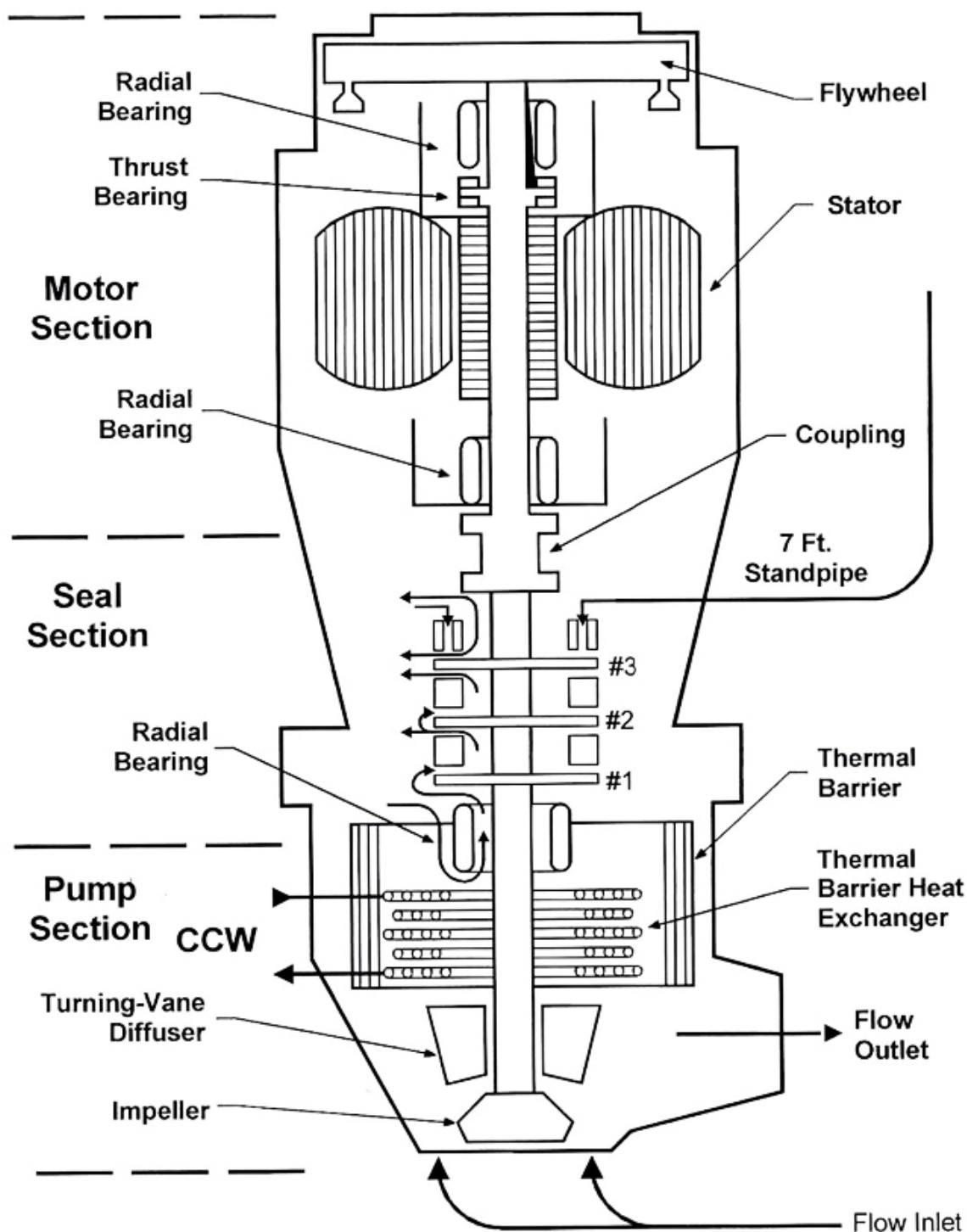
The purpose of the RCPs is to provide flow through the RCS to support the design heat transfer rate from the Reactor fuel core to the Steam Generators (SGs). A secondary purpose is to provide energy to initially heat the RCS from cold plant conditions. The RCPs are located at the 117-foot level in the Containment next to their respective SG. Each unit has four RCPs with identical characteristics. Each RCP takes suction from its respective

SG cold leg and discharges to the Reactor with sufficient energy to flow through through the Reactor and SG before returning to the suction of the RCP. This is depicted in the following RCS flow loop diagram.



The RCPs consist of the pump or hydraulic section, the seal assembly, the flywheel and the motor all located on a common shaft as shown in the following diagram.

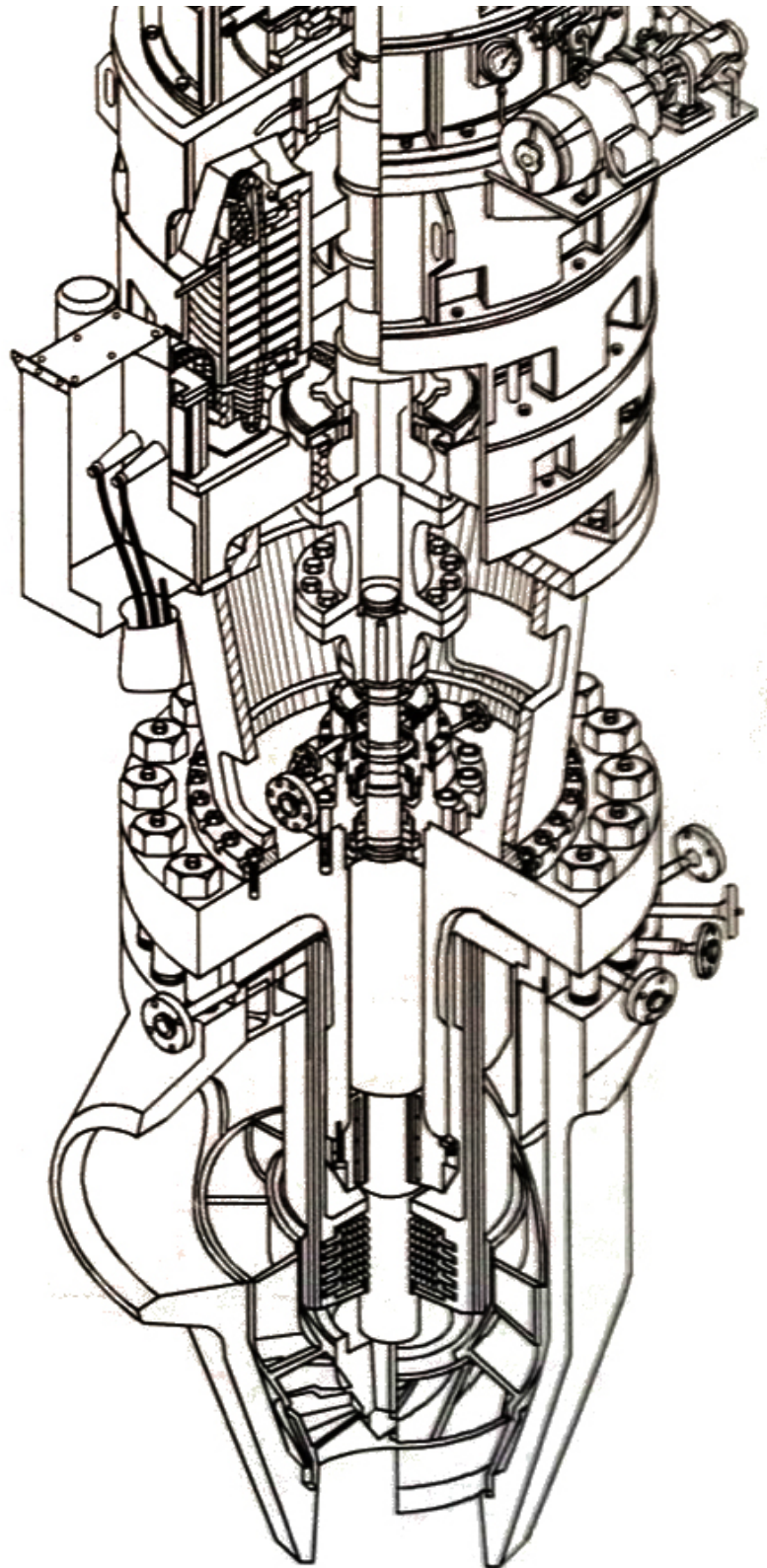
RCP Overview
Drawing
(Figure 1)



Motor Section

Seal Assembly

Hydraulic Section



The hydraulic section is a vertical, single stage centrifugal pump with an axial diffuser and turning vanes with a radial discharge outlet. The pump is rated to deliver 88,500 gallons per minute (gpm) at a head of 277 feet at 1190 rpm. A water-cooled radial bearing is located at the upper or driven end of the pump shaft. The seal assembly consists of three mechanical seals that provide a pressure drop from RCS pressure of 2200 psi nominally to ambient pressure, thus minimizing RCS leakage along the shaft.

The electric motor is a nominal 6000 hp 12,000 volt, vertical, 6-pole squirrel cage induction motor. It is equipped

with upper and lower segmented journal bearings and a Kingsbury thrust bearing. Motor bearings are lubricated by an internal oil pump and cooled by integral oil coolers. A flywheel at the top of the motor adds additional inertia that extends pump coast-down time. The flywheel also incorporates five pawls to prevent reverse rotation which could cause excessive starting current.

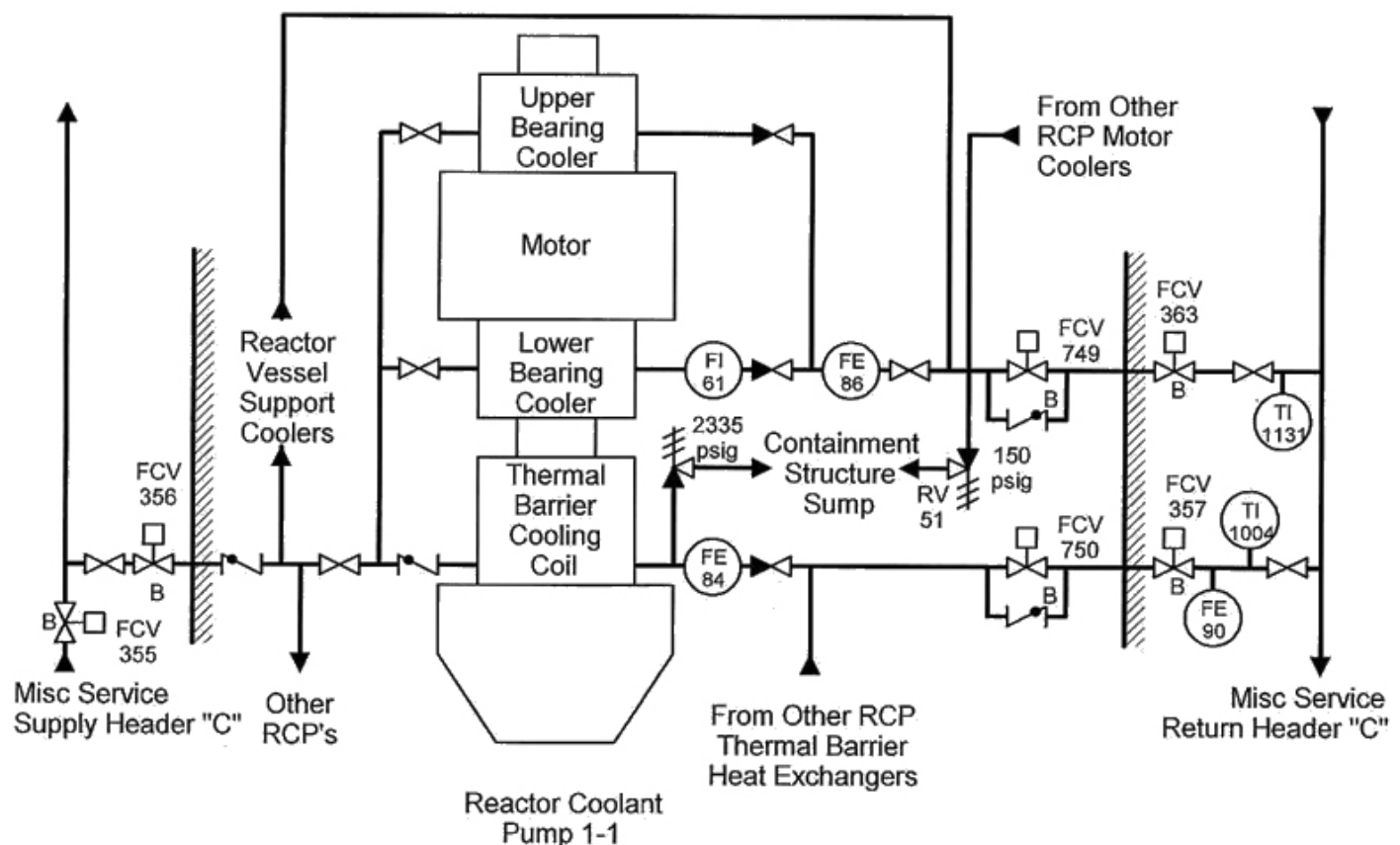
RCP motors have generally been trouble-free. They are inspected regularly and re-built on-site over a ten-year schedule. Beginning December 2009, there have been multiple instances of TCP motor bearing temperatures spiking high and immediately returning to normal. These instances are being tracked in the Corrective Action Program to determine the cause of the spikes and to ascertain the need for any corrective actions.

RCPs depend on the following systems:

- Component Cooling Water (CCW) System and heat exchangers to provide cooling water to the pump section thermal barrier heat exchanger
- Seal water injection flow provided by the Chemical and Volume Control System (CVCS) via the Charging Pumps
- Seal water return and leakage removal to the Pressurizer Relief Tank/Reactor Coolant Drain Tank (RCDT)
- Monitoring of temperature, vibration and flows

All RCPs are normally in service at power. RCP #2 is normally the first pump started and last pump shutdown because it is used to provide Pressurizer Spray flow. At least two pumps must be running to enter Mode 3, Hot Shutdown. All RCPS must be operating to enter Mode 2, Hot Standby and Mode 1, Power Operation.

The RCP shaft seal assembly is located near the upper or coupling (driven) end of the pump shaft as shown in the following diagram.



The seals are contained in three primary pressure seal housings that are bolted to the top side of the pump main flange. The assembly consists of three water-lubricated seals connected to an external monitoring and control system. The system monitors and controls the upward flow of the high pressure coolant during a loss of normal seal injection flow. If normal seal injection flow and CCW are lost, the RCP must be shut down immediately.

Seal injection is provided by the CVCS at 8-12 gpm. Approximately six gpm will pass the radial bearings and labyrinth seal into the RCS with the remaining 3 gpm providing lubrication and cooling for the seal package.

The #1 seal is the primary seal which is designed to operate with a minimum of 200 psid at 0.2 gpm leakoff. The #1 seal is a hydrostatically balanced film-riding seal. The runner and seal ring are stainless steel with silicon nitride faceplates. Controlled leakage provides seal face lubrication.

The #2 seal is a face-rubbing carbon graphite seal ring in a stainless steel retainer using cap screws and stops. Secondary sealing is via a double delta channel seal and o-ring. Its runner is a chrome-carbide stainless steel forging. During normal operation, the stationary ring and runner provides a rubbing seal with approximately 35 psi of pressure drop and three gpm leakoff to the RCDT. In the event of a #1 seal failure, the #2 seal is designed to function as an emergency backup.

The #3 seal is a double-dam face-rubbing seal designed as a low pressure vapor seal to ensure zero leakage of both contaminated water and dissolved radioactive gases to Containment. The purpose of the double dam and injected flow is to provide the seal with clean water between the two sealing surfaces, providing both lubrication and a water barrier to gases.

Seal water is injected at a nominal nine gpm into the No. 3 Seal with six gpm injected into the RCS and leak off of three gpm from the Number 1 and 2 seals. Seal water is important for cooling and leakage control to assure proper pump operation. Pump seals are given a general, non-intrusive inspection each year (8,760 operational hours) and a boroscope inspection of the pump rotor from inside every 10 years (87,600 operational hours). Pump seals are inspected with a boroscope typically every six years (52,560 operating hours), unless there are problems. Seals are being replaced on a three-cycle frequency.

The FFT went to the Mechanical Maintenance Training Facility and observed the RCP Seal Housing Mock-up, a full-size model of the area of the RCPs housing the seals. The mock-up is used for training personnel to replace seals and perform motor-to-pump alignment. The FFT received and reviewed the following procedures:

1. Reactor Coolant Motor-to-Pump Alignment
2. Removal, Inspection, and Installation of Mechanical Seal of Reactor Coolant Pump
3. Removal and Installation of Reactor Coolant Pump Coupling
4. Reactor Coolant Pump Backseating

These procedures appeared appropriate to the FFT.

DCPP has had a number of RCP seal leakage problems requiring replacements either at normal refueling outages or special shutdowns. Most of the leaks were caused by debris getting into the seals. This is a time, dose and personnel intensive procedure. DCPP will be replacing all RCP seals with improved third generation Westinghouse SHIELD Passive Thermal Shut Down Seals. These new seals are more rugged than the current ones and Seal #1 has a special thermal actuator which allows a piston ring and polymer seal to constrict around the RCP shaft seal leakage upon loss of seal cooling and temperatures of approximately 260-320°F. To be effective the RCP shaft must be stopped or slowly rotating. This is important for DCPP's move to NFPA-805 probabilistic fire protection

and FLEX considerations for a loss of all plant electric power which would cause loss of seal injection and unacceptable RCP seal leakage. DCPD plans to install the new seals before returning from refueling outage 1R19 for Unit 1 and 2R19 for Unit 2. The DCISC FFT reviewed DCPD's 10CFR50.59 evaluation (determination of need for NRC approval) for the new seals and found it satisfactory that no NRC approval was necessary.

The RCS health is currently Yellow (Needs Improvement) for the following reasons:

1. RCP seal leakage and failures
2. Pressurizer safety valves to steam seated internal weepage, during unit pressurization following outages
3. A design deficiency in the #2 seal leak off lines that could affect seal performance and reliability.
4. CET replacements to address aging concerns in an effort to recapture operating margin
5. Failures of the Aux Control Board Digital System have resulted in numerous unplanned entries into Tech Spec 3.4.15 due to inability to estimate RCS leakage.

Action plans are in place to address these items.

Conclusions:

DCPD Reactor Coolant Pumps (RCPs) have performed well without significant problems, except for occasional seal leakage problems. The RCP seals, which are sensitive to debris and thermal transients, are receiving proper attention in the form of periodic inspections, flushing of upstream seal water injection lines, and regular replacements. DCPD is replacing the current seals with improved models.

3.6 Reactor Vessel Material Specimens and Pressurized Thermal Shock

The Fact Finding team met with Dan Hardesty, Senior Advising Engineer, for an update on DCPD's Reactor Vessel (RV) Material Specimens and Pressurized Thermal Shock (PTS). The DCISC last reviewed this issue in August 2013 (Reference 6.6), concluding the following:

It appears that DCPD has a well-structured, ongoing program of testing material specimens that have been placed inside its reactor vessels to address the metal hardening issues related to both the old and new NRC rules on Pressurized Thermal Shock (PTS). Both reactor vessels have sufficient specimens to demonstrate the capability of each reactor vessel to withstand the effects of PTS through their 40-year licensed lifetimes as well as the proposed 20-year extensions.

The DCPD Reactor Vessel Surveillance Program (RVSP) manages loss of fracture toughness of reactor vessels due to neutron embrittlement in reactor materials exposed to neutron fluence exceeding 1.0×10^{17} neutrons/cm² for neutron energies above 1.0 MeV (Million Electron Volts). Capsules of RV material are periodically removed from the vessels during the course of plant operating life. Neutron embrittlement is evaluated through capsule testing and evaluation, ex-vessel neutron fluence calculations, and actual measurement of reactor vessel neutron fluence. Data resulting from the program are used to determine RCS pressure-temperature limits, minimum temperature requirements, and end-of-life fracture toughness requirements. Fracture toughness relates to the ability to withstand Pressurized Thermal Shock.

Pressurized Thermal Shock (PTS) is a concern for pressurized water reactors due to its potential to rupture the Reactor Vessel as a nuclear plant ages and neutron impingement hardens or embrittles the Reactor Vessel. If the vessel, which normally operates at approximately 600 degrees F and 2200 pounds per square inch of pressure (psi), were to experience a cold-water shock from inadvertently injecting cold water into the vessel while at

operating pressure, it is possible that existing cracks in the vessel could rapidly enlarge, resulting in a vessel rupture. Such a rupture could make it difficult to safely shut down the reactor and/or to maintain core cooling. This phenomenon is a concern only for vessels embrittled by years of high-energy neutron flux. Nuclear plants are designed and analyzed to be able to withstand such a shock without damage during their operating lives. For this reason DCP's reactors have a system, LTOP (Low Temperature Overpressure Protection) System, which prevents pressure increases above a selected point when at lower temperature upon increasing or decreasing power.

Mr. Hardesty explained that the DCP plant possesses enough metallic coupons, either in the reactor itself or already removed and in the Spent Fuel Pool, to support the plant's need to determine the capability of the reactor vessel to withstand the effects of pressurized thermal shock out to the full 40-year lifetime of the plant, as well as the proposed 20-year extension, if NRC grants a license extension. DCP is able to rely on additional backup information on tests conducted on specimens from another nuclear plant because the reactor vessel at that plant, and the accompanying metallic specimens, were fabricated from the same batch of metal as was the reactor vessel at DCP. DCP's two reactor vessels are slightly different in composition. Hence, they have slightly different metallic properties, slightly different susceptibilities to PTS, and different specimens for testing.

In January 2010 the NRC approved a final rule to provide alternate requirements for protection against pressurized thermal shock events in nuclear power plant reactor vessels. The NRC indicated that the rule, "Part 61a of Title 10, Code of Federal Regulations," increases the realism of calculations used to examine a Pressurized Water Reactor's (PWR's) susceptibility to PTS. Plants like DCP can choose whether to abide by the new rule or the earlier rule, known as "Part 61." Updated analysis methods allow PWR licensees to better account for some effects of aging on their reactor vessels. The NRC's announcement regarding this rule noted that the revised approach was derived using data from research on currently operating PWRs. This research was in three different areas: (1) the types of scenarios, and the likelihood of such scenarios that might lead to PTS, (2) the thermal and thermal hydraulic conditions that would occur during the various scenarios, and (3) the metallurgical properties of the vessels and welds and of their responses to PTS types of events.

Also noted was that the data indicate the overall risk of PTS-induced reactor vessel failure after 60 years of operation is much lower than previously estimated. If plants choose to adopt the new approach, the rule requires PWR operators to perform detailed analyses of both reactor vessel surveillance data and the results of regular reactor vessel inspections. If the analyses' findings exceed certain limits, the operator must take steps either to limit the reactor vessel's exposure to neutron radiation or to determine how the reactor's systems can be modified to prevent PTS-induced vessel failure.

DCP has chosen to address PTS by abiding by the old rule as well as the new rule, the latter of which would be used to increase design margin to permit more relaxed temperature-pressure curve operating restrictions.

Mr. Hardesty noted that several coupons that have been removed have already received the equivalent of 55 Effective Full Power Years, which replicates 60 calendar years of plant operation because the units do not run continuously at full power throughout their lifetimes but rather shut down periodically for refueling and maintenance. These specimens are subjected to a testing process that verifies their ability to withstand the forces of PTS. The test used to determine fracture toughness is the well-known and standardized "Charpy V-Notch" test.

For Unit 1 the last capsule is expected to be withdrawn during the 1R23 refueling outage in 2022 after it has accumulated a fluence equivalent to 94.2 years of operation. The remaining four standby capsules have low lead factors and will remain in the vessel throughout the vessel lifetime to be available for future testing. There are no capsules remaining in the Unit 2 vessel. All capsules were removed because high lead factors produced exposures

comparable to the fluences at the end of the period of extended operation.

Conclusions:

DCPP's reactor vessel material surveillance program appears satisfactory to support operation through the normal end-of-life as well as an additional 20 years, should life extension be sought by DCPD and granted by the NRC.

Recommendations:

None

3.7 Trouble-Shooting Program and Examples

The DCISC Fact-finding Team met with Ron Perry, Trouble-Shooting Program Manager and Instrumentation and Controls Manager, for an update and examples of DCPD Trouble-Shooting. The DCISC last reviewed Trouble-Shooting in March 2014 (Reference 6.7), when it concluded:

The DCPD Troubleshooting Process continues to improve now with Maintenance clearly the lead organization (and Engineering in support), controlled by the Work Planning Process, and incorporating risk assessment both to determine the level of troubleshooting and to inform applicable personnel about the relative risk involved. The DCISC should review a variety of specific troubleshooting applications when it next reviews troubleshooting.

DCPD developed a new interdepartmental procedure, which more clearly defines Maintenance as the Troubleshooting Owner with Engineering as support. A formal lead is now to be identified for each troubleshooting activity. The new procedure also now ties into the DCPD Risk Procedure, "Assessment of Integrated Risk," which establishes the process for integrated risk management associated with work activities performed on or around power plant equipment during Modes 1 through 6 and No-Mode (defueled), and during any work in an outage that could affect the operating unit. This procedure provides direction on identifying and classifying risk in the following areas:

- Industrial Safety
- Nuclear Safety
- Radiological Safety
- Chemistry and Environmental Safety
- Regulatory Compliance and Plant Operation
- Security

The risk assessment procedure appeared comprehensive and easy to implement with many specific examples of risk-significant activities and configurations. The overall effect is to determine, with Operations input, the risk of the problem to be addressed and to direct one to the appropriate of three levels of troubleshooting for that problem.

The procedure directs that Troubleshooting Plans be put into the DCPD Work Planning Process that generates Work Orders which are reviewed by Operations. Then once the problem has been identified, a new Work Order is initiated to accomplish the repairs. The plant believes that using the Work Planning Process will add better structure to troubleshooting investigations and repairs.

Unlike stated in the March 2014 report, DCPD decided to not include the Engineering causal processes to the TS

procedure to keep the procedure simple and focused on Maintenance; however, Engineering is available for technical support when requested, along with the Engineering causal processes.

The DCISC FFT and Mr. Perry discussed how individual TS applications would proceed and received the two following completed actual cases:

1. Troubleshoot Pressurizer Heater Group 1–2

This December 2014 troubleshooting plan provided instructions for Level B troubleshooting of Pressurizer Heater Group 1-2, which failed to energize on demand from the Control Room. The troubleshooting team determined that, upon visual inspection and exercising the toggle switch in the applicable breaker, Contact 4 was misaligned. Maintenance then generated another work plan and aligned Contact 4 and satisfactorily tested the breaker.

2. Troubleshoot Generator Differential Relay

This October 2014 troubleshooting operation was used to determine the cause of a problem with the Unit 2 Main Generator Differential Overcurrent Relay 87G2, which was suspected of incorrectly maintaining the trip bus energized. The troubleshooting team performed visual and voltage tests and determined that replacement and bench test calibration was necessary.

A new work plan was written for those operations in accordance with the manufacturer's equipment manual. The replacement relay could not be satisfactorily calibrated. Troubleshooting was resumed with another work plan; however, additional testing was inconclusive, and the relay was returned to the shop for further evaluation.

A new work plan was written for further bench testing of the relay. Initial testing was inconclusive, and Engineering was requested to provide new relay setpoints. The relay then tested satisfactorily. A new work plan was written to replace the relay in the breaker cabinet and perform a final in-place test. This was satisfactorily achieved and the breaker cabinet returned to service.

Each of the troubleshooting work plans addressed clearances and physical barriers necessary to protect personnel and adjacent equipment when the components were taken out of service. Foreign material exclusion and housekeeping requirements were included. References were made to specific procedures and manuals to perform testing and adjustments. Procedure place-keeping, independent verification, and supervisor concurrence were apparent in the procedure signoffs.

The troubleshooting, testing, and corrective actions appeared to have been properly carried out and documented to the DCISC FFT. There were no formal effectiveness reviews required to be performed on troubleshootings such as are done on Root Cause Evaluations; however, this was acceptable because the effectiveness of troubleshooting is apparent when the problem is seen to be resolved before the troubleshooting is concluded.

Conclusions:

Two DCPD troubleshooting cases appeared to have been performed satisfactorily as reviewed by the DCISC Fact-finding Team.

Recommendations:

None

3.8 DCPD State of the Plant Update

The DCISC Fact-finding Team met with Jan Nimick, DCPD Station Director, for a preview of his State of the Plant presentation to be made at the DCISC February 4, 2015 Public Meeting. The DCISC last received the DCPD State of the Plant presentation at its October 2014 Public Meeting (Reference 6.8).

The presentation covered the following items:

- Plant Operation—this is DCPD's 30th year of operation
- 230 kV Switchyard Flashover Root Cause Evaluation
- Workforce Management
- NRC Assessments
- 500 kV Lightning Arrestors Replacement
- Circulating Water Tunnel Cleaning
- 1Y19 Feedwater Heater Repair Outage
- 2R18 Refueling Outage Results
- Upcoming Station Activities

Conclusions:

The proposed DCPD State of the Plant presentation was similar to previous presentations and appropriately captured high-level activities and events at the station.

Recommendations:

None

3.9 Untimely Corrective Action on Potential Gas Intrusion into Containment Spray System

The DCISC Fact-finding team met with Mark Sharp, Design Engineering Manager, to review this topic. This is the first DCISC review of this item.

The DCPD Containment Spray System (CSS) provides water to a spray header high inside Containment to help limit and reduce temperature and pressure of steam following a Loss of Coolant Accident (LOCA) or Main Steam Line Accident. The CSS pump takes its initial suction from the Spray Additive Tank which adds sodium hydroxide to the liquid to be sprayed to help reduce the pH in Containment to help retain radioactive materials.

In May 2011 a Corrective Action Program (CAP) Notification was written, based on industry operating experience, to identify the potential for gas intrusion into the suction of the CSS pumps following a LOCA. The gas would have been educted from the Spray Additive Tank following draining of the solution from the tank. A Prompt Operability Assessment (POA) was written to support continued operation. The basis for the POA was a Westinghouse evaluation that a void fraction of less than 2% would occur, which would have no deleterious impact on CSS Pump operation without compensatory actions; however, because the DCPD licensing basis is zero void fraction, it was understood that corrective action would be required to preclude any air ingestion.

The original proposed corrective action was to revise a procedure to have Operations watch the tank level and isolate it when low. This was rejected by Operations, and DCPD reviewed other options until August 2014, when the original procedure change was decided upon and would finally be made. During its Problem Identification and Resolution inspection, the NRC determined it to be a Non-Cited Violation due to the three-year delay in corrective action. The procedure change is due by March 15, 2015.

DCPP initiated an Apparent Cause Evaluation to determine the cause for the delay and corrective actions to prevent recurrence. The causes were determined to be that

1. Existing DCPD processes do not address timely resolution of degraded/non-conforming conditions when an item is considered operable.
2. Current DCPD Processes do not adequately consider the regulatory consequences of the long-term failure to meet licensing bases for a degraded condition.

In addition to the above-mentioned procedure change, DCPD changed its process to require Plant Health Committee quarterly reviews of all POAs to concur with the corrective action, to monitor the timeliness for implementation, and to monitor the effectiveness of the interim actions.

Conclusions:

DCPD's action to account for the potential for gas intrusion from the Spray Addition Tank into the Containment Spray System Pump was not timely, taking three years, hence the Non-Cited Violation (NCV) by the NRC. In actuality, the gas intrusion would not have physically caused a problem; however, it violated the licensing basis, which stated zero intrusion. DCPD had itself come close to implementing its corrective action at the time of the NCV; however, it should have been more timely in its approach to satisfy the licensing basis.

Recommendations:

None

3.10 Meeting with Senior NRC Resident Inspector

The DCISC Fact-finding Team met with Tom Hipshmann, Senior NRC Resident Inspector at DCPD. The DCISC last met with the NRC in December 2014 (Reference 6.9) and concluded the following:

DCISC meetings with the NRC Resident or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCPD.

The discussion centered on the following subjects:

- INPO evaluations and sharing of information with the NRC
- NRC's inspection schedule
- October 31, 2014 230 kV flashover event
- Gas intrusion into Containment Spray System
- California Assembly Bill AB-1632 and resulting NRC December 16, 2014 letter
- Emergency Preparedness violation greater than Green and enforcement conference
- DCISC Fact-finding meeting agenda items

Conclusions:

DCISC meetings with the NRC Resident or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCPD.

Recommendations:

None

3.11 Single Point Vulnerability Program Update

The DCISC Fact-finding Team met with Mark Baker, Reliability Engineering Supervisor, and Steve Zawalick, Reliability Engineering Engineer, for an update on DCP's Single Point Vulnerability (SPV) Program. The DCISC last reviewed SPV in June 2014 (Reference 6.10), when it concluded:

The Single Point Vulnerability (SPV) Program continues to be comprehensive and functional. Recent SPV evaluations performed by knowledgeable contractors appear to be incisive. Station follow-up on out-of-specification test results appears to be thorough and effective.

A single component is an SPV component if its (alone) failure can result in a reactor trip or turbine trip, or a plant decrease in power of greater than 2% power. Obviously, SPVs are undesirable, and DCP, like other nuclear plants, take efforts to eliminate them. Generally, SPVs are eliminated by modifications and/or changes in their Preventive Maintenance (PM) to minimize or eliminate their failure rate. Generally, only active components are considered for SPV; however, selected passive components, generally treated as inherently reliable, can be considered.

DCP's first SPV study in 2002 to identify/eliminate single points of failure was performed at a system and component level. Then in 2006, using external contractor engineers working with DCP System Engineers and Operations, DCP performed a more extensive SPV study and completed it in 2008. DCP has completed the SPV study on all systems (about 20) that have an impact on either generation or reliability. This was a collaborative effort with support from industry organizations such as the Electric Power Research Institute (EPRI) and the Nuclear Energy Institute (NEI).

Safety-related components are covered by the NRC Maintenance Rule, which also includes rules for SPV. DCP also worked with an Industry Working Group to review nuclear plant scrams (automatic or manual fast reactor shutdowns) in order to identify scram causes and actions taken to prevent future scrams. (Most scrams were caused by failed circuit cards).

In the these 20 reviewed plant systems, over 1,500 SPVs were identified and evaluated for the two units (over 750 for each individual unit). Changes were then implemented as needed to a component's design and/or preventive maintenance.

The concept of SPV continues to be applied as various issues arise. One recent self-revealing example was a fire in an Auxiliary Saltwater System Pump Room in which a fire was detected (and subsequently extinguished). The fire was caused by a single electrical component failure, and the circuit was then modified.

DCP has been moving from analog control systems to digital versions. This has had a significant positive effect on single point failures caused by individual electronic components, such as capacitors.

Conclusions:

DCP has completed its studies for elimination of Single Point Vulnerabilities (SPVs), i.e., those individual components whose failure alone could cause plant trips or greater than two percent power reduction. Items identified as SPVs have either been modified or had their preventive maintenance changed. These studies have resulted in greater reliability and improved operation.

Recommendations:

None

3.12 Dr. Lam Meeting with DCPD Chief Nuclear Officer

Dr. Lam met with DCPD Chief Nuclear Officer, Ed Halpin, to discuss items from this fact-finding and other items of mutual interest.

4.0 Conclusions

4.1

DCPD appears to have satisfactorily performed its Quick Hit Self-Assessment of its FLEX Program and Spent Fuel Pool Instrumentation Project. The overall conclusion was that the FLEX Program was in compliance with industry and NRC guidance with specific recommendations for program enhancements and remaining work. The DCISC Fact-finding Team concluded that the Assessment and resulting action plans were appropriate. The DCPD FLEX program is on-schedule for on-time completion.

4.2

DCPD's seismic and tsunami analyses are being performed appropriately for submittal to the NRC.

4.3

The DCISC FFT believes the new streamlined and prevention-based Performance Improvement Program (PIP) approach will be an improvement in reducing problems at DCPD. Human performance has improved steadily since February 2014 primarily due to augmented management observations, coaching and counseling, employee engagement, a new Human Performance Committee, and work stand-downs following events. The DCISC should continue to follow DCPD's PIP, especially the PI 2015 Next-Level Actions document.

4.4

DCPD has a good clearance program, which continues to show effective protection to personnel and components.

4.5

DCPD Reactor Coolant Pumps (RCPs) have performed well without significant problems, except for occasional seal leakage problems. The RCP seals, which are sensitive to debris and thermal transients, are receiving proper attention in the form of periodic inspections, flushing of upstream seal water injection lines, and regular replacements. DCPD is replacing the current seals with improved models.

4.6

DCPD's reactor vessel material surveillance program appears satisfactory to support operation through the normal end-of-life as well as an additional 20 years, should life extension be sought by DCPD and granted by the NRC.

4.7

Two DCPD troubleshooting cases appeared to have been performed satisfactorily as reviewed by the DCISC Fact-finding Team.

4.8

The proposed DCPD State of the Plant presentation was similar to previous presentations and appropriately captured high-level activities and events at the station.

4.9

DCPD's action to account for the potential for gas intrusion from the Spray Addition Tank into the Containment Spray System Pump was not timely, taking three years, hence the Non-Cited Violation (NCV) be the NRC. In actuality, the gas intrusion would not have physically caused a problem; however, it violated the licensing basis, which stated zero intrusion. DCPD had itself come close to implementing its corrective action at the time of the NCV; however, it should have been more timely in its approach to satisfy the licensing basis.

4.10

DCISC meetings with the NRC Resident or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCPD.

4.11

DCPD has completed its studies for elimination of Single Point Vulnerabilities (SPVs), i.e., those individual components whose failure alone could cause plant trips or greater than two percent power reduction. Items identified as SPVs have either been modified or had their preventive maintenance changed. These studies have resulted in greater reliability and improved operation.

5.0 Recommendations:

None

6.0 References

6.1

"Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015", Approved October 20, 2015, Volume II, Exhibit D.2, Section 3.3 "New Spent Fuel Pool Instrumentation."

6.2

"Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014", Approved October 22, 2014, Volume II, Exhibit B.6, "DCPD Seismic Studies and Submittal to NRC."

6.3

"Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013", Approved October 9, 2013, Volume II, Exhibit B.9, "Performance Improvement Program Status."

6.4

"Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013", Approved October 9, 2013, Volume II, Exhibit D.2, Section 3.3, "Outage 1R17 Misposition, Clearance, and Safety Monitor Results."

6.5

"Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo

Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 22, 2014, Volume II, Exhibit D.5, Section 3.2, “Refueling Outage 1R18 Plan and Outage Safety Plan.”

6.6

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 20, 2015, Volume II, Exhibit D.2, Section 3.1, “DCPP Response to New Pressurized Thermal Shock Rule.”

6.7

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014,” Approved October 22, 2014, Volume II, Exhibit D.7, Section 3.8, “Trouble-shooting.”

6.8

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 20, 2015, Volume II, Exhibit B.3, “DCPP State of the Plant.”

6.9

Ibid., Exhibit D.5, Section 3.8, “Meeting with the NRC Senior Resident Inspector.”

6.10

Ibid., Exhibit D.1, Section 3.9, “Single Point Vulnerabilities.”

[25th Annual Report](#), [Volume 2](#), Exhibit D.7, Diablo Canyon Independent Safety Committee Report on Fact Finding Meeting at DCPD on March 30—April 1, 2015 by Robert J. Budnitz, Member, and David C. Linnen, Consultant

1.0 Summary

The results of the March 30—April 1, 2015 fact-finding trip to Pacific Gas and Electric Company's (PG&E's) Corporate Office in San Francisco, CA, on March 30, 2015 and to the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA on March 31 and April 1, 2015. The subjects addressed and summarized in Section 3 are as follows: :

1. PG&E Tsunami Risk Analysis
2. PG&E Seismic Study
3. Probabilistic Risk Assessment Program Status
4. Fire Protection System and Program Health
5. Spent Fuel Pools and Related Equipment
6. Safety Injection Pumps
7. Safety Conscious Work Environment
8. Human Performance Program
9. Meeting with NRC Resident Inspector
10. System Engineering Program
11. Compressed Air System
12. Meeting with VP Nuclear Services and Site Vice President

2.0 Introduction

This fact-finding trip to the DCPD 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 DCPD 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 PG&E Tsunami Risk Analysis

The Fact-finding Team met in PG&E's San Francisco offices with a large group of PG&E staff and consultants to discuss the topic of the tsunami hazard at the DCPD site. The leaders of the PG&E team on this topic were Stuart Nishenko, Senior Seismologist from PG&E's Geosciences Department, and Scott Maze of the PG&E staff. However, the major technical presentation was made by Stephan Grilli, a consultant to PG&E who is a professor in the Department of Ocean Engineering at the University of Rhode Island (URI). About a dozen other PG&E staff members and consultants were also present. Robert T. Sewell, a technical consultant to the DCISC on the topic of tsunami hazard who performed a 2003 tsunami-hazard study of the DCPD site, participated remotely by a telephone tie-in.

The DCISC performed earlier reviews of the tsunami hazard topic during a fact-finding meeting in November 2013, and again during a fact-finding meeting in December 2014 (References 6.1 and 6.2 respectively). DCISC's conclusions from each of these respective reviews were as follows:

November 2013

PG&E's technical work on tsunami hazards at the DCPD site is well-planned, proceeding very well so far, and working on the correct set of problems. The work is in fact moving rapidly toward achieving the needed understanding, and the technical quality seems to be excellent. The DCISC should continue to follow this work over the next few years.

December 2014

PG&E's technical work on tsunami hazards will be completed in March, 2015. The DCISC should review this work, and its relationship to the Sewell report, in a future Fact Finding meeting.

It was recognized at those times that PG&E's technical work on tsunami hazards would be completed in March 2015, which prompted the DCISC's scheduling of this topic for the March 30-April 1, 2015 fact-finding meeting.

As background, PG&E has been carrying out an extensive program for several years to gain better understanding of the tsunami hazard at the DCPD site, involving both an extensive data-gathering

effort and the development and use of several advanced modeling methods that had not been brought to bear previously on this topic. The results of the first phase of this PG&E-sponsored tsunami-hazard work were published in 2008, and that project motivated PG&E to perform follow-on work to provide a more refined understanding. It is important to note that PG&E began this effort well before the 2011 Fukushima accident in Japan focused the whole world's attention on the issue of whether tsunamis represent a significant threat to the safety of nuclear power plants at ocean sites around the world.

PG&E's second-phase work, undertaken over the past few years, has involved a considerable program of field measurements offshore of the DCPD site, as well as major new modeling and analysis, some of it using advanced hydrodynamic simulations and some of it using advanced three-dimensional modeling of energy, momentum, and mass balances occurring during a major tsunami as it approaches the coast and ultimately runs up the shore. In mid-March 2015, PG&E completed a new report, "DCPD Units 1 and 2 Flood Hazard Reevaluation Report," DCPD document DCL-15-034, Reference 6.3, submitted to the NRC in response to an NRC information request of March 2012. This was part of the NRC's post-Fukushima-accident activities to understand tsunami and other flooding hazards more fully. This new report covers several other external-flooding hazards at the DCPD site too—the tsunami-hazard section is but one part of the larger report. The tsunami-hazard section of this report, in turn, is but a summary of a considerable amount of underlying technical work that formed the basis of the PG&E presentation to the DCISC at this Fact-finding Meeting.

Another important piece of background is that the original "Design basis" tsunami hazard that was accounted for in the DCPD plant's design prior to obtaining its original NRC license in the 1980s considered mainly tsunamis generated from distant sources whose energy would need to travel great distances across the Pacific Ocean. It did not consider tsunamis that might arise from sources closer to the DCPD site itself, generated by possible submarine landslides or other similar phenomena occurring within the relatively nearby ocean close to the plant. It is these closer sources that are the major focus of the new tsunami studies that PG&E has undertaken in recent years, and that were the focus of discussion at this Fact-finding Meeting.

The principal technical presentation of PG&E's recent work was made by Dr. Grilli of URI, supported by other members of the PG&E study team. Grilli's presentation included extensive graphics and animated videos, which served to illuminate the major issues and topics covered. He emphasized the examination of several potential locations in the near offshore of the DCPD site which hold the potential for generating a tsunami due to large movements of sub-ocean-floor mass, triggered most likely by a major nearby earthquake. These submarine "Landslides" or "slumping" events, in turn, can occur only when the conditions on the seabed have the "right" combination of properties. Examples include areas with appropriate spatial extent, composition of the soil/rock, extent of saturation with water, and lubrication of surfaces between the material susceptible to movement and the underlying (more stable) rock. The dynamics of how such a large mass might move—its velocity, the duration of the movement, the total mass that would move, and the timing—are vital to understanding the properties of any resulting tsunami.

A major aspect of the new tsunami study was the identification of those few zones on the nearby

seabed with the potential to produce an important tsunami. Grilli explained how the study team, using criteria from other tsunami studies, determined which of several potential sources had enough potential so that detailed modeling of them would be worthwhile. He also described the modeling itself—the data gathered, the analysis methods used, how the data were used in part as benchmarks and in part as inputs to the analysis, and the sources of the major uncertainties.

One major result of the new work, reported in the NRC submittal and also discussed in Grilli's presentation, is PG&E's report's conclusion that no tsunami arising from any of the nearby sources of sub-sea landsliding or slumping could threaten the overall safety of the plant. While uncertainties remain, the report concludes that direct tsunami waves will not compromise the function of any plant safety system. This includes the Auxiliary Salt Water (ASW) System, which is the most vulnerable safety system located near ocean level because of its location. Also, PG&E concludes that while run-up resulting from the largest tsunamis can bring water inland to a considerably higher level than the level impacted by the direct tsunami wave (although well below the grade of the plant itself which is 85 feet above the Pacific Ocean), this is a short-term transient effect that PG&E concludes cannot cause significant damage, either from the water itself (wetting and flooding) or from the dynamic impulse loads brought along by the waves. This is explained in the report, and Grilli provided detailed explanations of the underlying phenomena.

As useful as the Grilli presentation and the ensuing discussion was—and it was very helpful to the DCISC Fact Finding team—a more detailed DCISC evaluation of the underlying technical work will need to be done in the future, based in part on careful study of the Grilli presentation and in part on the study of other underlying technical material that PG&E has not yet provided to the DCISC, nor to the NRC in the March submittal.

Conclusions:

PG&E submitted its most recent report to the NRC on tsunami hazards in mid-March, 2015. One major result of the report is PG&E's conclusion that no tsunami arising from any of the nearby sources of sub-sea landsliding or slumping could threaten the overall safety of the plant. The work contained in this report is clearly an important advance over previous analyses of the tsunami hazard at the DCP site, being based on considerably more site-specific data and much more advanced modeling methods than previous analyses. The DCISC should continue to review this topic as it gains access to the underlying technical data and reports.

Recommendations:

None

3.2 PG&E Seismic Study

After the discussion on tsunami hazards (Topic 3.1 of this report), the agenda of the Fact-finding meeting in PG&E's San Francisco offices moved on a second topic, the seismic hazard at the DCP site. The leaders of the PG&E team on this topic were Norman Abrahamson (Chief Seismologist) and Stuart Nishenko (Senior Seismologist), both from PG&E's Geosciences

Department in San Francisco, and Nozar Jahangir (Engineering Manager for the Seismic Program Update) of the DCP site staff. Mr. Jahangir made a presentation covering some of the topics, but some of the discussion covered topics outside of his presentation. Also participating in the discussion was William Lettis of Lettis Consultants International, a consultant to PG&E. About a dozen other PG&E staff members and consultants were also present.

The DCISC has performed several earlier reviews of the seismic hazard topic, the most recent being during its Public Meeting on October 14, 2014 (Reference 6.3) when Dr. Abrahamson and Dr. Nishenko made an extended public presentation, concentrating at that time on the newly published PG&E report on the “Central Coastal California Seismic Imaging Project”. Since that time, PG&E has completed its major multi-year DCP site-specific probabilistic seismic hazard study, the “Senior Seismic Hazard Analysis Committee (SSHAC) Level 3 Study”, and submitted the results to the NRC in mid-March as the “Seismic Hazard Reevaluation Report.” (Reference 6.4) This report was submitted to the NRC in response to an NRC information request of March 2012, which in turn was part of the NRC’s post-Fukushima-accident activities to understand seismic hazards more fully at each U.S. nuclear power-plant site.

The Fact-finding discussion began with the Fact-finding team asking the PG&E team if they could identify those technical topics within the recent SSHAC-3 seismic-hazard study where important uncertainties remain that are most worth discussing. The initial response concentrated on the issue of uncertain path effects in the ground motion propagation from source to site, which are in turn affected by the site’s underground rock profile. The PG&E team noted that because recent data have provided much more site-specific information about the subsurface, there is much less uncertainty now than had been the case, say, 10 or 15 years ago on this topic, but that the remaining uncertainties are still among the most significant sources of overall uncertainty in the site hazard. To overcome this, one needs an extended array of seismic instruments in and around the site, and then one needs to “wait for some earthquakes” (using continuous monitoring in the vicinity) so that path effects and other site effects can be directly measured. This may take 5 or 10 years of waiting for several small nearby earthquakes to occur before enough data will accumulate.

Another area where new information could help is better geodetic data in the near vicinity, to help in the understanding of slip rates and other phenomena on the nearby faults. At present not enough is known to pin down some of the parameters important to quantifying the hazard in a way that could be done with a few years of refined geodetic data. Dr. Lettis stated his belief, echoed by Dr. Abrahamson, that the recent “Seismic Hazard Reevaluation Report,” Reference 6.4, has done an excellent job of capturing the “Center, body, and range” of understanding of the various parameters of the site seismic hazard. (Those three words, commonly called the “CBR” by researchers in the field, are a major measure of the quality of a seismic hazard study, emerging as they have from the original 1997 SSHAC guidance on how to perform a modern seismic hazard study.) Confidence that the CBR has been captured for each of the major seismic-hazard parameters is one measure of the success of such a study. It is clear to the DCISC Fact-finding Team that an indication of the success of this new study would be if extensive reviews of it by other experts outside of the study team, and by the NRC, reveal that there is broad concurrence that the CBR has indeed been captured.

Another issue of major interest, and where important uncertainties remain, involves whether the large ground motions on the important nearby faults are in fact mainly described by a “stationary Poisson” process, or are better described by a process with some (or even considerable) bunching of seismicity in time. This is not known, and only more earthquake data, to be gathered over time in the future, can help reduce the uncertainties on this topic.

The final topic that was discussed, that contributes importantly to the uncertainties (and that in principle is amenable to reduction with future work) is the extent to which various faults are “Linked,” where a rupture on one fault would induce a rupture on the other fault also. The PG&E team explained that they have tried to “Bound” this effect in their new study by assuming that the Shoreline and Hosgri faults are indeed linked, although whether they are or are not is still unknown. This assumption then produces what was characterized as a “Conservative” hazard result, meaning a result that is likely to be on the “High side” of the actual site hazard. Again, only further study (in the future) can help reduce the uncertainty on this issue.

Conclusions:

PG&E submitted its most recent report to the NRC on the site seismic hazard in mid-March 2015. The work contained in this report is clearly a major advance over previous analyses. It will be reviewed in the near future both by the NRC staff and by other outside experts. The DCISC should continue to review this topic too, by studying the underlying technical data and reports and reviewing the reviews of others.

Recommendations:

None

3.3 Probabilistic Risk Assessment Program Status

The Fact-finding Team met with Rasool Baradaran, Supervisor, PRA, Matt Shepard, PRA Engineer, and Nathan Barber, Senior Engineer and Seismic PRA Project Manager, to discuss the current status of the DCP group under Baradaran’s supervision that is responsible for maintaining the station’s PRA (probabilistic risk assessment), 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 major PRA-development and PRA-enhancement projects now underway, and the PRA group’s use of several different PRA methods to support plant safety.

The DCISC has performed several reviews in the last two years of specific topics related to PRA, but this is the first time since its Fact-finding Meeting on June 26-27, 2013 (Reference 6.5) that it has done a broader review of the PRA area. The report of the June 2013 Fact-finding Meeting concluded the following:

The DCP PRA group’s work today is focusing both on completing work to develop new PRA models in the fire and seismic areas and on applying PRA methods in several safety-

significant applications at the plant. The group is also growing, which is appropriate if it is to support DCPD as it needs to. The work is proceeding well. The competence of the group and its recent accomplishments attest to a strong PRA capability. The DCISC should undertake a further review of this PRA area about a year hence, when the plant will have achieved additional major milestones in its PRA development effort.

The Fact-finding Team reviewed several different PRA topics, as discussed in what follows:

Internal-flooding PRA: The DCPD team reported that they are well along toward completing development of the PRA model for the internal-flooding PRA, after having worked on it for the last three years. An external peer review was conducted, which resulted in a few findings and observations that the DCPD team has responded to by revising and upgrading their model. This model was finally completed within the last few weeks before this Fact-finding Meeting, and is now being exercised by doing various analyses. A few technical findings from the model have resulted in the identification of some potential changes to the plant that are currently being evaluated. One involves potential sources of water that would flood the battery rooms, an issue that is being reviewed.

GI-191: The PRA team has been active with an industry consortium of 14 other nuclear power plants that is fostering the use of risk insights in the resolution of NRC Generic Safety Issue-191, "Assessment of Debris Accumulation on PWR Sump Pump Performance." Mr. Baradaran reported that the analysis has proceeded well.

Low Power and Shutdown PRA: Dr. Budnitz reported to the DCPD team that the American Society of Mechanical Engineers (ASME) and the American Nuclear Society (ANS) have recently published a new PRA methodology standard covering PRA analysis during low power and shutdown (LPSD) conditions. (Dr. Budnitz is one of the two co-chairs of the ASME-ANS joint standards committee that published this standard in early 2015.) The DCPD team already knew about this new standard, and reported that they are planning to initiate a new PRA to evaluate LPSD conditions. However, they plan to await the completion of two pilot applications of the new LPSD standard at other US plants, in order to benefit from the insights gained during those pilot studies.

Revision to Technical Specifications Based on Risk Insights: Mr. Baradaran reported that in mid-November the plant submitted a License Amendment Request (LAR) to the NRC to revise the plant's Technical Specifications based on insights from the plant PRA. DCPD is not the first U.S. plant to take an initiative along these same lines, and the NRC has already granted license changes to several other plants on this subject, so there are good precedents for DCPD's LAR submittal. The DCPD team is now awaiting receipt from the NRC of either a Safety Evaluation Report approving the request, or perhaps some questions seeking clarification. Related to this topic is Mr. Baradaran's report that a new software package, "Phoenix," is now in place to replace "Safety Monitor" for the PRA-based analysis of maintenance activities as required by Section (a)(4) of NRC's "Maintenance rule," 10 CFR 50.65.

Seismic PRA: The PRA team has been working for the last few years on a major updating of the

existing seismic PRA (SPRA), which was performed in the late 1980s and which at the time was considered one of the very best SPRAs ever performed—indeed, even today that prior SPRA is often considered a “gold standard” SPRA in terms of the scope and depth of its analysis and the methods it used.

Major work has been done on the new SPRA systems model, based in large part on the plant’s new internal-events PRA. One topic that remains “Open” now, but will be addressed soon, is the issue of which human-error probabilities (HEPs) to use in the SPRA model after a large earthquake. This issue of HEPs in SPRA has been a source of uncertainty in SPRAs for decades, but a recent project sponsored by the Electric Power Research Institute has made some important advances that the DCPD team expects to utilize after the EPRI report receives an upcoming broad review in the community of SPRA experts.

Based on new data, the PRA team is currently re-evaluating the part of the old SPRA dealing with the seismic-induced chattering of certain less rugged relays, which can cause inadvertent electronic signals that can be adverse to safety. The team expects that this part of the PRA will be ready for outside review by the summer of 2015.

The SPRA seismic-fragility work has been under way for more than a year, but completing it needs to wait until the NRC provides an endorsement of PG&E’s new seismic-hazard report, which was submitted to the NRC in mid-March and which will require several months of NRC staff review before PG&E will receive either an endorsement or further questions.

Fire PRA: The DCPD team has been working on a new fire PRA for three years, and analyses using it have served as a major part of the information in the plant’s submittal to the NRC supporting the plant’s plan to switch over its fire-protection regulations under NRC from the existing Appendix R-based approach to the new approach based on industry standard NFPA (National Fire Protection Association) Standard 805. The NRC recently sent the plant a second round of requests for additional information, which the plant has responded to just prior to this meeting. If NRC has no further issues, then DCPD plans to undertake its NFPA 805 “Integrated assessment” in May, with the expectation that the NRC’s review and assessment will be completed in December 2015. If successful, this schedule will mean that the plant’s ultimate switch-over to the NFPA-805 regulatory approach will occur one year thereafter, or at the end of 2016.

Conclusions:

The DCPD Probabilistic Risk Assessment (PRA) group’s development work today is emphasizing the completion of new PRA models in the seismic and internal-flooding areas. Its applications work continues with applying PRA methods in several safety-significant areas at the plant. The DCISC Fact-finding Team concludes that the PRA group is doing fine work, as its competence and its recent accomplishments attest. The DCISC should continue to follow developments in the seismic-PRA area closely. On the other PRA topics the DCISC should undertake a further review about a year hence, when the plant anticipates it will have achieved

additional major milestones in its PRA development effort.

Recommendations:

None

3.4 Fire Protection System and Program Health

The DCISC Fact-finding Team met with David Hampshire, Fire Protection Program Supervisor, and Daniel Ensinger, Fire Chief at DCP, for an update on DCP's Fire Protection Program and System. The DCISC's last Fact-finding review of this topic was in November 2013 (Reference 6.6) when it concluded the following:

DCP appears to have made considerable progress in enhancing the capabilities of its Fire Department, both in preparation and in equipment, to respond to a station fire and/or nuclear emergency. Communications and cooperation between DCP's Fire Department and CalFire (and other nuclear plants) also appear to have strengthened. The DCISC should consider observing a future station drill or emergency exercise that involves the mobilization of DCP's Fire Department (and CalFire if included). DCISC should also consider including this topic in a future Fact-finding Visit or Public Meeting no later than the first quarter of 2015.

An update on the Fire Protection Program was also provided by DCP at DCISC's Public Meeting in June 2014 (Reference 6.6).

DCP's performance reporting and monitoring practices for the Fire Protection Program are extensive and detailed. A Fire Protection System Health Report is maintained for each DCP Operating Unit. A listing of Fire Protection Impairments for the Station is also maintained. All of these documents were updated for the DCISC's Fact-finding Visit. The station is transitioning to a Risk-Informed, Performance Based Fire Protection Program based on the National Fire Protection Association Code (NFPA 805). All of the documents that reflect station performance in these areas were updated and provided to the DCISC Fact-finding Team.

DCP's Fire Protection System Health Reports showed that the Systems for both Units were rated White overall, based on the following scale:

Green = Healthy with, at most, some minor issues

White = Healthy, but a few more than minor issues needing attention

Yellow = Not Satisfactory, issues need attention

Red = Unhealthy

Each of the Unit System Health Reports also lists and rates each of six different performance categories for the Fire Protection System, namely: Reliability, Material/Equipment Condition and Corrective Action, Operations Concerns, Design, Performance Monitoring, and status with respect

to the NRC's Maintenance Rule. All of those categories were rated as Green. In addition, each of those major performance categories has a number of supporting performance categories, which can affect the overall rating of system performance. Although the vast majority of these performance subcategories were also rated Green, the following subcategories of performance were determined to be of sufficient significance to warrant the overall rating of White for both Units.

- "Aging Issues Affecting Reliability" was rated Red in the major Category of Material/Equipment Conditions and Corrective Action for each Unit, due the following issues: One pertained to degradation of a four inch header located between the Units 1 and 2 Containment Buildings. Also cited was degradation of Unit 1 Auxiliary Building four inch and six inch pipe headers, and some buried pipe pertaining to Unit 1 in the Yard Loop. It was noted that an Action Plan had been established for addressing the aging firewater pipe and the Plan had been updated as of October 2014.
- The degradation of some portions of the fire protection headers in both Units was also determined to constitute a "Margin" issue.

Although the degradation of decades old piping systems is clearly an issue, DCP's experience has been that the deterioration rate has been slow and the piping has experienced leakage rather than rupture. There are currently no significant fire water system leaks. The degradation mechanism, internal corrosion for all of the piping and soil side corrosion for the buried portions, is such that the pipe failure is judged to be unlikely. Also, pipe stresses are low and the pipes are well supported, which minimize the likelihood of a break rather than a detectable leak. With respect to the deluge stations, the failure consequences are low because the failure of any deluge station can be easily isolated and has no impact on any other location.

Reliability of the suppression system is considered to be good for both Units, with low failure consequence, due to redundant pumps and the capability to cross-tie the yard loop and the raw water storage reservoir supply.

Nevertheless, action plans have been developed to implement a program of pipe and component replacement and tank refurbishment. Although not an urgent matter, the DCISC should examine these plans no later than the second quarter of 2016.

The fire detection system is rated as functional. However, the System contains original detectors that are aged and obsolete. Also, detectors do not provide prompt detection in terms of specific location. Alarming detection is by zone which presents a challenge to Operations to promptly identify the location of a potential fire. In addition, the individual locations of about 40 detectors each create a challenge for station personnel to access and service the instruments.

DCPP participates in an information exchange program where organizations share their experiences with respect to addressing issues, solving problems, and making improvements. The following are a few examples of where DCP has been, and is, taking action based information gleaned from other sources:

- Industrial plants are changing fire protection detection systems from standard smoke and flame detectors to video fire detection, smart detectors, and air sampling detection systems. DCPD is involved in a National Fire Protection Association (NFPA) project to replace the detection system in support of fire risk modeling requirements as well as for system health.
- Based on external information with regard to mineral content for corrosion control purposes, DCPD added an instruction to fill the fire water storage tank with only west reservoir water.
- Based on external information, DCPD revised some surveillance frequencies in response to test results and trends that have been achieved.
- DCPD revised its servicing of fire and smoke dampers in ventilation ducts to improve industrial safety of the activity and reliability of the results.

DCPD's Fire Protection Program performance is also rated as White. One of the factors preventing a Green rating is the condition of a number of fire doors. The DCISC reviewed DCPD fire doors in November 2014 (Reference 6.7). The station's most recent Quarterly Report of Fire Program Health, 1st Quarter 2015, noted that there have been numerous notifications for inadequacies pertaining to impaired fire doors. Fire door impairments have been a concern of DCPD and the DCISC for a number of years. Some of the doors have had latching problems and ventilation issues, which can be solved through repair. Others are targeted for replacement. Until recently fire door deficiencies have resulted in a Yellow or Red performance rating for the Program. More recently, a "Life Cycle Management Plan" has been developed for all the plant fire doors. The scope includes power block doors, fire doors and safety related doors for flood protection, Heating, Ventilation, and Air Conditioning (HVAC), and High Energy Line Break (HELB) functions, as well as personnel access doors. Doors with security functions only are not included, nor are hatches and blowout panels. The Program Health Report noted that door replacements are underway, and this performance metric is expected to return to Green in 2015. The first priority is to address the fire doors that fail to close. Until those doors are replaced, compensatory actions will involve continued use of a roving fire watch. This responsibility can be assumed by non-licensed operators who are currently on shift.

The DCISC Fact-finding Team also welcomed and spoke briefly with Chief Daniel Ensinger, DCPD's new Fire Chief, who assumed his responsibility at DCPD in January 2015. Discussion included the continuing active interaction between DCPD's on-site Fire Department and CalFire, the local fire department, which occurs on a monthly basis and is governed by a formal Memorandum of Understanding. The North Access Road, a secondary access and evacuation road for the site, was discussed; and the Fact-finding Team was informed that DCPD expects to submit a proposal for an upgrade to that road. It was noted by Chief Ensinger that only three nuclear plants in the U.S. have on-site fire departments. It was also noted that all 18 DCPD Fire Technicians have been certified to the level of Technician or Specialist. It was further noted that the Fire Group has become involved with FLEX, in activities such as training for laying hoses and removing debris. It was also noted that an organizational restructuring has occurred at DCPD that involves the creation of a new group consisting of Emergency Services, Security, Fire Protection, and Performance Improvement.

Conclusions:

The Fire Protection System and Program have been receiving increased attention and more aggressive action during the past year. Creation of a new station group that has Fire Protection as one of its cornerstones will help maintain that focus. Plant aging has had a negative impact on the condition of DCPD fire protection systems and fire doors. Actions planned by DCPD to address existing issues appear to be reasonable from the standpoints of both adequacy and timeliness. The DCISC should review station progress and status, with regard to fire doors in particular and the fire protection program as a whole, no later than the second quarter of 2016.

Recommendations:

None

3.5 Spent Fuel Pools and Associated Equipment

The DCISC Fact-finding Team met with Cameron Christiansen, Project Engineer—Fukushima, and Lead Mechanical Engineer on all FLEX Strategies. Dan Hardesty, System Engineer for Spent Fuel Pool (SFP) Cooling and Area Owner, was scheduled to participate, but was unable to attend. The DCISC last reviewed the SFP in May 2011 (Reference 6.8) when it concluded:

Both Spent Fuel Pools and support systems appear to be in good condition. The system engineer continues to be knowledgeable and proactive. The two open issues noted during DCISC's previous Fact-finding Visit, i.e. backup cooling for each pool and the need to inspect the heat exchangers, have been adequately addressed by DCPD. Based on several problems during the past year involving the incorrect placement of fuel assemblies in the SFPs, the DCISC should consider reviewing this process and DCPD's evaluations and corrective actions resulting from the two problems identified in this report.

The safety-related purposes of the SFP Cooling System are as follows:

- To maintain an inventory of water in the SFP sufficient to keep the spent fuel immersed at all times.
- To provide reactivity control (borated water) as a secondary and backup means for mitigating the effects of a postulated misplaced fuel assembly. The primary method for reactivity control in the SFP is the physical arrangement of the fuel assemblies in which the most recent fuel assemblies removed from the reactor vessel are stored in locations in which each such assembly is surrounded by older fuel assemblies that were previously transferred from the reactor vessel to the SFP.
- To provide a water inventory in the SFP to mitigate radiological consequences that could stem from design basis fuel handling accident.

The SFP Cooling System provides a means of for transferring decay heat from the SFP to the Component Cooling Water (CCW) System via the SFP heater exchanger. In addition, the SFP Cooling

System maintains a water inventory in the SFP to provide radiation shielding for long-term storage of fuel assemblies in the SFP. It also purifies and demineralizes SFP water to maintain SFP water quality. Because the fuel assemblies in the SFP continue to produce heat, it is important to keep the water in the pools cooled. Also, since different assemblies are producing heat at different rates it is important to maintain knowledge and control of where each fuel assembly is located in order to avoid creating hot spots in the pool. DCPD has specific requirements governing the loading and storage locations of spent fuel assemblies. The Spent Fuel Pool is also the storage facility for new fuel assemblies that have been delivered to the plant prior to loading them into the reactor during a refueling outage.

Each of the two operating Units at DCPD has its own Spent Fuel Pool (SFP) and SFP cooling system. Each SFP is an interim storage facility for fuel assemblies that have completed their useful cycles of producing power, hence the term “spent” fuel. When a spent fuel assembly’s heat production diminishes to an acceptable level, the assembly is then individually transferred from the pool, along with 31 other spent fuel assemblies, into a dry storage cask. This cask, containing the 32 spent fuel assemblies, is then transported to the Independent Spent Fuel Storage Installation (ISFSI), a secure storage facility located on a hill above DCPD. Each cask is then placed in its own High Integrity Storage Module (HI-STORM), a thick concrete and steel overpack, which is then bolted firmly to a strong, solid concrete and steel pad for dry storage.

Each pool has two 100 percent capacity SFP Cooling Pumps provided with Class 1E electric power and one 100 percent capacity heat exchanger that is cooled by the Component Cooling Water (CCW) System. The SFP is designed with proper depth to provide a minimum of 23 feet elevation 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, during normal operation there is no remote wide-range level indication that could be used to determine the pool water inventory from outside the fuel handling building. During outages a mounted camera is focused on the level-marking strip in the pool so that it can be read from the Control Room. Annunciators in the Control Room provide the following alarms, as described in Annunciator Response Procedure AP PK 11-04: (these levels listed below represent elevations above the tops of the fuel assemblies in the SFP)

- Low Level 24 feet 2 inches (This is also the lowest level that can be detected by the instrument)
- High Level 25 feet 10 inches (This is also the highest level that can be detected by the instrument)
- High Temp 125 degrees
- Hi Rate of Temp Change 2 degrees/hour when > 80 degrees Fahrenheit

The normal SFP level is maintained at 24 feet 6 inches.

The lack of a wide-range level measurement for the pool, which could for example be provided by a

bubbler tube immersed to the bottom of the pool, that would provide indication outside the fuel handling area, proved to be a major problem in the management of the Fukushima nuclear accident. DCP, like all other domestic nuclear power plants, is adding wide-range SFP water level instrumentation. This was reviewed at the DCISC April 21-22, 2015 Fact-finding Meeting (Reference 6.z). These installations will be completed in September 2015.

Leakage from the SFP can also be determined locally using a manual process by which leak chase isolation valves are opened and sampled for water if present. The leak chases are located between the steel liner of each pool and the concrete pool structure, and collect any water that leaks through the liner. The locations of these isolation valves are such that gravity causes any leakage to be collected in each chase in which the water flows to the isolation valves. No remote detection capability exists. Therefore, in the event of a loss of coolant or the development of a large or moderate leak path while the SFP is unattended, the decreasing SFP level would be detected and alarmed by the new level monitoring system.

The Fact-finding Team was provided with the System Health Reports for both the Unit 1 and Unit 2 Spent Fuel Pools and associated equipment. The overall health of each pool was rated as Green, on a scale of:

Green = Healthy with, at most, some minor issues

White = Healthy, but a few more than minor issues needing attention

Yellow = Not Satisfactory, issues need attention

Red = Unhealthy

Overall System Health is a composite of similar ratings on a number of performance categories, namely: Reliability, Number of Critical Equipment Clock Resets, Number of Unplanned Entries into Limiting Conditions of Operations, Number of Reactor Trips Arising from Problems in the System, Issues Pertaining to the Nuclear Regulatory Commission's (NRC's) Maintenance Rule, Material/Equipment Condition and Corrective Actions, Operations Concerns, Performance Monitoring Issues, and Design Issues.

All of the above individual performance categories for each unit were rated as Green. However several issues considered to be minor were discussed for each SFP. For Unit 1, the boroflex panels in the Spent Fuel Racks are deteriorating and giving off silica into the pool water. After a refueling outage the Refueling Water Storage Tank needs to undergo feed and bleed to lower the silica amount. An alternative being considered is to buy, rent, or borrow a resin skid to remove the silica. For Unit 2, the SFP Pump #2 is experiencing leakage of the bearing oil. A modification is planned to correct this condition, and this same modification has been performed successfully on the two Unit 1 SFP Pumps, the SFP Skimmer Pumps, and Unit 2 Pump #1.

One issue that was addressed prior to the May 2011 Fact-finding Visit is that each Spent Fuel Pool has only one heat exchanger, and the need for a second "Back-up" heat exchanger for each pool was therefore examined. This single point vulnerability had been recognized for many years.

However, rather than purchasing and installing two additional heat exchangers, DCPD purchased and maintains one portable system consisting of hoses and three pumps. In situations where the cooling system for one of the SFPs becomes disabled, the portable system would be set up to transfer the cooler water from the SFP with the operational cooling system into the second SFP, whose cooling system is inoperable, and then to recirculate water from the second SFP back to the SFP with the operational cooling system. In effect, each SFP cooling system can now serve as a backup for the other. It has been demonstrated that this portable system, which is onsite, can be made operational within the minimum time-to-boil time frame for a Spent Fuel Pool, which would occur when the pool contains a fully and recently offloaded reactor core.

The DCISC Fact-finding Team was given a brief tour of the area above and around the Unit 2 Spent Fuel Pool. The area was clean and orderly.

Conclusions:

Both Spent Fuel Pools and their associated equipment are rated as “Healthy” with only minor issues needing to be addressed, and plans are in place to do so. The area of Unit 2 Spent Fuel Pool deck was clean and orderly.

Recommendations:

None

3.6 Safety Injection Pumps

The DCISC Fact-finding Team (FFT) met with Chris Harrison, Safety Injection System Engineer, and Sergio Santiago, Primary Systems Supervisor. The DCISC last reviewed this system as part of its review of the Emergency Core Cooling System in May 2012 (Reference 6.9), when the DCISC FFT concluded:

The DCPD Safety Injection System, a part of the Emergency Core Cooling System, exhibits Green (excellent) health and has no major problems. The system engineer appeared knowledgeable and pro-active about the system.

The DCPD Safety Injection System is part of the Emergency Core Cooling System that is designed to provide water initially from the Refueling Water Storage Tank (RWST) to cool the reactor core and provide negative reactivity in the event of a loss of coolant accident in either the Reactor Coolant System (RCS) or the Main Steam System, spurious lifting of a RCS relief valve, a Rod Cluster Control assembly ejection, or a Steam Generator tube rupture.

This fact-finding report is about the Safety Injection Pumps that are part of the Safety Injection (SI) System. SI consists of two 100% capacity trains that are interconnected and redundant such that either train is capable of supplying 100% of the flow required. The SIS contains two safety injection pumps along with associated suction, discharge, and throttle valves and instrumentation for each Unit. Four accumulator tanks and one RWST are also part of the SIS.

The Safety Injection pumps receive power from the 4160 V Vital AC electrical systems and utilize control power from 125V Vital DC distribution panels. Various SI motor operated valves receive power from buses F, G, and H of the 480 V Vital AC electrical system. These power sources are backed up by the Emergency Diesel Generators.

The SI Pump discharge lines are cross-connected via two normally open motor-operated valves (MOVs). Downstream of these valves, the discharge crosstie supplies the RCS cold legs via a header containing a normally open MOV (containment isolation valve) and four branch lines each containing a pressure reducing orifice assembly, flow orifice (used for flow measurement), and a throttle valve. This arrangement allows proper flow balancing between loops and limiting the pump flow to prevent pump runout. The injection lines are sized and the throttle valves are set so that a single broken injection line will not starve the other injection lines.

The SI Pumps provide ECCS flow to the RCS cold and hot legs, and flow through test lines for check valve testing and to fill all the accumulators. The nominal shutoff backpressure for the SI Pumps is 1,520 psig. The maximum allowable pump flow for the SI Pump is 675 gpm. The required Net Positive Suction Head at 675 gpm is approximately 29 feet. The maximum pump flow is controlled by design features, e.g., throttle valves, flow orifices, and piping resistances. SI Pumps are full-flow tested each refueling outage and tested quarterly at partial/recirculation flow. All tests have been successful. The SI Pumps are seismically qualified in accordance with NRC requirements.

The ECCS has been reviewed for its ability to withstand environmental effects of internal flooding. Flood levels for the Safety Injection Pump rooms have been evaluated and it has been determined that the levels will not exceed the height of the pump motors and associated instrumentation. Components are housed in separate compartments to ensure that redundant components are not impaired by flooding.

The current Health of the Safety Injection Pumps is Green on a scale of:

Green = Healthy with, at most, some minor issues

White = Needs Improvement

Yellow = Not Satisfactory, issues need attention

Red = Unhealthy

There are no significant issues affecting system health. Nevertheless, non-conforming conditions exist pertaining to welds on the vent and drain piping for each of Safety Injection Pumps 1-1, 1-2, and 2-1. More specifically, for each of those three pumps the welds in four small-bore pipe nipples have compositions that do not conform to the governing welding code. The welds of interest were performed during original installation prior to plant operation. The discrepancy was discovered during a recent review of station records. The station informed the NRC and engaged a contractor to perform a pipe stress and fracture mechanics analysis, the results of which led to PG&E's preparation and submittal of an "As is" relief request to the NRC. A response to this relief request is expected from the NRC during 2015. At this time immediate corrective action was deemed not to be

necessary due to the acceptable performance of the system. The reason that Safety Injection Pump 2-2 does not have this condition is that the pump was replaced in the 1990's, and the subject welds that were performed at that time complied with the governing code. The safety evaluation of these weld conditions results in the assignment of a "White" rating.

At the time of this Fact-finding Visit, on March 12, 2015, PG&E was in the process of submitting its tsunami analysis to the NRC. Based on information available at this time, it appears that neither external flooding nor internal flooding appears to be an event that could prevent the Safety Injection Pumps from being able to perform their design function.

Conclusions:

The Health of the Safety Injection Pumps is currently rated as "green," or "Healthy." Deviations from welding specifications on the part of some small bore pipe nipples in the vent and drain piping for three of the four Safety Injection Pumps do not appear to create a safety concern. Neither external flooding nor internal flooding appears to be an event that could prevent the Safety Injection Pumps from being able to perform their design function. The System Engineer demonstrated in-depth knowledge of the Safety Injection Pumps.

Recommendations:

None

3.7 Safety Conscious Work Environment

The DCISC Fact-finding Team met with Dean Overland, Procedure and Document Services Manager to discuss station activities that promote a safety conscious work environment and DCP's assessment of results.

The DCISC last reviewed a related topic, Nuclear Safety Culture Health Monitoring Panel, Process, and Report, in August 2012 (Reference 6.10), when it concluded the following:

DCP's Nuclear Safety Culture Health Monitoring process and Nuclear Safety Culture Monitoring Panel/Report appeared rigorous and effective in measuring and improving the plant's nuclear safety culture in accordance with the industry's Eight Nuclear Safety Culture Principles and supporting Attributes. The DCISC should monitor this process on a continuing basis.

Mr. Overland explained that DCP has been enlarging its efforts with respect to both nuclear and personnel/industrial safety, with the objective of fostering a Safety Conscious Work Environment. The Nuclear Safety Culture Monitoring Panel continues to maintain active oversight of station results in these areas. Examination of station events from the standpoints of human performance and possible underlying issues has been a long-term, active aspect of an ongoing effort to operate the facility in a safe manner and to protect members of the DCP workforce from injury. More recently, however, a greater focus has been placed on observing work activities for behaviors that

may not have resulted in problems at the time of the observation, but could be precursors to possible future problems. Supervisors and managers are being encouraged, and are expected, to take the time to engage in this observation activity, to provide feedback to their personnel on the job, and to listen to and strengthen their relationships with their subordinates.

In order to strengthen the observation process itself, some observations have, at times, been expanded to have more than one observer, and occasionally to have one observer observe another observer. Sometimes a supervisor and a manager will observe together, and they can also observe each other in the same process. The exchange of information has been found to be of benefit to the worker, the supervisor, and the manager. The results of these observations are then compiled and reviewed to identify strengths as well as issues that are in need of attention. The process, however, has not been implemented long enough to generate conclusive, meaningful data. In short, the station is still actively examining physical performance data, but is also supplementing these data with observations in the plant.

Mr. Overland further explained that DCPD has increased its emphasis on the facilitative aspects of being a leader, and a recent survey indicated that working level personnel have been feeling more comfortable in providing information upward within the organization. Mr. Overland also noted that an emphasis is continuing to be placed on this aspect of the organization (i.e. encouraging workers to provide feedback to supervisors and managers) as well as on communicating and reinforcing standards, self-reporting of issues, and promoting personal accountability.

Mr. Overland indicated that the station is in the process of developing a chart of major characteristics of and contributors to nuclear safety, with each major characteristic being supported by a number of related aspects of an organization and its people. However, the listing was not yet formalized to the point of being released within DCPD.

The Fact-finding Team was provided two documents that govern activities related to fostering a safety conscious work environment. The documents primarily focus on nuclear plant safety, but also have applications to industrial safety. The commercial nuclear industry's governing document is "Fostering a Healthy Nuclear Safety Culture," dated March 2014, and issued by the Nuclear Energy Institute, an organization that is supported by all U.S. nuclear plants and whose purpose, as the title of the above document implies, is to help its member companies achieve high levels of nuclear plant safety and reliability. The document identifies two key success factors for the monitoring process that can help create and foster an effective nuclear safety culture: 1) Inputs need to be obtained from a variety of data sources in order to discern emerging trends and 2) Organizations need to be genuinely self-critical, and interactions within the organization need to reflect and foster this aspect in the monitoring process.

The second document is DCPD's Interdepartmental Administrative Procedure (IDAP) OM16.ID2, "Nuclear Safety Culture Health Monitoring," dated December 8, 2014. The document prescribes responsibilities for creating and maintaining a healthy nuclear safety culture from the level of the Chief Nuclear Officer to station officers and managers and specifically to a station group, chaired by the Site VP and consisting of station directors, designated as the "Safety Culture Leadership Team."

Input to this group comes from a report prepared by the station's "Nuclear Safety Culture Monitoring Panel (NSCMP)". Members of the NSCMP are "seasoned nuclear professionals with broad, diverse backgrounds in nuclear plant operations and maintenance." These members would typically have management or supervisory responsibilities in areas such as nuclear regulations, industry operating experience, quality assurance, benchmarking, corrective action, security, human resources, employee concerns, and management observations.

The following information related to human performance was extracted from DCP's Plant Performance Improvement Report for January 2015:

Regarding human factors related to plant operational performance:

- Most recently, **DCP's Human Performance Event Clock Resets** indicator over the prior 18 month period was rated by the station as being Yellow, or less than Satisfactory. However, three of the four contributing events occurred during 2013, and the fourth occurred in August 2014, with none since then.

Regarding human factors related to industrial safety:

- **Total Industrial Safety Accident Rate**, which includes contractor personnel, was rated as Yellow for the period August 2013 through January 2015.
- **Lost Work Days** (due to injury), which includes only DCP personnel, was rated as Green, or Good, for the period November 2014 through January 2015; Yellow for the preceding period of June 2014 through October 2014; and Green again for the period August 2013 through May 2014. For that ten month period from August 2013 through May 2014, DCP experienced zero lost time accidents.

Conclusions:

DCP is organizationally focused on fostering a safety conscious work environment from the standpoints of both nuclear and industrial safety. The station appears to be in the early stages of implementing an enhanced process for observing station work activities. This includes obtaining feedback from employees being observed, occasionally conducting an observation with more than one observer, and expanding the amount of data that are retrieved and analyzed. The DCISC should continue to follow this area actively.

Recommendations:

None

3.8 Human Performance Program

The DCISC Fact-finding Team met with Mark Frauenheim, Performance Improvement Manager. DCISC last reviewed the topic of Human Performance at its January 2014 Fact-finding Visit (Reference 6.11), when it concluded:

Three Station Level Human Performance Event Clock Resets occurred during the fourth quarter of 2013, causing the station's 18-month indicator for such Resets to become Yellow (deficient). Two of these three events involved Operations personnel. Operations performance with respect to human error rate has been Red (Unsatisfactory) since July 2013. Component mispositioning appears to be a contributor. The DCISC should examine Operations' efforts with regard to plant status control and component mispositioning with regard to the station as a whole no later than the third quarter of 2014.

As indicated in the above conclusion from DCISC's January 2014 Fact-finding Visit, this topic was selected for review by DCISC at that time due to human performance issues that were reported during 2013 and manifested again in early 2014. As early as July 2012, DCP's Quality Verification Department had identified Human Performance as a concern and carried it as such throughout most of 2013. During the fourth quarter of 2013 DCP experienced three Human Performance Clock Resets, which are considered to be significant departures from expected performance. These Resets were discussed during DCISC's January 2014 Fact-finding Visit and are included in DCISC's Report on that Visit.

One purpose of this Fact-finding Visit was to review DDPP performance since January 2014 and gain an understanding of actions taken and planned by DCP to achieve improvement. The other purpose was to examine Operations Performance since January 2014. Mr. Frauenheim noted that over a year ago the station recognized that increased focus and greater effort needed to be applied to human performance. In early 2014 DCP performed a Root Cause Evaluation on an "Adverse Trend in Human Performance Resulting in Plant Events." The Root Cause of the situation was determined to be inadequate personal accountability that was reflected in a culture that did not drive human performance to meet expected standards. Two other factors were also identified as contributing to this situation: 1) over dependence on one individual to implement the program, and 2) weaknesses in causal evaluations that tended to focus overly on the individual involved with the problem and consequently overlooked possible organizational and programmatic factors. DCP's analysis examined not only the three events that were reportable to the NRC but other station occurrences that involved human performance.

Mr. Frauenheim noted that DCP's Performance Improvement Coordinators formerly reported to their respective departments, but now report directly to him. This helps to avoid situations in which the Coordinators could be diverted to other tasks within their respective departments. He also noted that all actions arising from the 2014 Root Cause Evaluation have been completed. Those corrective actions involve:

- Establishing a set of rewards and reinforcement practices that drive a culture of self-accountability at the worker, supervisor, manager, and senior leadership levels. Accountability involves non-punitive consequences that are separate from the DCP Positive Discipline process and also involves a discussion between the individual responsible for making the error and his/her leadership.
- Establishing a Human Performance Champion position to bring energy and awareness to the

station regarding human performance. Implementation of this is to help drive a culture of accountability to the worker level by reinforcing desired behaviors involving the use of human performance tools.

Four major insights also arose from the analysis of the three station level events that resulted in Human Performance Event Clock resets, as follows:

- Apparent Cause Evaluations were narrowly focused and they tended to neither examine the situation beyond the individual who made a mistake, nor address organizational and/or programmatic issues. Therefore, follow-up often consisted simply of assignment of accountability and coaching.
- Weaknesses in procedures and work documents had an impact on some of the events. This was particularly true for procedures that transitioned from providing specific directions early in the procedure to providing more general guidance as the procedure progressed. The more general guidance tended to create situations that were more likely to lead to errors.
- In some cases workers lacked the capability to recognize the need to reduce risks, or to understand how to reduce risks.
- Personnel did not consistently or properly use human performance tools, and management and supervisors did not consistently educate workers to the expected standards.

Mr. Frauenheim noted that the above insights have been useful in focusing DCP's efforts to improve human performance. The results have been favorable. Data from DCP's Monthly Plant Performance Improvement Reports indicate that Station Level Human Performance Clock Resets have been reduced. (This is an indicator that takes the number of human performance events for the prior 18 months and divides that number by the quotient of total person hours during that period and 10,000). The value of that performance indicator at the time of DCISC's January 2014 Fact-finding Visit was 0.0062. Its value in January 2015 of 0.0070. On the surface this would seem to indicate that DCP's Human Performance has actually deteriorated slightly during the past year (i.e. The rate of Human Performance Events has actually increased slightly.) However, DCP's indicator, which measures performance over an 18 month period is currently reflecting Human Performance events that occurred during October, November, and December of 2013, and those earlier events comprise 75 percent of the issues reflected in the current indicator. Therefore, if the station continues to operate as it has during the past 12 months, that 18 month indicator will decrease (i.e. improve) dramatically from April through June of this year.

Lastly, the Conclusion to DCISC's January 2014 Fact-finding Report, as shown at the beginning of this section of the report, indicates that the Human Performance of the Operations Department should be reexamined, due to weaknesses of Operations personnel with respect to Component Mispositionings and Plant Status Control, as reflected in station performance indicators at that time. With respect to both of these performance areas the Operations Department has been performing commendably. In particular, with respect to Plant Status Control, the Station as a whole was rated as Green (top rating) for the period September 2013 through February 2015 as shown in DCP's Plant Performance Improvement Report. In particular, during that period the Operations

Department experienced 4 Department Level Events, and Zero Station Level Events. Likewise, the Operations Department's performance with respect to Component Mispositionings has been commendable for the period February 2014 through January 2015. During that period the Operations Department incurred four Level 3 (i.e. Minor) Mispositionings and four Level 4 (i.e. Immediately Identified and Minor) Mispositionings. It is also worthy of note that DCP's performance as a whole with respect to Component Mispositionings was rated Green (top category) for the three month period November 2014 through January 2015 as reported in DCP's January 2015 Plant Performance Improvement Report dated February 13, 2015.

Conclusions:

Recent improvements in Human Performance at DCP reflect noticeable resources that the station has devoted to this important topic. The Operations group in particular has achieved commendable improvements in Component Mispositionings. The DCISC should reexamine these performance areas no later than the third quarter of 2016 to determine the degree to which these improvements are being sustained.

Recommendations:

None

3.9 Meeting with NRC Resident Inspector

The DCISC Fact-finding Team met with Mr. John Reynoso, DCP's NRC Resident Inspector. DCISC last met with the NRC Senior Resident Inspector in January 2015 (Reference 6.11), when it concluded:

DCISC meetings with NRC resident inspectors continue to be useful for sharing concerns and for reporting the results of reviews and activities.

Items of mutual interest that were discussed focused largely on Seismic and Tsunami issues. These included:

- Work undertaken and overseen by PG&E to characterize the nature and extent of potential hazards and risks with regard to both earthquakes and tsunamis utilizing the most current data identified by, or available to, PG&E.
- Attendance by the DCISC Fact-finding Team at presentations by PG&E personnel and contractors at PG&E's corporate office on March 30. The presentations provided summaries of recently completed Seismic and Tsunami Studies.
- DCISC's next Public Meeting on June 16-17, 2015, including DCISC's desire for a presentation/analysis, to be delivered by a contractor, on the recently completed Tsunami Study. (Subsequent to this Fact-finding Visit, it was learned that the contractor will not be able to participate in DCISC's June 2015 Public Meeting, but desires to participate in a future DCISC Public Meeting.)

- The possibility/desirability of NRC holding its Public Meeting, in which the NRC intends to present the results of its reviews of PG&E's recent Seismic and Tsunami studies, in conjunction with a DCISC Public Meeting.

Dr. Budnitz and Mr. Reynoso each expressed appreciation for the opportunity for the DCISC and the NRC to be able to interact and share information regarding the functioning of their respective organizations and regarding DCPD safety and reliability

Conclusions:

DCISC meetings with the NRC Resident, or Senior Resident, Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCISC.

Recommendations:

None

3.10 System Engineering Program

The DCISC Fact-finding Team met with Adam Peck, Engineering Director; Lou Fusco, Manager, Mechanical Systems; and Ryan West I&C/Electrical System Engineering Manager to discuss the status of the System Engineering Program. The DCISC last reviewed this topic in February/March 2011, (Reference 6.13) when it concluded:

Improvements in the System Engineering Program combined with those in the Plant Health Committee process to achieve a better focus on system health have good potential for maintaining DCPD systems healthy. DCPD system health has improved since these changes were made.

DCPD's approach to maintaining the "Health" of plant systems has been to assign specific engineering personnel the responsibility of essentially being the resident experts and caretakers for the specific system or systems assigned to them. This includes monitoring the "Health" of their system(s), recommending appropriate actions to be taken in order to maintain system health, taking or facilitating those needed actions, and tracking those actions to completion. In doing so, the System Engineers track and maintain the "Health" of their systems.

Each System Engineer maintains a Health Report for each system assigned to him or her. A Plant Health Committee, consisting almost exclusively of Director and Manager level personnel, meets weekly, except during outages, to review the Health of plant systems. Information that is routinely examined and discussed includes:

- System health and factors/issues affecting health
- Action Plans for addressing issues
- Information from the industry that is related to systems at DCPD

- Station priorities to ensure safe and reliable plant operation

The process for calling attention to the need for action is initiated by submitting a document referred to as a “Notification.” Beginning in late 2012, DCPD experienced an undesirable increase in the number of Open Engineering Notifications, which grew to over 500 in early 2013. Since then, a concerted effort has focused on accelerating actions to address the needs identified in these Notifications, and during the past two years the number has declined to less than three hundred. In order to help ensure that DCPD is, in fact, able to concentrate attention on issues of the greatest significance, a “Top Ten Equipment Issues” list is developed and reviewed collectively during a meeting of Managers from Maintenance, Engineering, Operations, and Work Management (MEOW). Input for this listing initially comes from the Operating crews, supported by Maintenance as well. This is a new concept and is therefore in the early stages of implementation.

The listing of DCPD’s Top Ten Equipment Issues below was provided to the DCISC Fact-finding Team during its Fact-finding Visit on March 31/April 1, 2015:

1. Increase Emergency Diesel Generator (EDG) Load Margin. Issue Design and Implement for the Watt Recorder. Expected Completion Date (ECD)—8/30/15
2. Increase EDG Load Margin. Issue Design and Implement for Day Tank Level Switch. ECD—8/30/15
3. Implement Containment Fan Cooler Unit Coupling Time Modification. ECD—5/30/15
4. Address On-line Breaker Cycling Issue. ECD—1R19, 2R19
5. Identify the Maintenance Strategy for the U1/U2 500 kV Standoffs to Prevent Unit Shutdowns Mid-Cycle. ECD—1R19/2R19
6. Implement Root Cause Evaluation Corrective Actions to Prevent Recurrence in Mini-Maintenance Outage Windows for EDG Inlet for Fuel Header Capscrews. ECD—U1 Completed, U2 7/15/15
7. Implement Insulator Replacements to Address 2R18 Unit 2 230 kV Yard Flashover Causes. ECD—9/30/15
8. Implement Spent Fuel Bridge Crane Reliability Improvements for Units 1 and 2. ECD—Completed for Both Units
9. Eliminate Service Cooling Water Heat Exchanger Fouling: Conduct Study and Implement Corrective Actions. ECD—U1: 9/30/15; U2:6/30/16
10. Eagle 21—Replace Fans to Avoid Trip Risk. ECD—5/15/15

The DCISC should consider focusing a future Fact-finding Topic on the Top Ten Equipment Issues List at that time for the purpose of reviewing the impact of those listed items on plant safety and reliability, and/or on the results of station actions taken to address system/equipment issues.

DCISC’s Fact-finding Team was also provided with the Units 1&2 System Health Charts that were reported in DCPD’s February 2015 Plant Performance Improvement Report. The information

pertaining to the systems that were rated as “Unhealthy,” i.e. Red or Yellow, is as follows:

Unit 1

System	Color	Months Unhealthy	Expected Return to Healthy
Reactor Coolant	Yellow	10	Nov 2015
Emergency Diesel Generators	Yellow	50	Nov 2015
HVAC - Control Rm/Containment	Yellow	38	Nov 2015
120V	Yellow	18	1R20
Residual Heat Removal	Red	2	May 2015
Aux/Fuel Handling Bldg Ventilation	Red	1	May 2015
Fuel Handling Equip	Yellow	1	July 2015

Unit 2

System	Color	Months Unhealthy	Expected Return to Healthy
Reactor Coolant	Yellow	13	2R19
Emergency Diesel Generators	Yellow	49	Nov 2015
120 V	Yellow	19	2R19
Fuel Handling Equipment	Yellow	1	July 2015

Conclusions:

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.

Recommendations:

None

3.11 Compressed Air System

The DCISC Fact-finding Team met with Jason Cook, Secondary System Engineer, and Surendra Sabharwal, Primary System Engineer. This was a follow-up to DCISC's recent review of this topic in September 2014 (Reference 6.14) when it concluded:

Although the Compressed Air System has remained operational, it has experienced a number of problems pertaining to material condition and reliability that have warranted a Yellow (deficient) System Health rating. This includes equipment aging, deterioration, and failure. One of the operating compressors is located in an area outside the plant that is subjected to environmental conditions that have had a negative impact on the reliability of that compressor. Installed equipment that could serve as backups to the preferred equipment has not been operated in about 15 years. DCPD has recognized and reported these issues and has plans to address them, which appear to be satisfactory. The DCISC should continue to monitor this system and revisit this issue in one year.

This Fact-finding Visit, March 31—April 1, 2015, was performed for two reasons: to follow up on some material condition issues, including any affected by the location of equipment in areas unprotected from the outside environment, and to improve understanding of the contribution of equipment and components in this system to plant safety. These issues were also related to the fact that the Health of this system had been rated Yellow (deficient) at the time of the DCISC's prior Fact-finding Visit in September 2014.

The Compressed Air System is common to and serves both units and is divided into two Subsystems: Instrument Air System (IAS) and Service Air System (SAS). The IAS is Safety Class 2, having redundancy and high-quality components typical of Class 1, but it is not designed for seismic loads or supplied by emergency electrical power. IAS consists of three primary full-capacity air compressors, Plant Air Compressors (PACs) 0-5, 0-6, and 0-7, which supply clean, dry, pressurized air primarily to air-operated valves (AOVs) and instruments needed to operate the plant and to safely shut the plant down. Normally one compressor is required for plant operation. These three compressors are rotated in succession to serve the plant with each compressor operating for a week at a time.

Four additional full-capacity reciprocating air compressors (PACs 0-1 through 0-4) are maintained on site and could serve the IAS if needed and could also serve in a secondary role during refueling outages. Although PACs 0-1 through 0-4 have been considered to be usable, they have not operated in 20 years and are considered to be in "Auto Standby" mode. Recently the station decided to install a 2 inch connection, with an isolation valve and exhaust muffler, in the discharge piping of PACs 0-1 through 0-4 in order to facilitate periodic testing of these compressors so that the reliability of these compressors could be tested and the compressors could be assured to be operable in the case of an "Emergent Situation." This modification is expected to be completed in April 2015. The System Health Report noted that this issue affects total Instrument Air System Margin that would be needed during events where one or more of the normal rotary air compressors is unavailable or during a large instrument air system leak. For this reason, the

“Margin” subcategory of the “Material/Equipment Condition and Corrective Actions” performance category in the System Health Report is rated “Red,” i.e. “Unsatisfactory.”

Because the IAS is not fully safety-related, the valves required for safe shutdown are supplied with an additional source of assured air from the Backup Air/Nitrogen System (BANS), a Class 1 design. The BANS is a passive pressure system with air or nitrogen accumulators located with and dedicated to each safe-shutdown valve. They are seismically designed, fabricated, and installed to resist earthquakes and require no electrical power. Each is designed with capacity adequate for valve operation to assure safe shutdown. There appear to be no design or operational problems with the BANS.

Lastly, during the previous Fact-finding Meeting on this topic, the DCISC Fact-finding Team was informed that one of the air compressors had been installed, and resides, outside the Turbine Building, i.e. it is continuously exposed to outside atmospheric conditions. This compressor is PAC 0-7, which is one of the three PACs on which DCPD continually relies for compressed air. Moreover, the Compressed Air System Health Report notes that PAC 0-7 “Often trips on elevated Low Pressure Element outlet air temperature during periods of elevated ambient site temperature.” It was further noted that “DCPD is working with the vendor to develop a detailed troubleshooting plan and evaluate (the) compressor for warranty repair.” Because this compressor is located outside and unprotected, the Fact-finding Team visually inspected the compressor and the station it occupies. The compressor and all other components at that compressor’s station appeared to be clean and free of rust.

Overall System Health is rated “White,” i.e. “Needs Improvement.” This compares to the overall System Health rating of “Yellow” in September 2014 that was primarily due 1) to oil leakage from the breather of PAC 0-5 when the compressor was loaded and 2) to the overall material condition of the outdoor air compressor PAC 0-7, both conditions of which have been remedied.

Conclusions:

DCPD has been taking action to improve the material condition of the Compressed Air System and the reliability of its individual components. Overall System Health has improved to White, i.e. Needs Improvement. The DCISC should conduct its next Fact-finding Visit on this topic prior to the third Quarter of 2016.

Recommendations:

None

3.12 Meeting Between DCISC Team and DCPD Site Vice President

DCISC Member, Robert J. Budnitz, and DCISC Consultant, David C. Linnen met with DCPD’s Site Vice President, Barry Allen. Discussion included topics pertaining to this Fact-finding Visit and other items of mutual interest.

4.0 Conclusions

4.1

PG&E submitted its most recent report to the NRC on tsunami hazards in mid-March, 2015. One major result of the report is PG&E's conclusion that no tsunami arising from any of the nearby sources of sub-sea landsliding or slumping could threaten the overall safety of the plant. The work contained in this report is clearly a major advance over previous analyses of the tsunami hazard at the DCPD site, being based on considerably more site-specific data and much more advanced modeling methods than previous analyses. The DCISC should continue to review this topic as it gains access to the underlying technical data and reports.

4.2

PG&E submitted its most recent report to the NRC on the site seismic hazard in mid-March 2015. The work contained in this report is clearly a major advance over previous analyses. It will be reviewed in the near future both by the NRC staff and by other outside experts. The DCISC should continue to review this topic too, by studying the underlying technical data and reports and reviewing the reviews of others.

4.3

The DCPD Probabilistic Risk Assessment (PRA) group's development work today is emphasizing the completion of new PRA models in the seismic and internal-flooding areas. Its applications work continues with applying PRA methods in several safety-significant areas at the plant. The Fact-finding Team concludes that the PRA group is doing fine work, as its competence and its recent accomplishments attest. The DCISC should continue to follow developments in the seismic-PRA area closely. On the other PRA topics the DCISC should undertake a further review about a year hence, when the plant anticipates it will have achieved additional major milestones in its PRA development effort.

4.4

The Fire Protection System and Program have been receiving increased attention and more aggressive action during the past year. Creation of a new station group that has Fire Protection as one of its cornerstones will help maintain that focus. Plant aging has had a negative impact on the condition of DCPD fire protection systems and fire doors. Actions planned by DCPD to address existing issues appear to be reasonable from the standpoints of both adequacy and timeliness. The DCISC should review station progress and status, with regard to fire doors in particular and the fire protection program as a whole, no later than the second quarter of 2016.

4.5

Both Spent Fuel Pools and their associated equipment are rated as "Healthy" with only minor issues needing to be addressed, and plans are in place to do so. The

area of Unit 2 Spent Fuel Pool deck was clean and orderly.

4.6

The Health of the Safety Injection Pumps is currently rated as “green,” or “Healthy.” Deviations from welding specifications on the part of some small bore pipe nipples in the vent and drain piping for three of the four Safety Injection Pumps do not appear to create a safety concern. Neither external flooding nor internal flooding appears to be an event that could prevent the Safety Injection Pumps from being able to perform their design function. The System Engineer demonstrated in-depth knowledge of the Safety Injection Pumps.

4.7

DCPP is organizationally focused on fostering a safety conscious work environment from the standpoints of both nuclear and industrial safety. The station appears to be in the early stages of implementing an enhanced process for observing station work activities. This includes obtaining feedback from employees being observed, occasionally conducting an observation with more than one observer, and expanding the amount of data that are retrieved and analyzed. The DCISC should continue to follow this area actively.

4.8

Recent improvements in Human Performance at DCPP reflect noticeable resources that the station has devoted to this important topic. The Operations group in particular has achieved commendable improvements in Component Mispositionings. The DCISC should reexamine these performance areas no later than the third quarter of 2016 to determine the degree to which these improvements are being sustained.

4.9

DCISC meetings with the NRC Resident, or Senior Resident, Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCISC.

4.10

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.

4.11

DCPP has been taking action to improve the material condition of the Compressed Air System and the reliability of its individual components. Overall System Health has improved to White, i.e. Needs Improvement. The DCISC should conduct its next Fact-finding Visit on this topic prior to the third Quarter of 2016.

5.0 Recommendations:

None

6.0 References

6.1

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013– June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.4, Section 3.3 “Update on Tsunami Hazard Analysis.”

6.2

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.5, Section 3.7, “Update on Tsunami Hazard.”

6.3

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit B.3, “Advanced Seismic Safety Studies.”

6.4

PG&E’s “Seismic Hazard Reevaluation Report” to the Nuclear Regulatory Commission, March 2015

6.5

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.1, Section 3.8, “Probabilistic Risk Assessment Update.”

6.6

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.4, Section 3.5, “Cooperative Efforts Between DCPP and the California Department of Forestry and Fire Protection (CalFire).”

6.7

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.4, Section 3.3, “Fire Doors Update.”

6.8

“Diablo Canyon Independent Safety Committee Twenty-First Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011”, Approved October 5, 2011, Volume II, Exhibit D.11, Section 3.5, “Spent Fuel Pool System Review.”

6.9

“Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012”, Approved October 1, 2012, Volume II, Exhibit D.9, Section 3.6, “High Pressure Injection System Review.”

6.10

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.2, Section 3.8, “Safety Culture Monitoring Panel.”

6.11

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.6, Section 3.6, “Human Performance Program.”

6.12

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.6, Section 3.10, “Meeting with NRC Inspector.”

6.13

“Diablo Canyon Independent Safety Committee Twenty-First Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011”, Approved October 5, 2011, Volume II, Exhibit D.9, Section 3.5, “System Engineering Program.”

6.14

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.3, Section 3.8, “Compressed Air System Health.”

[25th Annual Report](#), [Volume 2](#), Exhibit D.8, Diablo Canyon Independent Safety Committee Report on Fact Finding Meeting at DCPD on April 21–22, 2015 by Peter Lam, Member, and R. Ferman Wardell, Consultant

1.0 Summary

The results of the April 21–22, 2015 fact-finding trip to the Diablo Canyon Power Plant in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Meeting with NRC Senior Resident Inspector
2. Emergency Diesel Generator Status
3. MIDAS (Meteorological Information and Dose Assessment System)
4. Salt Deposition Rate Update
5. Design Quality Status
6. Spent Fuel Cooling System Review
7. Attend Plant Health Committee Meeting
8. FLEX Update
9. Licensing Basis Verification Program Issues
10. Pacific Ocean Winter Storm Experience
11. Operational Decision Making
12. Dr. Lam Meet with DCPD Site Vice-President

2.0 Introduction

This fact-finding trip to the DCPD 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 DCPD 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 Meeting with NRC Senior Resident Inspector

The DCISC Fact-finding Team (FFT) met with Tom Hipshmann, NRC Senior Resident Inspector (SRI) at DCPD to share information on each organization's reviews and findings. The DCISC last met with an NRC SRI in January 2015 (Reference 6.1) when it concluded the following:

DCISC meetings with the NRC Resident Inspector or Senior Resident Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and to the DCISC.

The discussion centered on the following topics:

1. The upcoming April 28, 2015 webcast NRC and PG&E joint panel discussion on PG&E's March 2015 Fukushima-related seismic and flooding studies reports submittals
2. The upcoming NRC Annual Assessment Letter for DCPD—there is the possibility of a White Finding on a DCPD self-identified Emergency Preparedness legacy issue for not having a formal procedure for surveillance of the ocean area near the plant. This could put DCPD into an augmented NRC inspection schedule with one additional annual inspection. DCPD-requested enforcement discretion on this issue was denied. As a result, DCPD initiated an Emergency Preparedness Licensing Basis Verification Project to assure its licensing bases were understood and appropriately met. The EPLBVP is scheduled to be completed by the end of 2015.
3. Both the NRC and DCISC are following Emergency Diesel Generator issues. (The DCISC reviewed EDGs in this Fact-finding visit (see Item 3.2 below).
4. The NRC will be looking into plant severe weather policies in the near future.
5. The NRC is aware of some exceedences of the DCPD Hosgri Seismic Spectrum resulting from the recent seismic analyses and understand that PG&E may take credit for these with their Long-Term Seismic Program margin.

Conclusions:

The DCISC periodic meetings with the NRC Resident and/or Senior Resident Inspector continue to be beneficial for sharing of information on important DCPD issues.

Recommendations:

None

3.2 Emergency Diesel Generator Status

The DCISC Fact-finding Team met with Sean Dunlap, Supervisor of DCPD Balance of Plant Mechanical Systems Engineering, for an update on the status and health of the DCPD Emergency Diesel Generators (EDGs). The DCISC last reviewed the EDGs in March 2014 (Reference 6.2) when it concluded the following:

The six (three per unit) DCPD Emergency Diesel Generators (EDGs) are operable and able to perform their functions; however, system health is rated as Yellow (needs improvement) primarily because of the need to increase their rated loads to meet new demand conditions. Prompt Operability Assessments have been performed to support operation with the higher loadings. Testing has shown that the EDGs are able to perform at the higher loads. Calculations are being performed to support a License Amendment Request (LAR) for NRC review and approval prior to documenting the new loads in the Updated Final Safety Analysis Report. DCPD expects to return the EDGs to White (healthy) status in mid-2015. The DCISC should review the EDGs at that time.

The former EDG System Engineers (one mechanical engineer and one electrical engineer) have moved on to other assignments, leaving openings which the supervisor is currently in the process of filling and temporarily handling.

The EDGs are safety-related pieces of equipment whose functions are as follows:

- To furnish sufficient power to mitigate a design basis accident in one unit and safely bring the other unit to cold shutdown when both the 230 kV and 500 kV 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 in either the hot or cold shutdown condition, or (b) the equipment for both units in either the hot or cold shutdown condition.

Each nuclear operating unit is supported by three EDGs. Each diesel-generator set is provided with two 100% capacity starting air trains, with each train having two starting air motors.

NRC Safety Guide (SG) 9 provides the basis for the design of the EDGs. Their ratings are as follows:

- 2,600 kW, Continuous (8,000 hours per year)
- 2,750 kW, 2,000 hours per year
- 3,000 kW, 2 hours per 24 hours
- 3,100 kW, 30 minutes per year

Each EDG is designed to start automatically on any of the following signals:

- A Safety Injection signal from either Train A or Train B of the plant protection system.
- Undervoltage on the preferred offsite sources to each of the 4160 V vital buses; this starts its respective diesel.
- Undervoltage on any of the vital 4160 V buses; this starts its respective diesel.

These automatic starts are to ensure that the EDGs are available with minimal delay to mitigate any operational or accident condition that may exist at the time of the signal. The Safety Injection signal, by itself, is an indication of an accident condition. The undervoltage signal from any vital bus is an indication of a loss of both onsite and offsite power sources.

Currently, the EDG Systems of both units are rated Yellow, as needing improvement, and have been Yellow for at least the previous four quarters. All of the EDGs are operable, but the following concerns appeared in the EDG System Health Report for each Unit:

License Amendment Request (LAR 14-001) to NRC for both units has been filed with the NRC for the following eight items. Corresponding calculations and implementation of LAR items are expected to be complete by July 1, 2015. The resolution of these loading issues will result in a healthy system color of White.

LAR 14-001 Issues

1. Margin management issue: EDG time dependent dynamic load study showed that some EDGs are loaded above their continuous rating.
2. Prompt Operability Assessment (POA): the Diesel Fuel Oil Day Tank low-level alarm is impacted by the higher EDG fuel consumption rates calculated.
3. POA: EDG maximum calculated loads in Item 1 above are greater than the specified EDG full load rejection value.
4. POA: EDG maximum calculated loads in Item 1 above are greater than the allowable Technical Specification (TS) upper frequency limit of 61.2 Hertz.
5. POA: Current TS allow EDG testing below continuous and two-hour load ratings, which does not meet Regulatory Guide 1.108 requirements.
6. POA: Sustained winds could impact the ability of the EDG radiators to cool the jacket water

and engine compartment components.

7. Engine Derate due to air inlet temperature being higher than ambient. This degraded condition is bounded by the POA for EDG loading.
8. Engine Derate due to high jacket water intercooler inlet temperature, which is bounded by POA.

Other EDG Issues

1. Margin Management Issue: The EDG usable volume of fuel oil in each Day Tank has been recalculated, and new low-level alarm setpoints are required. Estimated completion for Unit 1 is August 31, 2015 and for Unit 2 is July 1, 2015.
2. Margin Management Issue: EDG instrument channel loop uncertainty of ± 90 kW is too large to comply with LAR 14-001 requirements, due to deficient margin in the instrument control loops. EDG watt transducers will be replaced to reduce the uncertainty to 24.5 kW. Completion is expected by August 31, 2015 for Unit 1 and July 1, 2015 for Unit 2.
3. Margin Management Issue: EDG dynamic loading analysis determined engines were overloaded and margins deficient. Long-term corrective action is to restore margin by uprating the engines. Completion is expected by the end of 2019.
4. The EDG control system components are over 40 years old and obsolete. Upgrades are planned for 2017—2020 (Outages 1R20, 1R21, and 1R22 for Unit 1 EDGs) and (2R20, 2R21, and 2R22 for Unit 2 EDGs).
5. Oil leakage occurs at the cylinder head pushrod grommets. Grommet replacements will be performed as part of the EDG uprate project to be completed by the end of 2019.
6. Lower the pre-circulation lube oil standby pressure alarm setpoint. Completion is planned for mid-2016.

The DCISC notes that many of the conditions in the above listing are “Conditions Requiring Prompt Operability Assessments (POA) with Compensating Measures.” Four POAs have been implemented to support continued operation while the problems are resolved. DCPD expects to achieve White (healthy) status by July 1, 2015 with approval of the NRC of EDG LARs. Green health is expected to be achieved for Unit 1 by September 1, 2015 with the implementation of the Day Tank setpoint changes, Watt transducer upgrades, and capscrew upgrades by the end of August 2015. Green health is expected to be achieved for Unit 2 by June 10, 2016 when the above upgrades are complete and when Unit 2 EDGs re-enters the Maintenance Rule monitoring phase.

DCPD EDG Unavailability Goal

The DCPD unavailability goal is no more than 230 hrs/yr, per EDG evaluated for a rolling 24 month period.

Current performance

EDG 1-1: 154.07 hrs/yr

EDG 1-2: 197.71 hrs/yr

EDG 1-3: 135.79 hrs/yr

EDG 2-1: 105.15 hrs/yr

EDG 2-2: 121.76 hrs/yr

EDG 2-3: 157.29 hrs/yr

This performance appears acceptable to the DCISC; however, It was learned that EDG 1-2 is on a trend to exceed its unavailability goal at the end of 2015. DCPD has entered this into the Corrective Action Program for evaluation and corrective action.

EDG 2-3 was also reported to be having performance problems, and a Reliability Action Plan is being developed for completion by April 30, 2015 after review by the Plant Health Committee. Review of these two issues should be done on one of the next two fact-finding meetings in September or October 2015.

MSPI Performance data (12-quarter rolling unavailability) for the DCPD EDGs are as follows:

<

Unit	Actual	DCPD Goal	NRC "White" Threshold
1	8.4×10^{-10}	$< 3.0 \times 10^{-7}$	$< 1.0 \times 10^{-6}$
2	6.7×10^{-8}	$< 3.0 \times 10^{-7}$	$< 1.0 \times 10^{-6}$

Regarding its position in the industry, DCPD EDGs rank in the second quartile.

Conclusions:

The six (three per unit) DCPD Emergency Diesel Generators (EDGs) are operable and able to perform their functions; however, system health is rated as Yellow (needs improvement) primarily because of the need to increase their rated loads to meet new demand conditions. Prompt Operability Assessments have been performed to support operation with the higher loadings. Testing has shown that the EDGs are able to perform at the higher loads. DCPD is awaiting NRC review and approval prior to documenting the new loads in the Updated Final Safety Analysis Report. DCPD expects to return the all EDGs to White (healthy) status by July 1, 2015 and Green by September 1, 2015 for Unit 1 and June 10, 2016 for Unit 2. The DCISC should review the new DCPD EDG Reliability Action Plan in September or October.

Recommendations:

None

3.3 MIDAS (Meteorological Information and Dose Assessment System)

The DCISC Fact-finding team met with Curt Hansen, Emergency Preparedness Coordinator, for an update on DCP's MIDAS program. The DCISC last reviewed MIDAS in August 2014 (Reference 6.3), when it concluded the following:

DCP appears to have successfully implemented the second version of the Meteorological Information and Dose Assessment System (MIDAS), utilizing seven meteorological towers and several sonic detection and ranging (SODAR) units, which provides more accurate offsite radiation release consequence predictions. DCP will be implementing the third MIDAS version by the end of 2014 which will provide the capability to accommodate multi-point releases. The DCISC should review the use of the new system in early 2015 and at the next emergency exercise observed by the DCISC.

MIDAS is used to predict the path and magnitude of radiation releases to the surrounding environment caused by an accident at the plant, such that protective action (sheltering, evacuation, etc.) recommendations can be made to protect the public. Inputs to MIDAS include the concentration and height of radioactive releases at the plant, wind and temperature data from up to seven meteorological towers and several SODAR (Sonic Detection and Ranging) units. The predictions are compared to data from roving Field Monitoring Teams and by nine Pressurized Ionization Chambers (PIC radiation detectors) at fixed locations.

For practice emergency exercises or actual accidents involving radioactive material releases radioactive dose assessment begins in the Control Room (CR) (or Control Room Simulator for practice exercises). Operators in the CR originally used a program named "EPR2net" to make initial calculations of offsite radiological consequences as described in DCP Procedure EP R-2, "Release of Airborne Radioactive Materials Initial Assessment." A special Control Room version of MIDAS replaced EPR2net, and operators have been trained on its use. The backup for this process is a manual calculation of radiological consequences using templates and pre-determined formulas.

When the Unified Dose Assessment Center (UDAC), a joint DCP and San Luis Obispo (SLO) County team, is activated in a practice exercise or an actual emergency, they assume the duty of calculating offsite radiological consequences originally using EARS (Emergency Assessment Response System) and MIDAS. Now, the new MIDAS replaces EARS. Similarly, MIDAS replaces RASCAL (Radiological Assessment System for Consequence Analysis) previously used by San Luis Obispo County.

The purpose of the MIDAS third version was to enhance the capability of PG&E and the County for making appropriate Protective Action Recommendations (PARs) and decisions. Such decisions relate to the need to evacuate or shelter the population in various geographic sectors in the vicinity of DCP in the event of an unplanned radiological release from the site. Typically, the most significant radioisotope initially from a radiological accident is Iodine-131 (with a half-life of approximately 8 days), which may be released in the form of small aerosol particles from fuel damaged in a severe accident, and can be ingested through breathing or eating contaminated food and then concentrated in the thyroid gland.

MIDAS has been verified by its developer and DCPD. There will be a self-assessment of MIDAS use with industry peers in June 2015 to prepare for an NRC inspection in August 2015. There is also an Emergency Preparedness exercise in June. The DCISC should follow up on these activities in the fourth quarter of 2015.

Conclusions:

DCPD has successfully implemented the third version of MIDAS (Meteorological Information and Dose Assessment System) for predicting the magnitude and path of radioactive plumes from the plant in the event of an emergency. This version will provide more accuracy and versatility than the previous version.

Recommendations:

None

3.4 Salt Deposition Rate Update

The DCISC Fact-finding team met with Ryan West, Manager, Electrical Engineering, to review data the plant has collected regarding the amount of salt deposition on plant equipment and components. The DCISC last reviewed this topic at its October 14-15, 2014 Public Meeting (Reference 6.4). At this meeting the DCISC reported the following:

Dr. Peterson reported the Evaluation considered the potential safety impact of using seawater for evaporative cooling in place of fresh water. He reported a study by the California Energy Commission reviewed the use and effect of high salinity water used in cooling towers on accelerated corrosion on unprotected metal surfaces on buildings and equipment. This report concluded that nearly all plants with high salinity cooling towers, both natural and forced draft, have encountered accelerated corrosion. Dr. Peterson reported that use of saltwater cooling towers with drift elimination at DCPD is expected to release approximately 830 metric tons of salt each year in aerosol form and a key question involves where that salt will be deposited on the plant site. Dr. Peterson reported data shows that the majority of the time the wind would carry a plume from southern-sited cooling towers to the south and away from the plant but 11% of the time the wind would carry the plume to the north and over the plant, while 23% of the time the plume would be expected to rise in light to no wind conditions. DCPD is once again collecting data on current salt deposition rates at various locations and it appears the current rate of deposition is approximately 1.5 or 2 metric tons per year. Dr. Peterson stated modeling tools could be used to develop more accurate projection for salt deposition which these would be important tools in reviewing the impact on systems and equipment which use large volumes of air such as the EDGs, the ventilation systems, and the dry cask spent fuel storage systems as well as upon the reliability of high voltage equipment including the switchgear in the 230 kV and 500 kV Switchyards where a simultaneous failure would lead to a loss of offsite power. Dr. Peterson observed that most of the flashover problems experienced by U-2 appear to be associated with drift from the Outfall which is pulled by

the wind between the Administration and the Turbine Building and the use of freshwater could reduce or eliminate that issue. Use of saltwater cooling towers could increase deposition rates substantially from the present and periods of adverse weather with higher deposition rates could increase flashover events and this is subject to analysis through modeling. Dr. Peterson stated the Evaluation reviewed the use of high salinity cooling towers by the Palo Verde Nuclear Generating Station (Palo Verde) in Arizona which uses reclaimed water from the City of Phoenix in a desert environment with different wind and humidity than at DCPD and Palo Verde produces a lower salinity release, containing approximately one-half the amount of salt as is forecast for DCPD if saltwater cooling towers were built. Dr. Peterson stated the Evaluation concludes that more study concerning the implications of using saltwater cooling towers is required.

DCPD shared data for the following areas of the plant:

Plant Area	Salt Contamination Level (ESSD)
230 kV Switchyard Buses	Light
230 kV Switchyard Insulators	Medium to Extra Heavy
230 kV Transformer Yard Insulators	Light
500 kV Transformer Yard Ho Bushing (Unit 1)	Heavy
500 kV Transformer Yard H1 Bushing (Unit 1)	Medium to Extra Heavy
500 kV Transformer Yard Ho Bushing (Unit 2)	Heavy
500 kV Transformer Yard H1 Bushing (Unit 2)	Medium to Heavy

Where

Light = 0.03–0.08 mg/cm² (Equivalent Salt Deposit Density)

Medium = 0.08–0.25

Heavy = 0.25–0.6

Extra Heavy = > 0.6

These data were measured in the February–March, 2015 time frame. The salt came from the Pacific Ocean spray, primarily from water exiting the plant discharge cascading down the discharge outfall. The level of deposition depended on the distance from the ocean and the exposure to the ocean.

The frequency and level of cleaning were directly proportional to the salt contamination level and other contaminants such as dirt and dust.

Conclusions:

Being an ocean-sited power plant, DCPD is susceptible to salt contamination from ocean spray. DCPD measurements of contamination levels on outdoor components showed what one would expect: contamination levels were directly proportional to

the closeness and exposure to the ocean. Contamination levels ranged from Light to Extra Heavy.

Recommendations:

None

3.5 Design Quality Status

The DCISC met with Jacqui Hinds, Director, Quality Verification, for an update on QV's assessment of DCPD Design Quality. The DCISC last reviewed Design Quality in August 2014 (Reference 6.5), concluding the following:

DCPD's Design Quality measures show satisfactory performance based on scores of final designs released for installation. There was a small percentage (less than 10%) which were problematic during Outage 1R18, and they have been corrected and evaluated for cause correction to prevent recurrence. The DCISC should continue to monitor design quality.

The Design Quality issue was about erroneous designs released for construction. During Refueling Outage 1R17 (Spring 2012), there were three major modification designs with errors released for implementation. The reason for the error determination was the large number of Field Changes required after design package release for the modifications to be implemented. Three design packages were issued incomplete ("managed exceptions" due to vendor issues and late scope additions, counting on the Field Change Process (FCP) to add information to complete the packages; however, the FCP did not include the same discipline and rigor as the full Design Change Process (DCP). Approximately one-third of the FCs were due to design errors. Adding to the problem was the fact that each of these designs was begun late and performed on a compressed time schedule.

DCPD had investigated the design quality problems and developed a plan of corrective action, which included, in addition to tighter controls of Field Changes, improved project communications, augmented pre-release design reviews, and additional training of engineers on the design change process. A Root Cause Evaluation (RCE) identified the root cause as "... the organization failing to recognize the risk and complexity of this first-time Process Control System (PCS) project, and therefore not assuring that an adequate organizational structure and project oversight were in place (i.e., did not designate it as a strategic project or Engineering major project). This ultimately created an environment that promulgated a human error-likely environment."

Corrective actions were implemented and an effectiveness evaluation was performed following Outage 1R18 in June 2014. The conclusion stated, "A review of the performance of modification since implementation of the Process Control System (PCS) Root Cause Evaluation (RCE) has determined that the corrective actions have been effective." This was based on the successful installation and one cycle of performance of the Process Control System (one of the problematic modifications on Unit 1) upgrade in Outage 2R17 as compared to its installation in Outage 1R17.

QV disagreed with the effectiveness review based partly on two problematic modifications out of ten completed for Outage 1R18: Unit 1 Containment Fan Cooler Unit Dampers and Single Point Vulnerability (SPV) on the Main Bank Transformers projects. Reviews of causes for these problems showed that they were unique to these projects and different than the previous 1R17 project problems. These were among the following Green-scoring projects:

- Unit 1 Polar Crane
- Motor Operated Valve Control Circuit Logic
- Rod Control Cluster Assembly Replacement
- Auxiliary Feedwater Vent Line
- And six others

Upon further analysis, Engineering agreed with QV and performed an additional evaluation of 64 major and minor projects and modifications over the course of the last three refueling outages and determined that approximately 92% were well-devised designs. When problems do occur, DCPD uses Root Cause Evaluations, Apparent Cause Evaluations, and Lessons Learned reviews to determine the causes for corrective actions and improvements.

Design Quality improved enough in Refueling Outage 2R18 that it is now off QV's Site Status Report Top Issues List and Issues and Trends List; however, it remains a QV Concern, and QV is monitoring it. An Effectiveness Evaluation of Design Quality will be performed following Refueling Outage 1R19, which begins in October 2015. QV will be reviewing this evaluation, as should the DCISC. The plant's Design Change Program health, a major measure of Design Quality, has been rated Green (good) since January 2015.

Conclusions:

DCPD Design Quality has been on Quality Verification's top issues lists since its down-rating in Refueling Outage 1R17 which concluded in June 2012. Engineering has performed assessments and implemented corrective actions, which resulted in enough improvement in Outage 2R18 (Fall 2014) that QV changed from a top issue to monitoring. Since January 2014, the Design Change Program has shown Green (good) health. QV will perform an Effectiveness Evaluation following Outage 1R19 near the end of 2015. The DCISC should continue to monitor Design Quality.

3.6 Spent Fuel Pool Cooling System Review

The Fact Finding team met with Dan Hardesty, Senior Advising Engineer and System Engineer, for an update on DCPD's Spent Fuel Pool (SFP) Cooling System. The DCISC last reviewed this system in May 2011 (Reference 6.6), concluding the following:

Both Spent Fuel Pools and support systems appear to be in good condition. The system engineer continues to be knowledgeable and proactive. The two open issues noted during DCISC's previous Fact-finding Visit, i.e. backup cooling for each pool and the need to

inspect the heat exchangers, have been adequately addressed by DCP. Based on several problems during the past year involving the incorrect placement of fuel assemblies in the SPFs, the DCISC should consider reviewing this process and DCP's evaluations and corrective actions resulting from the two problems identified in this report.

Also, the DCISC, at its October 2014 Public Meeting (Reference 6.5), heard a presentation from DCP on improvements being made to the SFP level instrumentation.

Each of the two operating Units at DCP 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, hence the term "spent" fuel. However, even 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 is then transferred from the pool, along with 31 other spent fuel assemblies, in a dry storage cask. This cask, containing the 32 spent fuel assemblies, is then transported to a secure dry storage area located on a hill above DCP where the cask is bolted firmly to a strong, solid concrete and steel pad for dry storage. The Spent Fuel Pool is also the temporary storage facility for new fuel assemblies that have been delivered to the plant prior to loading them into the reactor during a refueling outage.

Because the fuel assemblies in the SFP continue to produce heat, it is important to keep the water in the pools cooled. The purpose of the SFP Cooling System is as follows:

- To maintain a water inventory in the SFP sufficient to keep the spent fuel immersed at all times.
- To provide cooling of the water in the SFP
- To provide a water inventory in the SFP to mitigate radiological consequences that could stem from design basis fuel handling accident
- To provide reactivity control (borated water) for storage of spent fuel assemblies

The SFP Cooling System transfers decay heat from the SFP to the Component Cooling Water (CCW) System via the SFP heater exchanger. In addition, it maintains a water inventory in the SFP to provide radiation shielding for long-term storage of fuel assemblies in the SFP. It also purifies and demineralizes SFP water to maintain SFP water quality.

Each pool has two 100 percent capacity pumps provided with Class 1E electric power and one 100 percent capacity heat exchanger that is cooled by the Component Cooling Water (CCW). The SFP is designed with proper depth to provide a minimum of 23 feet elevation over the tops of the spent fuel assemblies. Each SPF 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, during normal operation there is no remote wide-range level indication that could be used to determine the pool water inventory from outside the fuel handling building. During outages a mounted camera is focused on the level-marking strip in

the pool so that it can be read from the Control Room Annunciators in the Control Room. A new SFP water level instrumentation system is being installed, which will be connected to a readouts in the Control Room as described in the DCISC October 2014 Public Meeting minutes (Reference 6.6).

Because each Spent Fuel Pool has only one heat exchanger, the need for a second exchanger for each pool has been examined. DCPD has purchased and maintains one portable system consisting of hoses and three pumps. In situations where the cooling system for one of the SFPs becomes disabled, the portable system is set up to transfer the cooler water from the SFP with the operational cooling system into the second SFP, whose cooling system is inoperable, and then to recirculate water from the second SFP back to the SFP with the operational cooling system. In effect, each SFP cooling system can now serve as a backup for the other. It has been demonstrated that this portable system can be made operational within the minimum time-to-boil time frame for a Spent Fuel Pool, which would occur when the pool contains a full and recently offloaded reactor core. The installed heat exchangers have recently undergone eddy current examinations, and were found to have no significant tube indications.

The SPF Cooling System health is Green (good) overall for each Unit with no major problems outstanding. The System Engineer appeared knowledgeable and proactive about the System.

Conclusions:

DCPD's Spent Fuel Pool (SFP) Cooling System is currently rated to be in Green (good) health with no major outstanding issues.

Recommendations:

None

3.7 Attend Plant Health Committee Meeting

The DCISC Fact-finding Team attended the April 22, 2015 Plant Health Committee (PHC) meeting. The DCISC last attended a PHC meeting in September 2013 (Reference 6.7), when it concluded the following:

DCPD's Plant Health Committee meetings continue to be effectively and efficiently managed. Actions to regain the health of unhealthy systems are addressed swiftly and concretely.

The PHC is governed by DCPD 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
- Review and monitoring of plant health issue plans that are presented to the PHC

Membership and expected attendance is as follows:

- Plant Health Committee Chairman and Facilitator (currently the Station Director)
- Project Engineering Manager
- Operations Director
- Engineering Director or Senior Director
- Maintenance Director
- Outage Management Director
- Reliability Engineering Supervisor
- Administrative Support Person

Others are invited to the meetings as appropriate.

Plant health issues that require PHC review include:

- Issues that result in a red or yellow (unacceptable health) system health color (reviewed at least every six months)
- Programs that are rated red or yellow health color (reviewed at least every 6 months)
- Equipment performance issues that result in a red or yellow component health color
- Issues that result in a Maintenance Rule (a)(1) system
- Chronic system, program, or component health problems
- Issues that require special management attention or extensive resources to address
- High Critical (1A) Preventive Maintenance deferral requests and appeals

The agenda for this meeting included the following:

1. Safety Minute
2. Reviewed Purpose and Desired Outcomes
3. Assign a Scorecard Scribe
4. Review and Approve Minutes from last meeting
5. System Review: 480 Volt Vital and Non-Vital Systems—presentation of the System Health Report by the System Engineer (see below for a description of system health)

6. Preventive Maintenance Deferral on Various Electrical Panels
7. Action Item Review—all actions had been completed
8. Meeting Evaluation

The system health for both units of 480 Volt System was White (healthy). It had been changed from Green (good) in the third quarter of 2012 due to a lack of compliance with a Westinghouse Technical Bulletin which requires that Westinghouse circuit breakers greater than 20 years old be cycled each refueling outage (RFO) to maintain their qualification or be replaced. DCPD had been cycling these breakers every third RFO. DCPD was in the process of re-scheduling breaker testing to meet the Westinghouse requirement. Green health was expected to be achieved again in late 2018.

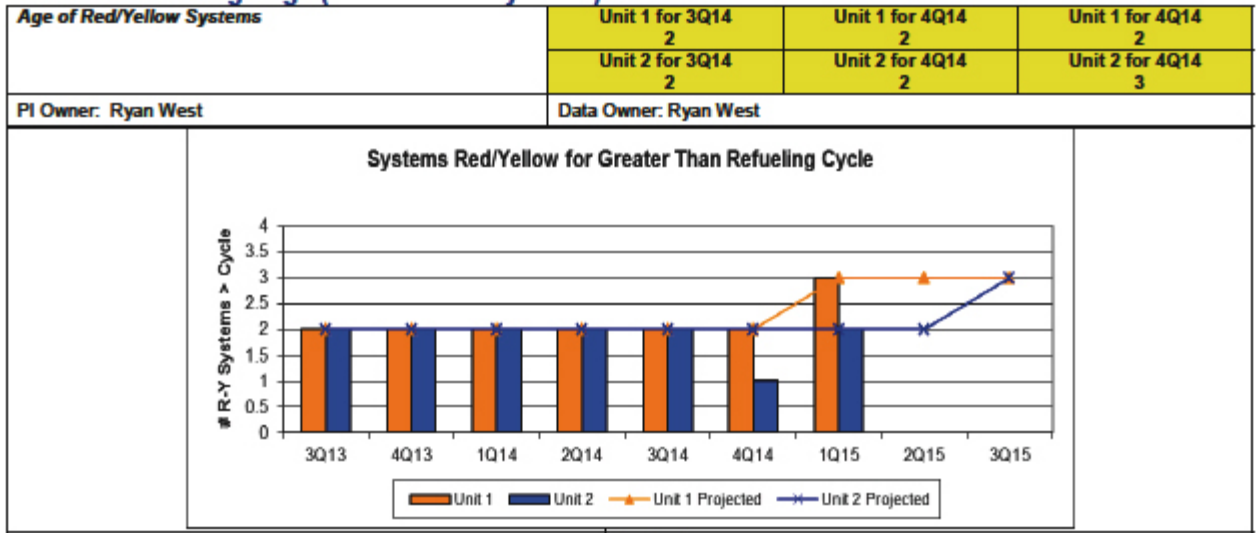
DCPD considered the most significant challenge to system health to be the age of breakers, some of which are approximately 30 years old. There were also some seismic concerns about breakers for motor-operated valves, which could cause the valve to move to an undesired position. These issues are being managed through a program of breaker/bucket replacement, routine maintenance, and corrective action program.

The PHC meeting was run effectively and efficiently. Presentations were well prepared, discussions were focused, and decisions well founded. There is one new aspect of the PHC, which is their ability to now approve funding of up to \$1 million per year and \$100,000 each for expense items which affect safety and reliability.

The chart below shows system health from the standpoint of the number of systems with Red or Yellow health for longer than one refueling cycle. There are currently eight unhealthy Unit 1 and five unhealthy Unit 2 systems of which the three below in the table have been unhealthy for greater than one refueling cycle. The schedule for regaining health is as follows:

System	Return to Health Schedule
EDG (Increase Load Margin)	November 2015
Containment Fan Cooler Unit SI Timer Changes	March 2016
Vital Inverter Output Breakers	2R19/1R20

System Health – Average Age (Red / Yellow Systems)



The PHC tracks these on a regular basis.

At the end of the PHC meeting, both Dr. Lam and Mr. Wardell were invited to provide comments about the meeting. Dr. Lam indicated that the meeting was conducted efficiently with focus and clarity. Mr. Wardell agreed and stated that the DCISC appreciated the purpose and actions of the PHC to keep systems healthy.

Conclusions:

The April 22, 2015 DCPD Plant Health Committee (responsible for plant system health), meeting was focused on improving the system health of the 480 Volt Vital and Non-Vital systems. The meeting was conducted crisply and effectively. The DCISC should observe these meetings regularly.

Recommendations:

None

3.8 Fukushima/FLEX Update

The DCISC Fact-finding Team met with Pat Nugent, Fukushima/FLEX Program Manager, for a report on the progress of the DCPD FLEX project. The DCISC last reviewed FLEX in January 2015 (Reference 6.8), concluding:

DCPD appears to have satisfactorily performed its Quick Hit Self-Assessment of its FLEX Program and Spent Fuel Pool Instrumentation Project. The overall conclusion was that the FLEX Program was in compliance with industry and NRC guidance with specific recommendations for program enhancements and remaining work. The DCISC Fact-finding Team concluded that the Assessment and resulting action plans were appropriate. The DCPD FLEX program is on-schedule for on-time completion.

The status of individual Fukushima/FLEX initiatives is as follows:

1. Seismic and Flooding Hazard Re-evaluation

- a. Flooding and Seismic Re-evaluation Reports were submitted to NRC on March 12, 2015. NRC has separated these results from the plant design basis.
- b. Results of analyses using Local Intense Precipitation and Probable Maximum Flood show some ponding in areas around the Turbine and Auxiliary Buildings, which can be mitigated by use of sandbags. There were no other exceedences.
- c. Results of tsunami analyses show a one foot decrease in tsunami wave height, which is bounded by the original design basis.
- d. Two exceedences, drawdown for the Auxiliary Saltwater (ASW) Pump and run-up/scouring above the ASW Bypass Piping, do not affect current designs.
- e. New seismic analysis are generally bounded by existing Hosgri analysis with some exceedences in high and low frequency ranges.
 - i. No safety-related equipment is susceptible to the high and low frequencies in question
 - ii. New ground motion spectra are bounded by the Long-Term Seismic Program spectra.
 - iii. All equipment meets both spectra.

2. Seismic and Flood Walkdowns

- a. No issues
- b. No further work expected in this area at this time
- c. Potential flood seal issue in ASW Pump Vault, which plant is reviewing

3. New NRC Station Blackout Rule underway—draft expected Summer 2015 earliest. DCPD will use Licensing Basis Verification Project to handle.

4. FLEX Strategy Design Packages

- a. SFP Cooling—issued
- b. Raw Reservoir—issued
- c. Primary Storage in Warehouse—issued
- d. Emergency Auxiliary Feedwater (EAFW)—issued
- e. Emergency Reactor Coolant System (ECRS) Make-up—issued
- f. Safety Function Support—April 17, 2015
- g. Emergency Auxiliary Saltwater (EASW)—issued
- h. Debris Mitigation—May 15, 2015

- i. Units 1 and 2 Mechanical and Electrical Modifications—issued
 - j. Communications Modifications—issued
- 5. Storage Locations
 - a. Primary On-site Storage—begin moving in June 1, 2015
 - b. Secondary On-site Storage (near ISFSI)—design to be issued May 15, 2015
- 6. Equipment Procurement
 - a. Front-end loaders and ERCS pumps on-site
 - b. Mobile generators and EASW pump stored off-site until air permits received
- 7. FLEX Support Guidelines drafted and ready for training
- 8. National SAFR Response Center—design to be issued by June 15, 2015
- 9. NRC Pre-Implementation Audit—week of August 17, 2015
- 10. Spent Fuel Pool Instrumentation
 - a. Design to be issued by April 23, 2015
 - b. Equipment delivery scheduled for June 30, 2015
 - c. Installation scheduled for July 15—September 15, 2015
- 11. On-Site Emergency Response Center Staffing Study
 - a. Phase 1 study completed in 2013
 - b. Phase 2 study begun April 2015—possibly need one engineering position filled.
 - c. Report to NRC by May 26, 2015
- 12. Emergency Preparedness
 - a. Final multi-unit dose assessment program complete
 - b. MIDAS software enhancement underway
- 13. INPO review visit scheduled for first week of June 2015

Conclusions:

The DCCP Fukushima/FLEX modifications, analyses, equipment, procedures and training appear to be on-schedule.

Recommendations:

None

3.9 Licensing Basis Verification Project

The DCISC Fact-finding team met with Eric Nelson, Project Manager for the Licensing Basis Verification Project (LBVP), and Christen Zaitz, NSSS (Nuclear Steam Supply System) Structural and Licensing Engineer, for an LBVP update. Mr. Nelson had presented an update at the June, 2015 DCISC Public Meeting (Reference 6.9).

The purpose of the Licensing Basis Verification Project (LBVP) is to perform an objective evaluation to ensure the DCP's licensing basis has been adequately maintained, and to resolve any identified discrepancies. This is a voluntary effort by PG&E to ensure safe and reliable continued operations, and in this effort the LBVP is aligned with NRC. The goal is to provide the best possible Final Safety Analysis Report (FSAR) and the most accurate current licensing basis (CLB) determination to enhance technical evaluations going forward. Additional key goals are to provide and enhance knowledge transfer of the CLB. The FSAR is a summary document of DCP's commitments to the NRC which documents the plant's design basis. When changes are made to DCP they are reviewed against the licensing basis and the FSAR to ensure continuing compliance. The FSAR is required to be updated and the updated FSAR is submitted to the NRC at the conclusion of each U-2 refueling outage.

The main scope of the LBVP is as follows:

- To evaluate the facility and analyze changes made since completion of the original FSAR in 1980 through the current FSAR and to resolve any licensing basis discrepancies discovered.
- To update the FSAR, including technological hyperlinks to its source documents (e.g. correspondence with the NRC, safety evaluations, etc.) and to create a Google-like search tool.
- To improve the current licensing basis database full-text search capabilities.
- To perform corrective actions for issues identified. The project is staffed to do evaluations, operability assessments, calculations, etc.
- To enhance knowledge transfer by rotation of engineering and operations staff onto the project.
- To perform component design bases reviews, after the licensing basis has been validated, of five risk-significant systems (Component Cooling Water, 230 kV, 500 kV, Emergency Diesel Generator, and Auxiliary Feedwater). These reviews are modeled after NRC inspection procedures around component design basis inspections.

DCP has made a commitment to the NRC to complete the LBVP by December 31, 2015. Completion of the LBVP includes:

- All licensing basis review reports
- System review reports
- FSAR updates
- Component design basis review reports

- Electronic database upgrades
- Implementation of new current licensing basis search tools
- Resolution of licensing basis discrepancies that do not require prior NRC approval

The DCISC was interested in one particular LBVP issue in this meeting: the Hosgri seismic and LOCA (Loss of Reactor Coolant Accident) load requirements for the new Reactor Vessel Head and new DCPD Steam Generators. Apparently, the DCPD-specific requirements for procurement of these components had been overlooked when ordered as replacements; however, the components had been designed to generic industry requirements. This discrepancy was originally identified by the LBVP Project as reported to the DCISC in its November 20-21, 2013 Fact-finding meeting (Reference 6.10). As reported at that time, a Prompt Operability Assessment (POA) was completed permitting continued operation and a seismic re-analysis was initiated. This work is expected to be completed and approved by September 30, 2015, and the related Westinghouse concrete load report by October 20, 2015.

Regarding the overall status of the LBVP, the following was reported to the DCISC:

1. System reviews and FSAR updates are to be completed by June 30, 2015
2. All FSAR reviews and section updates (excluding corrective actions) are to be completed by December 31, 2015
3. All corrective actions are to be completed in 2016

Conclusions:

DCPD's Licensing Basis Verification Project (LBVP) continues to progress on schedule with a completion date of year-end 2015. An issue identified by the Project, incorrect specification of the seismic and loss-of-coolant accident loads on the new reactor vessel heads and steam generators, is being re-analyzed, and is expected to be completed by September 2015.

Recommendations:

None

3.10 Pacific Ocean Winter Storm Update

The DCISC Fact-finding Team met with Paula Gerfen, Director of Operations, for an update on 2014–2015 winter storm impact on DCPD. The DCISC last reviewed this topic in April 2014 (Reference 6.11) when it concluded the following:

DCPD's winter 2013–2014 storm experience was moderate with respect to its impact on intake equipment, resulting in a single rampdown of Unit 2 to 28% power for about 18 hours. Substantial improvements have been made, such as to traveling screens and screen wash pumps at the plant intake, particularly the addition of a new "Bubble curtain"

system, which can be expected to improve the reliability of the cooling water system and the electric generating plant.

Station Procedure OP O-28, “Intake Management,” provides direction with respect to mitigating the effects of short-term debris loading on the intake traveling screens and condensers. The procedure directs appropriate Operations, Maintenance and Security personnel to the intake to evaluate whether systems and equipment are operating at maximum capacity. Engineering may be directed to develop a plant rampdown plan, and Learning Services may prepare for training for Operations to practice ramping down the units on the Plant Simulator.

The procedure defines and addresses high swell forecasting, high swell warning, and Operations response to high swell warning. Pre-job briefs would be conducted for the Control Room operators as well as for the intake operators who would be expected to monitor intake conditions frequently. Maintenance and Security personnel would be directed to the intake along with Operations personnel to help ensure that systems and equipment (e.g. intake screens and wash pumps) are able to be operated at maximum capacity. Engineering could become involved, as appropriate, in developing a plant ramp plan and Learning Services could prepare training in which operators could practice ramping the units on the plant simulator. The response, when appropriate, would include operating the intake screens manually, controlling the screen speed appropriately, and manning the intake with two operators.

During this past winter, there were no Pacific Ocean winter storms which impacted DCP.

Conclusions:

During this past winter (2014–2015), there were no Pacific Ocean winter storms which impacted DCP.

Recommendations:

None

3.11 Operational Decision Making

The DCISC Fact-finding Team met with Paula Gerfen, Director of Operations, to review DCP's Operational Decision Making (ODM) Process and review several recent examples of its application. The last DCISC review of ODM was in March 2012 (Reference 6.12), concluding the following:

The DCP Operational Decision Making process appeared sound and effective for solving problems, which affect plant operability and safety. Two example ODMs reviewed were performed satisfactorily.

The DCISC Fact-finding Team (FFT) reviewed DCP Procedure OP1.ID7, “Operational Decision Making,” Revision 10, November 10, 2014. This is the controlling procedure for ODM. The FFT concluded that the procedure was satisfactory. According to the procedure, the purpose of ODM is to “provide a systematic method for evaluating technical and operational issues at the station and

making effective decisions that affect plant operations, safety, reliability, and material condition when faced with degraded conditions.”

Degraded conditions may involve reductions in operating/safety margins or encroachment on system/component reliability that occur over days or weeks. Examples include:

- Increased primary system or containment leakage that remains below operational or licensed limits
- Step changes in vibrations that remain at alert levels
- Numerous or long-term valve or pump leaks
- Fuel defects or increased corrosion rates
- Chronic or aggregate equipment material deficiencies
- Degraded conditions requiring a Prompt Operability Assessment
- Potential challenges to Technical Specification equipment

The Station Director is the Decision Maker (or assigns a Decision Maker) for decisions that involve outage extensions of >24 hours, potential NRC Notice of Enforcement Discretion, decisions that involve changes in mode or power level, short duration action statements, or changing curtailment schedules. The Decision Maker typically assigns a Decision Team, which is composed of individuals with expertise in diverse areas applicable to the decision at hand. For evolutions that involve a significant reduction in reactor safety, an individual with a Senior Reactor Operating License will be designated to lead the Decision Team.

The Decision Team meets and follows a prescribed process to collect and analyze data and formulate a decision using/considering the following:

- Gathers validated information from diverse sources including key stakeholders
- Defines full scope of the degraded conditions considering operational effects, safety margins, personnel safety, and business impacts
- Defines the timeliness of solution implementation considering the rate of degradation and consequences of exceeding margins or limits
- Uses risk evaluation and appropriate problem analysis tools
- Considers the operational impact of options with the rigorous application of operating experience, Probabilistic Risk Assessment, licensing and design bases, and engineering and operational judgment

When its decision is made, the Decision Team obtains final approval from the Station Director who reports the decision to the Site Vice-President. The decision is communicated to plant personnel and is implemented. An effectiveness review is performed about six months after completion of the ODM.

The DCISC reviewed the following three ODMs:

1. Pressurizer Power Operated Relief Valves (PORVs) are required to be stroked once per calendar quarter. One PORV had its block valve closed due to hydrogen leakage through its associated PORV. Based on experience, stroking the PORV would introduce a pressure transient, causing excessive hydrogen leakage while the block valve is opened and may cause increased Pressurizer safety valve leakage of hydrogen after the block valve is stroked. The Decision Team considered six solutions, including doing nothing, before deciding on the action to declare the block valve inoperable due to excessive leakage and enter Technical Specification 3.4.11, Action A, which states that when one or more PORVs is inoperable and capable of being manually cycled, close and maintain power to associated block valve. This would temporarily remove the stroke test requirement and leave the PORV available if needed. The valves would remain in this state until repairs were made in an outage.
2. Unit 2 experienced a reactor trip due to tie-line differential relay operation. The cause of the differential relay operation was a single line-to-ground fault on the A Phase CCVT (Capacitive Controlled Voltage Transformer) due to an insulator flashover. The components, along with their lightning arrestors and main bank phase A and B high voltage bushings have an insulating system of silicone polymer rather than porcelain for personnel safety. The Decision Team was asked to consider options with a goal to develop a way to ensure that Unit 1 can operate safely without flashover until the next refueling outage. The solution was to continue to monitor the CCVTs performance with high power optics and camera during the next rain storm and plan for a unit curtailment later for contaminant cleansing.
3. It was determined that Unit 2 Reactor Coolant System (RCS) leakage was increasing slowly. A Trouble-shooting Team was initiated to determine the location. The leak was in the Reactor Coolant Pump 2-3 seal leak-off lines. A Decision Making Team was assembled to determine a course of action, including shutting down the unit to repair the seal. The Team decided to continue to monitor the leakage, and if leakage were to increase beyond 0.4 gallons per minute (gpm), then the unit would be shut down for repair. Reducing the seal flow injection stabilized the leak to an acceptable < 0.1 gpm.

The DCISC FFT also reviewed the three following effectiveness evaluations for other ODMs which were more than six months old:

1. Unit 1 Condenser delta-P (pressure drop) exhibited an increasing trend, which signified that intake tunnel cleaning would be needed sooner than originally scheduled. An ODM Decision Making Team convened and reviewed the situation. It decided to move the tunnel cleaning up one week. This was performed successfully. An effectiveness evaluation was later performed by an Operations Shift Foreman. The evaluation concluded that the ODM was effective in that the tunnel cleaning was performed in a timely manner to avoid unit curtailment and did not result in any reactor scrams or transients; challenges to nuclear safety or related systems, structures or components; increase in area radiological dose rates or any elevation in offsite dose; or any unplanned entry into Equipment Control Guidelines or Technical Specifications.

2. An ODM was performed to assess and decide what course of action to take for a grounding problem in the Plant Process Control System. This problem could have adversely affected the plant's Appendix R Fire Protection analysis. The ODM selected having a temporary modification made to correct the ground problem. The temporary modification would be in place until a permanent modification could be implemented. An effectiveness evaluation concluded that this ODM was effective because there were no shorts or other plant problems due to the temporary grounding modification.
3. An ODM was written to install the salp bubble curtain in June 2014 to prevent jellyfish-like salp from entering the plant intake during high salp months of July and August and cause plant power curtailment or shutdown. The effectiveness evaluation concluded the ODM was effective because no significant amount of salp entered the intake and there were no other adverse impacts on the plant.

Conclusions:

DCPP appears to have performed its Operability Decision Making satisfactorily. Follow-up effectiveness evaluations were performed appropriately concluding that the ODMs were effective.

Recommendations:

None

3.12 Dr. Lam Meeting with DCPP Site Vice-President

Dr. Lam met with DCPP Site Vice-President Barry Allen to discuss items from this fact-finding and other items of mutual interest.

4.0 Conclusions

4.1

The DCISC periodic meetings with the NRC Resident and/or Senior Resident Inspector continue to be beneficial for sharing of information on important DCPP issues.

4.2

The six (three per unit) DCPP Emergency Diesel Generators (EDGs) are operable and able to perform their functions; however, system health is rated as Yellow (needs improvement) primarily because of the need to increase their rated loads to meet new demand conditions. Prompt Operability Assessments have been performed to support operation with the higher loadings. Testing has shown that the EDGs are able to perform at the higher loads. DCPP is awaiting NRC review and approval prior to documenting the new loads in the Updated Final Safety Analysis Report. DCPP expects to return the all EDGs to White (healthy) status by July 1, 2015 and Green by September 1, 2015 for Unit 1 and June 10, 2016 for Unit 2. The

DCISC should review the new DCPD EDG Reliability Action Plan in September or October.

4.3

DCPD has successfully implemented the third version of MIDAS (Meteorological Information and Dose Assessment System) for predicting the magnitude and path of radioactive plumes from the plant in the event of an emergency. This version will provide more accuracy and versatility than the previous version.

4.4

Being an ocean-sited power plant, DCPD is susceptible to salt contamination from ocean spray. DCPD measurements of contamination levels on outdoor components showed what one would expect: contamination levels were directly proportional to the closeness and exposure to the ocean. Contamination levels ranged from Light to Extra Heavy.

4.5

DCPD Design Quality has been on Quality Verification's top issues lists since its down-rating in Refueling Outage 1R17 which concluded in June 2012. Engineering has performed assessments and implemented corrective actions, which resulted in enough improvement in Outage 2R18 (Fall 2014) that QV changed from a top issue to monitoring. Since January 2014, the Design Change Program has shown Green (good) health. QV will perform an Effectiveness Evaluation following Outage 1R19 near the end of 2015. The DCISC should continue to monitor Design Quality.

4.6

DCPD's Spent Fuel Pool (SFP) Cooling System is currently rated to be in Green (good) health with no major outstanding issues.

4.7

The April 22, 2015 DCPD Plant Health Committee (responsible for plant system health), meeting was focused on improving the system health of the 480 Volt Vital and Non-Vital systems. The meeting was conducted crisply and effectively. The DCISC should observe these meetings regularly.

4.8

The DCPD Fukushima/FLEX modifications, analyses, equipment, procedures and training appear to be on-schedule.

4.9

DCPD's Licensing Basis Verification Project (LBVP) continues to progress on schedule with a completion date of year-end 2015. An issue identified by the Project, incorrect specification of the seismic and loss-of-coolant accident loads on the new reactor vessel heads and steam generators, is being re-analyzed, and is

expected to be completed by September 2015.

4.10

During this past winter (2014–2015), there were no Pacific Ocean winter storms which impacted DCP.

4.11

DCP appears to have performed its Operability Decision Making satisfactorily. Follow-up effectiveness evaluations were performed appropriately concluding that the ODMs were effective.

5.0 Recommendations:

None

6.0 References

6.1

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.6, Section 3.10 “Meeting with the NRC Senior Resident Inspector.”

6.2

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 22, 2014, Volume II, Exhibit D.7, Section 3.10 “Emergency Diesel Generator Review.”

6.3

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.2, Section 3.1, “MIDAS (Meteorological Information and Dose Assessment System).”

6.4

Ibid., Exhibit B.1, “Salt Deposition Rate Update.”

6.5

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.2, Section 3.5, “Design Quality Effectiveness Evaluation.”

6.6

“Diablo Canyon Independent Safety Committee Twenty-First Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011”, Approved

October 9, 2011, Volume I, Exhibit D.11, Section 3.5, “Spent Fuel Pool System Review.”

6.7

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2014,” Approved October 22, 2014, Volume II, Exhibit D.3, Section 3.9, “Attend Plant Health Committee Meeting.”

6.8

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.6, Section 3.1, “FLEX Quick Hit Self-Assessment.”

6.9

Ibid., Exhibit B.9, “Licensing Basis Verification Project.”

6.10

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014,” Approved October 22, 2014, Volume II, Exhibit D.4, Section 3.3, “Licensing Basis Verification Project.”

6.11

Ibid., Exhibit D.8. Section 3.2, “2013–2014 Winter Storm Update.”

6.12

“Diablo Canyon Independent Safety Committee Twenty-Second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2011—June 30, 2012,” Approved October 22, 2012, Volume II, Exhibit D.7, Section 3.6, “Operational Decision Making.”

[25th Annual Report](#), [Volume 2](#), Exhibit D.9, Diablo Canyon Independent Safety Committee Report on Fact Finding Meeting at DCPD on May 20–21, 2015 by Per F. Peterson, Member, and David C. Linnen, Consultant

1.0 Summary

The results of the May 20–21, 2015 fact-finding trip to the Diablo Canyon Power Plant in Avila Beach, CA are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Plant Health Committee Meeting
2. Discussion with NRC Senior Resident Inspector
3. Office Seismic Safety
4. Discussion with PG&E Chief Nuclear Officer
5. Seismically Induced System Interactions (SISI) Housekeeping Program
6. Seismic Reviews of DCPD's Replacement Steam Generators and New Reactor Vessel Heads
7. Benchmarking Program
8. Operating Experience Program
9. Potential for Chloride Stress Corrosion Cracking (CSCC) of Multi-purpose Canisters (MPCs) in the Independent Spent Fuel Storage Installation (ISFSI)
10. External Flooding Assessment
11. Quarterly Station Performance Review Meeting

2.0 Introduction

This fact-finding trip to the DCPD 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 DCPD 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 (FFT) observed a routine weekly meeting of the Plant Health Committee (PHC). The DCISC last reviewed such a meeting in April 2015 (Reference 6.1), when it concluded the following:

The April 22, 2015 DCPD Plant Health Committee (responsible for plant system health), meeting was focused on improving the system health of the 480Volt Vital and Non-Vital systems. The meeting was conducted crisply and effectively. The DCISC should observe these meetings regularly.

The PHC is governed by DCPD 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
- Review and monitoring of plant health issue plans that are presented to the PHC

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 and Facilitator (currently the Station Director)
- Engineering Director
- Operations Director
- Nuclear Work Management Director
- Maintenance Director
- Strategic Projects Director
- Equipment Reliability Director

Also, any other Director may serve as a Decision Making Member at the discretion of the Chairman.

The PHC is also supplemented by a group of Supporting (non-voting) Members as shown below:

- Chemistry Manager
- Compliance, Alliance, and Risk Director
- System Engineering Manager
- Reliability Engineering Supervisor
- Administrative Support Representative

Plant health issues that require PHC periodic review include:

- Issues that result in a Red or Yellow (unacceptable health) System Health color (reviewed at least every six months)
- Programs that are rated Red or Yellow health color (reviewed at least every 6 months)
- Equipment performance issues that result in a red or yellow component health color
- Issues that result in a Maintenance Rule (a)(1) system
- Chronic system, program, or component health problems
- Issues that require special management attention or extensive resources to address

Prior to the Fact-finding Visit, the DCISC Fact-finding Team reviewed its most recent copy of DCP's most recent monthly Plant Performance Improvement Report (PPIR) (released April 16 for March 2015 data) which, among many other things, provides a listing of plant systems whose Health has been rated Red (Unsatisfactory) or Yellow (Deficient), for Unit 1, Unit 2, or Both. The following systems were on those lists:

Red

- Residual Heat Removal (U1 only)

Yellow

- Reactor Coolant System (U1&2)
- Emergency Diesel Generators (U1&2)
- Radiation Monitoring (U1&2)
- 120 V System (U1&2)
- Heating, Ventilation, and Air Conditioning (U1) (Control Room/Containment)
- Fuel Handling Equipment (U2)

The agenda for this meeting included the following:

- Review and approve Minutes from previous meeting
- Review of Action Items
- Review of Auxiliary/Fuel Handling Building Ventilation System
- Review of Reactor Coolant System
- Evaluation of the Conduct of the Meeting

The meeting was conducted with great efficiency, and the agenda was covered as scheduled. It was evident that discussion by focus groups prior to the meeting helped the attendees prepare for the meeting. Great emphasis was placed on plant safety and reliability throughout the discussion.

A portion of the meeting was designated for discussion of the Units 1 and 2 Reactor Coolant Systems (RCS), both of which are rated as Yellow (Unhealthy) and have been Unhealthy for about a year. The discussion was classified as a “6-month Review” of this topic. The RCS System Health Reports had been distributed to the attendees for their review prior to the meeting. Also, the most recent Plant Performance Improvement Report indicates that those systems are expected to return to Healthy status during Refueling Outages 1R19 (i.e. 4th Quarter 2015) and 2R19 (i.e. 1st Quarter 2016) respectively. The DCISC’s most recent review of these systems was in September 2014.

Throughout the meeting attendees actively engaged in providing their input and in asking questions of others. The meeting Chairman encouraged this interaction. This included providing differing opinions, having questioning attitudes, and yet reaching agreement on issues being discussed. Participants appeared to be well prepared for the meeting and knowledgeable of the topics being discussed. During the discussion, a plant announcement was made over the P/A system, and discussion immediately ceased so that all attendees could hear the announcement.

The objective of maintaining safe and reliable nuclear plant operation was stated on a number of occasions. Actions were assigned to participants as the meeting progressed and captured for future reference. Participants readily accepted responsibility for these future actions as the needs arose.

Conclusions:

The Plant Health Committee meeting was conducted efficiently and effectively. Members and presenters appeared to be well prepared. Discussion was active, thoughtful, and probing, with a focus on safety. The DCISC should consider conducting a Fact-finding review of the Reactor Coolant Systems of both Units prior to the 4th Quarter of 2015 since both systems have been rated as Unhealthy for about a year.

Recommendations:

None

3.2 Discussion with NRC Senior Resident Inspector

The DCISC Fact-finding Team met with Mr. Thomas Hipschman, DCP's NRC Senior Resident Inspector. The DCISC last discussed issues/topics pertaining to DCP with the station's NRC Resident or Senior Resident Inspector during DCISC's April 2015 Fact-finding Visit (Reference 6.2), when it concluded:

The DCISC periodic meetings with the NRC Resident and/or Senior Resident Inspector continue to be beneficial for sharing of information on important DCP issues.

Topics that were discussed by the DCISC Fact-finding Team and Mr. Hipschman included the following:

- Framework of the Plant Health Committee, the nature of its responsibilities, and the Committee's process for fulfilling its responsibilities.
- NRC's functioning and responsibilities associated with the identification and resolution of "Cross-cutting" issues.
- Performance of safety system functions, especially those related to industry responses to the accident at Fukushima.
- NRC's upcoming Public Meeting on June 24 pertaining to the NRC's Annual Assessment of DCP performance.
- The possibility of occasionally scheduling future NRC and DCP local Public Meetings adjacent to one another during the same week. In this regard, it was recognized that both organizations have the legal obligation to provide advance notice to the Public regarding the scheduling of their meetings and that constraints may also occur due to the availability of meeting space.
- Brief overview of DCP's recent submittals to the NRC regarding seismic and flooding risk.
- The potential for a presentation at the October DCISC Public Meeting by an outside Consultant (Dr. Robert Sewell) under contract with DCISC to perform a review of DCP's tsunami hazard.
- Issues pertaining to the testing of the FLEX Emergency Auxiliary Water System pumps under realistic conditions, where State of California permits do not allow the pumps to be tested in the plant intake cove where more realistic plugging conditions for the pump suction screens would exist.

Conclusions:

DCISC meetings with the NRC Resident, or Senior Resident, Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCISC. Because it could be beneficial to have a future DCISC Public Meeting scheduled in the same week as a NRC public meeting, the DCISC should follow up to see if this can be coordinated in the future.

Recommendations:

None

3.3 Office Seismic Safety

The DCISC Fact-finding Team met with Tom Baldwin, Site Services Director, to discuss DCP's continuing efforts to address office seismic safety. The DCISC last reviewed this topic during its December 2-3, 2014 Fact-finding Visit (Reference 6.3), when the DCISC concluded:

DCP has been making good faith efforts in recent years with regard to Office/Personnel Seismic Safety. Much progress has been made, and status is at the point where an Action Plan is no longer needed. However, it is likely that some potential hazards may have been overlooked and could pose a risk to employees and/or might impede employee response to an earthquake. DCP should consider ways to encourage its employees to self-report items of potential risk. Also, PG&E's methods of responding in its corporate offices in San Francisco after the 1989 Loma Prieta earthquake, which shook all of San Francisco and environs and caused dozens of deaths, might be helpful to DCP.

The initial portion of this fact-finding meeting was devoted to reviewing activities that have taken place within DCP with regard to office seismic safety, as well as actions that have been taken by the DCISC to encourage appropriate station efforts with respect to this issue. In Mr. Baldwin's new position as Director of Site Services, he has taken a proactive approach to gain a clearer understanding of the DCISC's view of DCP's current status. To assist in this, the Fact-finding Team provided Mr. Baldwin with copies of some of DCISC's past Fact-finding reports on this topic.

Although the DCISC has been reviewing DCP's plant seismic safety since the Committee's inception, Office Seismic Safety was not examined and reported as a distinct topic until May 2010. Since then the DCISC has reviewed this specific issue at least annually, and more often during the last two years. Likewise, DCP has more actively focused on this specific topic since 2010 and has made considerable progress, which has involved:

- Bracing office equipment located within time critical response travel routes that would be traversed in response to a plant emergency
- Benchmarking other California facilities that have strong performance in Office Seismic Safety
- Developing DCP's own Office Seismic Safety Guidance Policy and Communicating it to station personnel
- Conducting station walk downs to identify non-compliant issues
- Resolving identified issues to meet station requirements

Nevertheless, during various Fact-finding Visits over the most recent two years, the DCISC Fact-finding Teams continue to identify heavy, tall office furniture that needs to be braced in order to avoid harming personnel in the event of a significant earthquake. During this particular Fact-finding

(FF) Visit in May 2015, the FF Team was able to identify a number of tall, heavy, unsecured pieces of office furniture that would be expected to topple during an earthquake. The furniture is located on the 5th Floor of DCP's Administration Building. Mr. Baldwin accompanied the FF Team throughout this review. During a portion of this inspection, the FF Team was also accompanied by DCP's Fire Captain, Dan Ensminger. Captain Ensminger noted that a Station Notification (50705251) has been written to provide for coordinating future seismic safety inspections with fire safety inspections. The DCISC Fact-finding Team believes that such coordination will be beneficial to the quality of both inspections.

Conclusions:

Although DCP has made much progress in recent years in the seismic bracing of tall furniture, there continue to be instances where seismic bracing is needed. The recent personal involvement of a senior station manager in this issue is a noteworthy expression of the station's interest in completely resolving the issue. DCP's intent to conduct seismic safety inspections in conjunction with fire safety inspections can be expected to increase the safety benefit of each type of inspection. The DCISC should consider reexamining this issue in mid-2016.

Recommendations:

None

3.4 Discussion with PG&E Chief Nuclear Officer

DCISC Member, Per F. Peterson, met with PG&E's Senior Vice President and Chief Nuclear Officer, Ed Halpin. Discussion included topics pertaining to this Fact-finding Visit and other items of mutual interest.

3.5 Seismically Induced Systems Interaction (SISI) Housekeeping Program

The DCISC Fact-finding Team met with Rich Harvey, Work Week Manager, and Craig Stolz, Seismically Induced Systems Interaction (SISI) Housekeeping Program Owner. The DCISC last reviewed this topic in May 2011 (Reference 6.4), when it concluded:

Performance appears to have improved considerably in the area of DCP's Seismically Induced Systems Interaction Housekeeping Program since the DCISC Fact-finding Team's last review of this topic in July 2010. Recognizing that increased effort and attention to detail on this issue will be needed as a result of the accidents at Fukushima, the DCISC should review this topic on a periodic basis through Fact-finding trips and/or through DCP presentations at Public Meetings.

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 procedure also specifies that it does not apply to SISIP evaluations associated with design modifications. These evaluations are specifically governed by other station procedures.

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.

The procedure provides a lengthy list of examples of temporary equipment and components that could damage plant equipment if stored unrestrained in unacceptable areas of the plant, and/or inadequately secured, and if an earthquake were to occur. Some examples are tools, ladders, gas bottles, work-benches, rigging equipment, test equipment, temporary power load centers, and parts resulting from operations, maintenance, modifications, or testing activities.

One method to help prevent an undesirable seismic impact on plant systems has involved the designation of "SISI Safe Areas," which have been evaluated by Engineering and are predesignated throughout the plant. As such, these areas are intended for repeated use and do not require an SISI evaluation by engineering when the need occurs to store items temporarily in those areas. Such areas are identified by NOTICE signs located throughout the Turbine Building, Auxiliary Building, and Fuel Handling Building.

The Engineering Evaluation resulting in the identification of an "SISI Safe Area" involves identifying potential "Targets," which are defined by Procedure AD4.ID3 as systems, structures, and components that are required to "safely shutdown the plant, maintain the plant in a safe shutdown condition, and/or maintain the function of accident mitigating systems." Targets also include related tubing, instrumentation, electrical circuitry, and component supports that are necessary to ensure that the associated systems, structures and components can perform their design functions. Thus, the "SISI Safe Areas" are locations where stored equipment, tools, or components could not negatively affect "Targets" and therefore could not have a negative on impact nuclear safety in the event of an earthquake.

Procedure AD4.ID3 also provides guidance to help inspect for and evaluate potential SISI housekeeping issues. As would be expected, this process depends to a great extent on examining areas outside the "SISI Safe Areas" as well as examining the adequacy of restraints applied to materials being temporarily stored in the vicinity of SISI "Targets."

DCPP has a programmatic requirement to perform, and to report on, a quadrennial SISI Program Self-assessment. The results of the most recent Self-assessment, conducted in August 2014, were

provided to the DCISC Fact-finding Team. Since it had been four years since its previous, formal self-assessment, DCPD contacted another station by phone prior to performing the self-assessment to determine any lessons learned from that station's self-assessment.

DCPD's formal Self-assessment had one Deficiency, no Strengths, six positive findings, and six gaps representing opportunities for improvement. The Deficiency was that DCPD did not have an SISI Walkdown Checklist for conducting area walkdowns. Strengths included the overall conservatism of the program, plant cleanliness and housekeeping, procedure adherence by workers, worker knowledge of SISI Program requirements, definition of General Plant Personnel Responsibilities, and a number of effective procedural elements. The gaps primarily pertained to clarity of some aspects of procedures, to the inadequacy of some performance metrics for clearly identifying some trends and for providing insights, and to not modeling SISI concepts in training labs.

Station performance with respect to the SISI Housekeeping Program is reported in DCPD's monthly Plant Performance Improvement Report. Each monthly report tracks SISI performance for each month during the prior twelve. Performance is graded each month on a point basis with 100 being the maximum achievable. However, points are subtracted from 100 for each of the following types of deficiencies that are noted during the month:

- 21 points—SSISI significant event that resulted in an inoperable condition of a system, component, or structure; or NRC Violation

- 10 points—SISI threat that resulted in an evaluation

- 2 points—Missed or incomplete monthly area SISI inspection

- 1 point—SISI concern that resulted in a program rule violation

The resulting monthly point scores are then translated into performance categories, as follows:

- Green (Good) = 95 to 100

- White (Acceptable) = 90 to 94

- Yellow (Needs Improvement) = 80 to 89

- Red (Unsatisfactory) = Below 80

Because a number of years had transpired since the DCISC's last Fact-finding review of this topic, the DCISC Fact-finding Team examined DCPD's reported monthly performance from January 2013 to the present. From January 2013 through January 2014, each of the monthly indicators was Green. In February 2014 two issues were identified, which resulted in a White rating. In March 2014, five issues were reported, yielding a Red rating; and April and May 2014 were rated Green. The indicator for June 2014 was Red due to some issues identified by the NRC during plant inspections. The monthly indicators then returned to Green from July 2014 through April 2015, except for September 2014, which was White due to some outage work related issues.

Conclusions:

DCPP's Performance with respect to its Seismically Induced Systems Interaction Program appears to have been reasonably strong and stable during the past few years, with the exception of a few nonconformances. Given the heightened attention to seismicity during this same period, DCISC should review this program at a frequency of at least once every 2 years.

Recommendations:

None

3.6 Seismic Reviews of DCP's Steam Generators and Reactor Vessel Heads

The DCISC Fact-finding Team met with Nozar Jahangir, Seismic Engineering Manager, and Kristin Zaitz, Engineer. Although this is DCISC's first review of this specific collective topic, the DCISC has been actively following station progress with respect to the updated seismic evaluation of the entire plant facility and site, which has direct implications for this topic. The DCISC's most recent review of PG&E's Site Seismic Study was conducted on March 30, 2015 at PG&E's corporate office in San Francisco, as part of the DCISC's March 30—April 1, 2015 Fact-finding Visit (Reference 6.5), where the DCISC Fact-finding Team concluded:

PG&E submitted its most recent report to the NRC on the site seismic hazard in mid-March 2015. The work contained in this report is clearly a major advance over previous analyses. It will be reviewed in the near future both by the NRC staff and by other outside experts. The DCISC should continue to review this topic too, by studying the underlying technical data and reports and reviewing the reviews of others.

However, even more recently, during the DCISC's review of the status of DCP's Licensing Basis Verification Project in its April 2015 Fact-finding Visit (Reference 6.6), the DCISC Fact-finding Team drew the following conclusion with respect to the seismicity of DCP's Steam Generators and Reactor Vessel Heads:

DCP's Licensing Basis Verification Project (LBVP) continues to progress on schedule with a completion date of year-end 2015. An issue identified by the Project, incorrect specification of the seismic and loss-of-coolant accident loads on the new reactor vessel heads and steam generators, is being re-evaluated, and is expected to be completed by September 2015.

PG&E is also engaged in a "Seismic Fragility Probabilistic Risk Assessment (PRA)." This topic was last reviewed by the DCISC in August 2014 (Reference 6.7) when it concluded:

DCP is proceeding satisfactorily with its Seismic Fragility Probability Risk Assessment (SFPPRA) analysis using the latest methodology and seismic response spectra. SFPPRA is a very useful tool, because it provides information about the likelihood of different plant damage states caused by earthquakes. Because the seismic PRA provides improved information on the most probable plant damage states that could be caused by an

earthquake, the DCISC recommends that this information be used in developing the DCPD FLEX strategy to respond to beyond design basis earthquakes. Although early, there have been no problems identified. The DCISC should continue to monitor this analysis, and review how the DCPD FLEX program uses SFPRA results to develop mitigation strategies for beyond design basis earthquakes.

As noted above, the DCPD-specific requirements for procurement of these major pieces of equipment had been overlooked when they were ordered as replacements, and this equipment had been designed rather to generic industry seismic load requirements and those pertaining to Loss of Coolant Accident (LOCA) loads. This particular issue is being addressed through a re-analysis being performed as part of the LBVP, and this re-analysis is expected to be complete by September 30, 2015.

There is an additional commonality between the hazards to the New Steam Generators and hazards to the New Reactor Vessel Heads. That is, since both types of equipment are replacements for original equipment, both also may need to be examined collectively, as well as individually, for their ability to withstand a Loss of Coolant Accident (LOCA) occurring simultaneously with an earthquake, as were the original pieces of equipment.

In addition, it may be advisable to install seismic instrumentation on these large vessels in order to be able to verify how any future seismic ground motion and acceleration affects the shaking of this equipment. Nevertheless, it can be stated that thus far, since the replacement of this large equipment, all of this equipment has been functioning properly.

Conclusions:

Ongoing seismic re-evaluations include verifying the capability of DCPD's Steam Generators and Reactor Vessel Heads to withstand a Design Basis Earthquake. They have also been separately analyzed to withstand a Design Basis Loss of Coolant Accident. However, more analysis may be needed in to confirm that this equipment can also withstand a Design Basis Earthquake that occurs concurrently with a Design Basis Loss of Coolant Accident. Also the re-analysis of the seismic and loss of coolant accident loads on this equipment is expected to be complete by September 2015. In addition, it may be appropriate to install seismic instrumentation on this equipment in order to verify how future seismic events affect the motion of this equipment.

Recommendations:

None

3.7 Benchmarking Program

The DCISC Fact-finding Team met with Derek Schmidt, Senior Performance Improvement Coordinator. The DCISC last reviewed DCPD's Benchmarking Program in January 2013 (Reference 6.8), when it concluded:

The Benchmarking Program appears to be active and productive. It continues to provide for formal and informal examinations of a broad range of nuclear plant performance areas. The material provided by DCP's Program Owner to the Fact-finding Team was especially well organized and extensive. This program appears to warrant DCISC's to warrant DCISC's review no more frequently than biennially.

Station Procedure OM15.ID4, "Self-Assessment and Benchmarking Procedure, OM15.ID4," defines benchmarking as "A study which first identifies best practices in one or more organizations and subsequently compares DCP programs, processes, products, and services to identify gaps, develop recommendations, and set targets to improve performance." "Formal" benchmarking is a highly structured process that involves scheduling, planning, training, conducting a site visit by a DCP team, documenting results in written reports, planning and tracking corrective actions, and evaluating the resultant changes. "Informal" benchmarking may consist of telephone interviews, surveys, resource sharing, attendance at industry meetings, querying site visitors, or internal benchmarking. Informal benchmarking may also include a site visit or a trip to a vendor or another plant, but without the structure of a formal program.

The station's Self-assessment Review Board (SARB) is the governing and reviewing body for all formal benchmarking. It is a group composed of appropriate members of the leadership team to provide oversight of benchmarking schedules, plans, and results, as well as oversight of operating experience and other station programs.

Station departments have the latitude to conduct informal benchmarking without having to schedule them through SARB. These can be conducted by phone or e-mail. Also, effectiveness reviews are expected to be conducted at the department level for Benchmarking activities.

As a part of DCP's routine correspondence, DCISC is provided with copies or summaries of various station reports and other documents, some of which report the Benchmarking activities that are conducted by DCP. Examples of the topics of some of these Benchmarking reports that have been reviewed by DCISC during the past year are as follows:

1. Feedwater Iron Strategies
2. "Fix It Now" Benchmark Report
3. Design Drafting and Drawing Incorporation
4. Work Week "T+1" Meeting
5. Functioning of the Equipment Reliability Working Group
6. Evaluation of Operating Crew Performance in the Simulator
7. Operations Training Program
8. Pressurized Water Reactor Owners Group Procedure Subcommittee Meeting, with special focus on Emergency Operating Procedures, Severe Accident Management Guidelines, Extreme Damage Mitigation Guidelines, and Fukushima Response Support Guidelines

Information in the reports reviewed by the DCISC Fact-finding Team appeared to be clear and focused, and would be expected to be of potential help to the station.

Conclusions:

The Benchmarking Program appears to continue being an active and productive method for obtaining information supporting the achievement and maintenance of safe and reliable nuclear plant operation. It continues to provide for formal and informal examinations of a broad range of nuclear plant performance areas. The program again appears to warrant DCISC's review no more frequently than biennially.

Recommendations:

None

3.8 Operating Experience Program

The DCISC Fact-finding Team met with Derek Schmidt, Senior Performance Improvement Coordinator. The DCISC last reviewed DCP's Operating Experience Program in September 2013 (Reference 6.9), when it concluded:

The DCP Operating Experience Program is well established and, though below DCP's desired goal in performance, is improving. DCP is taking actions to benchmark industry best performance and practices and incorporate them.

Industry operating experience information comes from two primary sources:

1. An Industry Consolidated Event System (ICES)
2. Other, including NRC, industry vendors, etc.

The former has the most extensive collection of operating event information.

The Plant receives 15-20 Operating Experience (OE) documents weekly from a variety of sources as noted above. These OEs are screened and information considered to be relevant to DCP is transmitted to department Subject Matter Experts (SMEs) who review the material for specific applicability to their areas and determine appropriate action. The process and requirements for reviewing, screening, disseminating, and evaluating this industry OE are described and controlled by plant procedure: "Assessment of Industry Operating Experience." In addition to receiving industry OE, DCP also provides its own operating experience reports to both NRC and for others in the industry.

The DCISC Fact-finding Team (FFT) reviewed DCP OE Program Health for the month of February 2015 as shown in DCP's Plant Performance Improvement Report (PPIR), dated March 16, 2015. The health report measures the following attributes:

- NRC Industry Event Report (IER) Response Timeliness
- IER Evaluation Quality
- OE Evaluation Timeliness
- Industry Consolidated Event System (ICES) Report Timeliness
- ICES Report Completion

A system of point values and weighting values is used for assessing performance of each of the above attributes, which are combined to assess overall OE Program Performance.

The scale on which performance is reported is:

- Green = Healthy
- White = Acceptable
- Yellow = Needs Improvement
- Red = Unacceptable

OE Program Health had been Red (Unacceptable) for the period ending two months prior to the report, then improved to Yellow (Needs Improvement) for the period ending one month prior to the report, and again improved to Green for the most recent month. These overall improvements were due almost exclusively to improvements in Evaluation Quality and Timeliness. The DCISC Fact-finding Team also reviewed prior monthly PPIRs dating back through May 2014 to discern DCP's monthly performance over a longer time span. In none of those prior months was DCP's OE overall performance rated as Red. One overall rating was Yellow (November 2014) and the ratings in the other months were Green and White. The predominant reasons for these lower ratings involved timeliness of both evaluations and processing of the industry documents.

DCPP also continues to engage with others in the industry in order to adopt and maintain best industry practices and has also continued to review industry performance metrics to identify top performers.

Conclusions:

DCPP continues to maintain an active and effective Operating Experience Program. DCISC should continue to examine this topic on a frequency no greater than biennially.

Recommendations:

None

3.9 Potential for Chloride Stress Corrosion Cracking (CSCC) of Multi-purpose Canisters (MPCs) in the Independent Spent Fuel Storage Installation (ISFSI)

The DCISC Fact-finding Team met with Larry Pulley, Used Fuel Storage Manager, to discuss the Potential for Chloride-induced Stress Corrosion Cracking (CSCC) of Multi-purpose Canisters (MPCs) in the Independent Spent Fuel Storage Installation (ISFSI). This is the DCISC's first review of this topic.

After each nuclear fuel cycle, the operating unit is shut down, and a portion of the nuclear fuel is removed from that reactor and replaced with new nuclear fuel. The spent nuclear fuel assemblies are then temporarily stored (for a number of years) in the Unit's Spent Fuel Pool. However, each Spent Fuel Pool, one for each operating Unit, has a capacity that is limited. Therefore, DCPD has constructed an Independent Spent Fuel Storage Installation (ISFSI) pad above the plant on a hill to the east of the plant, on which this spent nuclear fuel is stored after undergoing a highly controlled transfer process. The spent fuel assemblies (32 in each movement) are inserted into a stainless steel MPC-32 which is then sealed and welded, and is eventually transferred into a thick concrete and steel High Integrity Storage Module (HI-STORM), which is then fastened to a reinforced concrete pad at the ISFSI. A more detailed description of this transfer process from the Spent Fuel Pool is as follows:

- A Multi-Purpose Canister (MPC-32), designed to store 32 spent nuclear fuel assemblies, is loaded into a High-integrity Transfer Cask (HI-TRAC), which is then lowered into the Spent Fuel Pool (SPF).
- 32 spent fuel assemblies are each loaded individually underwater in the Spent Fuel Pool into the MPC-32, which is in the HI-TRAC.
- The HI-TRAC is then removed from the pool, decontaminated while over the pool, and moved to the Cask Washdown area.
- A lid is then welded onto the MPC-32, which is then moved to the Forced Helium Dehydration Skid where the MPC-32 is drained and then flushed and filled with helium gas to remove moisture, after which a cover plate is welded on the MPC and the HI-TRAC lid is installed.
- The HI-TRAC is then moved out of the Fuel Handling Building via a Low Profile Transporter (LPT), and the HI-TRAC is then transferred to a larger Transporter, which carries the MPC-32 up the hill to the Cask Transfer Facility (CTF).
- At the CTF, which is near the final ISFSI storage pads, a very large cask referred to as the HI-Integrity Storage Module (HI-STORM) becomes the container for MPC-32. A mating device is fastened to the top of the HI-STORM, and this mating device will be used to connect the bottom of the HI-TRAC to the top of the HI-STORM. The HI-STORM is then placed in a pre-constructed cavity in the ground and the bottom of the HI-TRAC (containing the MPC-32 with its 32 spent fuel assemblies) is fastened to the mating device at the top of the HI-STORM.
- The top and bottom lids are then removed from the HI-TRAC, and the MPC-32, containing the 32 spent fuel assemblies, is lowered into the HI-STORM.
- The HI-TRAC is then removed from the mating device, and a lid is installed on the HI-STORM.
- The Low Profile Transporter (LPT), which was used to transport the MPC-32 up the hill from the Fuel Handling Building, lifts the HI-STORM (now containing the MPC-32) out of the

ground and moves the HI-STORM to its assigned location on the ISFSI pad, where the HI-STORM is bolted to its storage pad.

- The HI-STORM, allows for convection cooling of the MPC-32 and the configuration is designed to prevent overheating of the spent fuel assemblies, given the decay heat requirements for the used fuel that is permitted to be transported to the ISFSI.

The key points for the purpose of this issue are:

- The used fuel is in a sealed, stainless steel MPC and the atmosphere inside the MPC is dry helium, not air. The helium atmosphere inside the MPC protects the fuel. Being a sealed canister, this also prevents loss of helium, and prevents the release of radioactive decay products to the atmosphere.
- Because the spent fuel canister is dried using forced helium dehydration, the peak temperature of the metal cladding of the fuel pins remains low, and none of the spent fuel in storage at DCPD has the potential to have experienced cladding hydriding and embrittlement as may be possible with vacuum drying processes used by other spent fuel cask vendors.
- The HI-STORM, which contains the sealed MPC, has vents in its bottom and top to allow natural convection air flow upward around the stainless steel MPC to carry away decay heat being produced by the nuclear fuel.
- Stainless steel can undergo corrosion influenced by chlorides, which are in the salt aerosol particles formed from sea-spray and carried inland by winds at the DCPD site. Some types of stainless steel are more susceptible to chloride stress induced corrosion cracking than others. DCPD has a program to monitor salt deposition rates in various locations around the plant.
- The issue is whether the MPCs could undergo chloride stress induced corrosion cracking to an extent that could expose the nuclear fuel to the outside atmosphere and permit the release of radionuclides to the outside atmosphere.

Mr. Pulley noted that the industry is pursuing this issue and that he is a member of the Electric Power Research Institute's (EPRI's) Technical Advisory Committee on Stress Corrosion Cracking. DCPD is part of an EPRI pilot program where some sample swabs have been taken from the surfaces of some MPCs, from the circumferential weld at the midpoint as well as from an axial weld. The samples were analyzed, and found to contain chlorides. He noted further that different types of stainless steel have differing degrees of susceptibility to chloride stress induced corrosion cracking, and he noted that lower carbon content in stainless steel tends to reduce its susceptibility to this type of corrosion. He mentioned four types in particular: 304 (austenitic), 304L (L means lower carbon), 316, and 316L. The 304 stainless were determined to be the most susceptible to this corrosion, and Mr. Pulley noted that the first two sets of DCPD's casks (16 casks in total) transferred to the ISFSI in 2009 and 2010 contain MPCs made of 304 stainless.

On November 14, 2012, the Nuclear Regulatory Commission issued NRC Information Notice (IN 2012-20) to all holders and applicants for an independent spent fuel storage installation (ISFSI) license. The reason for this notice was "To inform addressees of recent issues and technical information

concerning the potential for chloride-induced stress corrosion cracking (SCC) of austenitic stainless steel dry cask storage system canisters. Significant SCC could affect the ability of the spent fuel storage canisters to perform their confinement function during the initial license or license renewal storage period(s). The NRC expects that recipients will review this information to determine how it applies to their designs and facilities and consider actions, as appropriate, to avoid these potential problems. However, suggestions contained in this IN are not NRC requirements; therefore, no specific action or written response is required.”

The NRC’s Information Notice further provides background information, as follows:

“SCC is induced from the combination of tensile stress and a specific corrosive environment. Austenitic stainless steels under tensile stress are known to be susceptible to SCC when exposed to chlorides in the environment. A literature survey has revealed failures attributed to chloride-induced SCC in the types of austenitic stainless steels typically used in dry cask storage system canisters when these materials are exposed to atmospheric conditions near salt-water bodies. This phenomenon is of concern at temperature and relative humidity combinations that allow the chloride compounds to deliquesce (i.e. to become soft or liquid with age). It is thought that airborne salts could deposit on the material surface, then form chloride-rich deliquescent brines in conditions of high relative humidity. Laboratory data suggests that chloride-induced SCC is of particular concern as the canister surface temperature decreases to the level where salt will deliquesce.”

“Researchers do not yet fully understand the relationship between the proximity to a salt-water body and the potential for chloride deposition on a dry cask storage system canister. However, it should be noted that many ISFSIs are located near salt-water bodies or other sources of chlorides, such as salted roads or condensed cooling tower water. These canisters may have high tensile residual stresses from welding or other fabrication processes.”

NRC Information Notice 2012-20 further states:

“The NRC is currently evaluating data to determine the level of susceptibility and potential safety significance for existing licenses and certificates. The NRC has engaged the Nuclear Energy Institute (NEI) to describe information related to structures, systems, and components important and to understand industry plans for generically addressing this issue. The NRC also has communicated concerns and technical information regarding this topic at several stakeholder meetings. At this point, no immediate safety concern has been identified with currently approved licenses that would warrant a backfit analysis under 10CFR 72.62, ‘Backfitting.’ However, maintenance and surveillance programs during initial license periods and aging management programs (AMPs) during license renewal periods are required to address aging effects, such as chloride-induced SCC, as appropriate for the relevant canister design(s), operating conditions, specific site environmental conditions, and proposed

license renewal periods.”

As stated above, NEI has been engaged in supporting the industry on this issue. In an October 29, 2014 letter to the NRC, NEI concluded, and informed the NRC and the industry, that this issue “Has not reached a level of urgency of safety significance to qualify it for the NRC’s generic safety issue process because testing is inconclusive (laboratory conditions do not accurately represent in-situ conditions at ISFSI sites), actual conditions (atmospheric and cask) vary from site to site and from model to model and cask to cask; and actual field data is insufficient. Since there is not an immediate safety concern, use of this protocol permits a deliberate yet timely approach to understanding the issue and creating the necessary tools for licensing and implementing prevention and mitigation strategies, as necessary.” NEI’s stated goal at that time was to finalize and send to the NRC by June 2015 “Industry Susceptibility Criteria that can be used by ISFSI licensees to evaluate the potential for Chloride Induced Stress Corrosion Cracking to occur on canisters at their site.”

Measurement of the surface temperature of the canisters in the DCPD ISFSI, along with the outside ambient temperature, provides a way to verify that the canister surface temperatures are sufficiently high to make deliquescence impossible, even if the air relative humidity is 100%. The rate of decay heat generation in the canisters currently in storage is sufficiently high that this condition exists and deliquescence is impossible. One concern is that in coming decades, decay heat generation will drop and ISFSI canisters may then become vulnerable to deliquescence and SCC. Given the age of the spent fuel in storage in the ISFSI, the dominant heat generation comes from decay of Cs-137 and Sr-90, which have 30-year half-lives, so heat generation can be expected to drop by about half every 30 years. However, if the canister temperatures are monitored, it will be possible to block air vent holes in the over pack containers to reduce air flow, and thus to maintain appropriate canister temperatures over extended periods of time if required.

PG&E and the state of California are also examining the possibility of installing salt-water cooling towers as an option to once through cooling. To the extent possible it would be advisable to examine the potential impact of such cooling towers on salt deposition rates at the ISFSI, and the accompanying impact on the possible deliquescence and SCC phenomena for the ISFSI Multipurpose Canisters.

Conclusions:

DCPD is participating in an industry initiative to determine the impact of atmospheric chlorides on the corrosion rate of ISFSI Multipurpose Canisters (MPCs). It is expected that these corrosion rates will be individually dependent upon the material properties of the individual MPCs and the atmospheric conditions at each ISFSI. DCPD’s initial 16 MPCs that were used for transfer of used nuclear fuel to the ISFSI are made of 304 austenitic stainless steel, which tends to be somewhat more susceptible to chloride induced stress corrosion cracking than other types of stainless steel that are used for this purpose. Deliquescence that can cause stress corrosion cracking can be made impossible if the canister surface

temperatures are maintained sufficiently above outside ambient temperatures, so periodic monitoring of canister temperatures is valuable. Because PG&E and the state of California are examining the possibility of installing salt-water cooling towers as an option to once through cooling at DCP, it would be advisable, to the extent possible, to examine the potential impact of such cooling towers on the rate of salt aerosol deposition at the ISFSI.

Recommendations:

None

3.10 External Flooding Assessment

The DCISC Fact-finding Team met with Scott Maze, Fukushima Project Supervisor; Behooz Shakibnia, Civil Supervisor, Design Engineering; Julio Barbosa, Mechanical Design Engineer; Allen Clark, Architect, Civil Group; and Hector Garcia, Mechanical Design Engineering Supervisor. Although the DCISC has examined tsunami risk in earlier Fact-finding Visits, this is DCISC's first Fact-finding review of this collective topic.

This PG&E assessment of external flooding was conducted in response to an NRC Request for Information dated March 12, 2012. In it the NRC requested DCP to re-evaluate site seismic and flooding hazards using updated flooding information and present-day regulatory guidance and methodologies. In essence, the review was to be conducted in the same way as if DCP were a new plant. With respect to the flooding aspects, PG&E's 90 day response letter, DCL-12-058, stated that PG&E would submit the flooding hazards reevaluation to the NRC by March 12, 2015. (PG&E's Response was submitted on March 11, 2015 in PG&E Letter DCL-15-034.) PG&E further committed that if its flooding reevaluation was not bounded by the Current Licensing Basis (CLB), then PG&E would evaluate and/or discuss mitigation actions in an Integrated Assessment by March 2017.

In addition to following the NRC's formal regulatory guidance for a response to a Request for Information, PG&E adhered to the requirements of the following NRC documents pertaining to this specific request:

- Regulatory Guide 1.59: "Design-Basis Floods for Nuclear Power Plants"
- NUREG/CR-7046: "Design-Basis Flood Estimation for Site Characterization at Nuclear Power Plants in the United States of America"
- NUREG/CR-6966 "Tsunami Hazard Assessment at Nuclear Power Plant Sites in the United States of America—Final Report"
- JLD-ISG-2012-06: "guidance for Performing a Tsunami, Surge, and Seiche Flooding Safety Analysis"

The analysis was performed in a hierarchical fashion. That is, the most conservative assumptions were embedded in the first analysis, such as assuming that no active components remain functional and the site drainage network is completely blocked. After this, another analysis was performed

using assumptions that were more realistic. This progression of analyses is referred to as a Hierarchical Hazard Assessment (HHA).

Historical data was used to determine the values that are relevant. For example, to obtain Probable Maximum Precipitation (PMP) historical California data was extracted for all-season data, seasonal data, and local storm data. Local Intense Precipitation (LIP) (i.e. microbursts) was also examined over the entire site drainage basin.

Tsunami/Ocean analyses had been performed to calculate the effects of distant and near source tsunamis due to earthquakes as well as offshore landslides, including the effects of updated hydrostatic and hydrodynamic forces, debris and water-borne projectiles, and sediment & erosion. Likewise storm surges were also incorporated using historical wave data.

The historical records of local intense precipitation (LIP) were also reexamined along with the flow paths for the accumulating water that could enter the plant and affect equipment. To determine areas and equipment that could be affected, site walkdowns were performed, including the identification of potential entry points providing flow paths to equipment that is important to safety. The determination of maximum water surface elevations then allowed the assessment of whether equipment would be affected. This reanalysis indicated that there is a potential for inundation of power block structures during a LIP event. PG&E's Letter DCL-15-034 noted: "The flood hazard reevaluations are distinct from the current design and licensing bases of DCPD and do not alter the terms of the license. NRC staff considers the flood hazard reevaluations being performed to be beyond the current design/licensing basis of operating plants (NRC, 2012c)."

Findings of the report are as follows:

- Reevaluation results showed there is the potential for water intrusion into power block structures during a local intense precipitation (LIP) event.
- It was determined that the 230 kV Switchyard would not experience flooding.
- Tsunamis were determined not to be a threat based on historical information for distant and near term sources as well as analyses of potential landslides.
- Raw water reservoirs on the hill above the plant, which had been evaluated in the Current Licensing basis, were determined not to have a contribution to power block flooding.

Based on the determination of the potential impact of a local intense precipitation event on plant safety, this type of event will be examined further and addressed in an Integrated Assessment that is required to be submitted to the NRC prior to March 13, 2017.

Conclusions:

PG&E's Flood Hazard Reevaluation of the DCPD site appears to be detailed and thorough. Local intense precipitation (LIP) was determined to present the only potential risk of inundation of the power block structures. PG&E further noted that NRC has considered LIP to be beyond the current design and licensing basis of the

plant. In conformance with a commitment that PG&E made to the NRC, PG&E will conduct further examination of LIP and address the results in an Integrated Assessment that will be submitted to the NRC prior to March 13, 2017.

Recommendations:

None

3.11 Quarterly Station Performance Review Meeting

The DCISC Fact-finding Team attended the first 90 minutes of a 3½ hour Quarterly Station Performance Review Meeting (PRM). The DCISC last attended such a meeting in July 2012 (Reference 6.10), when these meetings were held on a monthly basis, and when the DCISC concluded:

The DCPM Monthly Performance Review Meeting was well structured and focused and was conducted effectively. The focus was primarily on topics related to current station initiatives on Event Free Operations, Performance Improvement, and Regulatory Excellence. The DCISC should consider reviewing the elements of DCPM's station initiative for achieving Event Free Operations either in a future Fact-finding Visit or Public Meeting.

The overall expressed purpose of these meetings is to align the station leadership team on actions needed to help drive positive performance. Participants in the meeting were largely senior manager and manager level personnel, over 20 in number, from a wide range of technical disciplines. During the course of the meeting individual attendees provided brief summaries (about 5 minutes each) of over 20 key areas of station performance in which their individual areas of responsibility had the lead. The desired outcomes of these discussions were to:

- Review recent plant performance
- Review issues and open action items
- Identify potential plant issues which will affect future plant performance
- Share quality insights to align gaps to excellence
- Assign issue owners to coordinate plant actions

Since it was often the case that other station work groups provided support to performance areas being discussed, those other managers would inject their own comments regarding the subject activities. These same individuals would also summarize their own responsibilities for assisting in addressing issues for which another group had the lead.

The Chairman of the meeting was actively engaged in frequently summarizing the material being presented and ensuring that the appropriate individuals understood their specific responsibilities. He also provided positive feedback with regard to progress that was being achieved in various areas. He occasionally asked questions regarding the degree to which presenters needed help from others in order to address specific issues. He emphasized the importance of maintaining effective

alignment between DCP's managers, which is the manifestation of organizational alignment.

A listing of Action Items stemming from the previous Station Performance Review Meeting (February 19, 2015) was also reviewed. All but three of the 14 had been completed, and the remaining three were administrative in nature.

Conclusions:

The quarterly Performance Review Meeting was well structured, appropriately focused, and conducted efficiently and effectively. The meeting provided a framework for DCP management personnel to stay updated on key station issues and associated responsibilities, and it fostered an atmosphere of teamwork. The change in frequency of this meeting from monthly to quarterly appears appropriate, recognizing the nature of this meeting and the time required for all participants to prepare for, and participate in, this important meeting.

Recommendations:

None

4.0 Conclusions

4.1

The Plant Health Committee meeting was conducted efficiently and effectively. Members and presenters appeared to be well prepared. Discussion was active, thoughtful, and probing, with a focus on safety. The DCISC should consider conducting a Fact-finding review of the Reactor Coolant Systems of both Units prior to the 4th Quarter of 2015 since both systems have been rated as Unhealthy for about a year.

4.2

DCISC meetings with the NRC Resident, or Senior Resident, Inspector continue to be beneficial with regard to sharing information and to understanding issues important to the NRC and DCISC. Because it could be beneficial to have a future DCISC Public Meeting scheduled in the same week as a NRC public meeting, the DCISC should follow up to see if this can be coordinated in the future.

4.3

Although DCP has made much progress in recent years in the seismic bracing of tall furniture, there continue to be instances where seismic bracing is needed. The recent personal involvement of a senior station manager in this issue is a noteworthy expression of the station's interest in completely resolving the issue. DCP's intent to conduct seismic safety inspections in conjunction with fire safety inspections can be expected to increase the safety benefit of each inspection. The DCISC should reexamine this issue in mid-2016.

4.4

DCPP's Performance with respect to its Seismically Induced Systems Interaction Program appears to have been reasonably strong and stable during the past few years, with the exception of a few nonconformances. Given the heightened attention to seismicity during this same period, DCISC should review this program at least once every 2 years.

4.5

Ongoing seismic re-evaluations include verifying the capability of DCP's Steam Generators and Reactor Vessel Heads to withstand a Design Basis Earthquake. They have also been separately analyzed to withstand a Design Basis Loss of Coolant Accident. However, more analysis may be needed in to confirm that this equipment can also withstand a Design Basis Earthquake that occurs concurrently with a Design Basis Loss of Coolant Accident. Also the re-analysis of the seismic and loss of coolant accident loads on this equipment is expected to be complete by September 2015. In addition, it may be appropriate to install seismic instrumentation on this equipment in order to verify how future seismic events affect the motion of this equipment.

4.6

The Benchmarking Program appears to continue being an active and productive method for obtaining information supporting the achievement and maintenance of safe and reliable nuclear plant operation. It continues to provide for formal and informal examinations of a broad range of nuclear plant performance areas. The program again appears to warrant DCISC's review no more frequently than biennially.

4.7

DCPP continues to maintain an active and effective Operating Experience Program. DCISC should continue to examine this topic on a frequency no greater than biennially.

4.8

DCPP is participating in an industry initiative to determine the impact of atmospheric chlorides on the corrosion rate of ISFSI Multipurpose Canisters (MPCs). It is expected that these corrosion rates will be individually dependent upon the material properties of the individual MPCs and the atmospheric conditions at each ISFSI. DCP's initial 16 MPCs that were used for transfer of used nuclear fuel to the ISFSI are made of 304 austenitic stainless steel, which tends to be somewhat more susceptible to chloride induced stress corrosion cracking than other types of stainless steel that are used for this purpose. Deliquescence that can cause stress corrosion cracking can be made impossible if the canister surface temperatures are maintained sufficiently above outside ambient temperatures, so

periodic monitoring of canister temperatures is valuable. Because PG&E and the state of California are examining the possibility of installing salt-water cooling towers as an option to once through cooling at DCP, it would be advisable, to the extent possible, to examine the potential impact of such cooling towers on the rate of salt aerosol deposition at the ISFSI.

4.9

PG&E's Flood Hazard Reevaluation of the DCP site appears to be detailed and thorough. Local intense precipitation (LIP) was determined to present the only potential risk of inundation of the power block structures. PG&E further noted that NRC has considered LIP to be beyond the current design and licensing basis of the plant. In conformance with a Commitment that PG&E made to the NRC, PG&E will conduct further examination of LIP and address the results in an Integrated Assessment that will be submitted to the NRC prior to March 13, 2017.

4.10

The quarterly Performance Review Meeting was well structured, appropriately focused, and conducted efficiently and effectively. The meeting provided a framework for DCP management personnel to stay updated on key station issues and associated responsibilities, and it fostered an atmosphere of teamwork. The change in frequency of this meeting from monthly to quarterly appears appropriate, recognizing the nature of this meeting and the time required for all participants to prepare for, and participate in, this important meeting.

5.0 Recommendations:

None

6.0 References

6.1

"Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015", Approved October 21, 2015, Volume II, Exhibit D.8, Section 3.7 "Attend Plant Health Committee Meeting."

6.2

"Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015", Approved October 21, 2015, Volume II, Exhibit D.8, Section 3.1, "Meeting with NRC Senior Resident Inspector."

6.3

"Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015", Approved

October 21, 2015, Volume II, Exhibit D.5, Section 3.4, “Office/Personnel Seismic Safety.”

6.4

“Diablo Canyon Independent Safety Committee Twenty-First Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2010—June 30, 2011”, Approved October 5, 2011, Volume II, Exhibit D.11, Section 3.6, “Seismically Induced System Interactions Housekeeping Program.”

6.5

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.7, Section 3.2, “PG&E Seismic Study.”

6.6

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.8, Section 3.9, “Licensing Basis Verification Project Issues.”

6.7

“Diablo Canyon Independent Safety Committee Twenty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2014—June 30, 2015”, Approved October 21, 2015, Volume II, Exhibit D.2, Section 3.7, “Seismic Fragility PRA Update.”

6.8

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.6, Section 3.6, “Benchmarking Activities.”

6.9

“Diablo Canyon Independent Safety Committee Twenty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2013—June 30, 2014”, Approved October 14, 2014, Volume II, Exhibit D.3, Section 3.1, “Operating Experience Program Update.”

6.10

“Diablo Canyon Independent Safety Committee Twenty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2012—June 30, 2013”, Approved October 9, 2013, Volume II, Exhibit D.2, Section 3.7, “Observation of DCPM Monthly Performance Review Meeting.”

25th Annual Report, Volume 2, Exhibit G-1, Telephone Correspondence Log

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.

Date Initiated	From	Status	Comments/Information
6/1/2014	Mr. John Geesman, Alliance for Nuclear Responsibility (A4NR)	Complete	Email recd. w/attached Letter requesting copy under CPRA of 12/11–12/13 FF Report re load-following operations; 6/3/14 Email acknowledgement sent; 6/11/14 Acknowledgement sent by mail; 6/25/14 Email sent w/attached Letter with response to CPRA request with redacted version of 12/11–12/13 FF Report;
6/9/2014	Ms. Sherry Lewis, San Luis Obispo Mothers for Peace (MFP)	Complete	Email sent with draft Minutes of February 12–13, 2014 public meeting for review at June 14 PM 8/5/14 Email recd. With questions on approval of DCISC evaluation of Bechtel draft Addendum. 8/6/14 Email response sent 10/10/14 Email sent with Minutes from June 14 and August 14 DCISC public meetings for review at Oct 14 PM. 2/2/15 Email sent with copy of draft of Oct 15 MP Minutes for review at Feb 15 PM. 2/5/15 Email recd. w/copy of statement read to DCISC on 2/5/15 2/6/15 Email acknowledgement sent. 6/12/15 Email sent with copy of

			draft Minutes of Feb. 15 and May 14 PMs for review at June 15 PM
6/16/2014	Dr. Gene Nelson, Californians for Green Nuclear Power	Complete	Email recd. With info on CME and disruption of electrical transmission; 6/16/14 Email acknowledgement sent 6/18/14 Email request for copies of 6/11/14 PM power-points; 6/18/14 power-points sent by Email 6/20/14 Email recd. w/request for copies of 17th A/Rprt and info on 24th A/Rpt 6/20/14 17th A/Rpt. sent by mail with info on availability of 24th A/Rpt. 7/3/14 17th A/Rpt. returned undeliverable, email sent to Dr. Nelson; 7/3/14 Email recd. w/new address. 7/17/14 17th A/Rpt. re sent by mail 10/14/14 Email recd. with comments for Oct. PM 10/14/14 Email recd. With informational files 10/15/14 Email recd. w/Statement provided for record. 10/16/14 Email acknowledgement sent. 10/17/14 Email recd. with information on Hope Creek NGS recd. 10/17/14 Email Acknowledgement sent. 10/22/14 Email recd. Re opposition to cooling towers. 11/3/14 Email recd. w/copy of comments to SWRCB 11/7/14 Email Acknowledgement sent And acknowledged by Dr. Nelson 11/7/14 Email recd. Re Dr. Nelson opposition to cooling towers.

			11/9/14 Email sent re Dr. Nelson attendance at SWRCB meeting 11/10/14 Email recd. w/acknowledgement of receipt of RT Sewell 2003 Tsunami Study 11/12/14 Email recd. w/SWRCB agenda for 11/18/14 11/13/14 Email acknowledgement sent. 6/11/15 Email recd. w/ CEC filing 6/11/15 Email acknowledgement sent. 6/17/15 Email recd. w/comments made at June public meeting 6/18/15 Email acknowledgement sent
6/16/2014	Ms. Rochelle Becker, A4NR	Complete	Email recd. w/letter to SWRCB; 6/16/14 Email acknowledgement sent; 7/28/14 Email recd. requesting info on future DCISC meeting; 7/28/14 Email send w/info on 8/8/14 PM9/5/14 Email recd. inquiry re Sewell tsunami study 9/9/14 Email response provided 10/14/14 Email recd. With information on SWRCB OTC study 10/15/14 Email recd. Re dates reply briefs due on CPUC filings on seismic issues & copy of A4NR opening brief 10/17/14 Email acknowledgement sent. 10/17/14 Email recd. With A4NR Reply Brief. 10/21/14 Email recd. re letter to SWRCB supporting local SLO facility for SWRCB mtg. on 11/18/14 and IPRP meeting; 10/21/14 Email response sent and acknowledged 2/6/15 Email recd. w/comments sent to CEC. 2/6/15 Email acknowledgement sent. 2/10/15 Email recd. w/A4NR in

			support of Dr. Lam reappointment. 2/11/15 Email acknowledgement sent and acknowledged. 3/13/15 Email recd. re PG&E response to NTTF Recommendation 2.1 Seismic 3/16/15 Email acknowledgement sent. 5/14/15 Email recd. w inquiry re 5/14/15 DCISC public meeting. 5/15/15 Email response sent 6/19/15 Email recd. w/article by Sec. Moniz on nuclear facilities. 6/19/15 Email acknowledgement sent.
6/16/2014	Mr. David Weisman, A4NR	Complete	Email recd. redacted Sewell Tsunami Study; 6/16/14 Email Acknowledgement sent 11/14/14 Email recd. with copy of letter to President of CPUC and CEC Chair re inadequate oversight of AB 1632 studies 1/23/14 Email acknowledgment and response sent. 2/12/14 Email recd. w/info from New Times newspaper 2/11/15 Email recd. Re FOIA request for RT Sewell 2003 Tsunami Study and request for FOIA request re NRC "communications strategy"; 2/21/15 Email acknowledgement sent 2/17/15 Email recd. w/info on cultural display by A4NR "Redacted" 2/21/15 Email acknowledgement sent 3/4/15 Email recd. w/notice of art exhibit entitled "Redacted"
6/18/2014	Ms. Jane Swanson, MFP	Complete	Email recd. re demand for NRC Commissioner Magwood resignation;

			6/18/14 Email acknowledgment sent 8/7/14 Email recd. w/inquiry re mailing list. 8/7/14 Email response sent, added to mailing list 9/6/14 Email recd. re inquiry re deadline for comments 9/26/14 Email response sent 9/26/14 Email recd. w/comments by Mothers for Peace on DCISC draft Evaluation of Bechtel Addendum received. 9/27/14 Email acknowledgement sent 10/14/14 Email recd. Re statement made on Ms. Swanson's behalf at Oct. PM 10/14/14 Email acknowledged. 10/16/14 Email recd. with J. Swanson comments re Oct. PM 10/16/14 Email response sent. 10/16/14 Email recd. re website posting of DCISC Evaluation of Bechtel Addendum 10/16/14 Email response sent and acknowledged. 10/22/14 Email recd. (copy of email to E. Brousse) with DCISC responses to questions from Oct. PM 11/7/14 Email acknowledging receipt of R.T. Sewell 2003 Tsunami Study 6/16/15 Email recd. re central coast tsunamis. 6/16/15 Email acknowledgement sent. 6/16/15 Email recd. w/photo of Avila Beach circa 190 6/16/15 Email acknowledgement sent.
8/06/2014	Mr. Damon Moglen, Friends of the Earth (FOE)	Complete	Email recd. With questions of DCISC approval of its evaluation of Bechtel Addendum.

			8/7/14 Email response sent. 8/7/14 Email recd. w/inquiry re teleconference locations, 8/7/14 Email response sent. 8/8/14 Email recd. w/Statement for record provided for the 8/8/14 public meeting. 9/26/14 Email recd. w/comments by Powers Engineering on DCISC draft Evaluation of Bechtel Addendum 9/26/14 Email acknowledgement sent. 9/26/14 Email recd. remote location for 10/14–15/14 public meeting. 10/8/14 Email sent confirming time allowance for FOE comments at Oct.14 PM 10/13/14 Email responses sent, 10/13/14 Email recd. re arrangements made for FOE to provide comments by telephone at Oct. PM. 10/13/14 Email recd. Re appearance by B. Powers at Oct. PM
8/6/2014	Ms. Linda Seeley, MFP	Complete	Email recd. w/attached Letter with concern re DCISC approval of evaluation of Bechtel Addendum and CPRA request 8/6/14 Email acknowledgement sent 8/18/14 Email sent w/attached Letter responding to CPRA request provided re cooling tower project correspondence— DCISC/PG&E/Bechtel
8/7/2014	Mr. J.B. Brown, Director Safe Energy Project, World Business Academy	Complete	8/7/14 Email recd. w/Statement re DCISC Evaluation of Bechtel Addendum, 8/7/14 Email acknowledgment sent Statement read at 8/8/14 public meeting and provided for DCISC record

9/29/2014	Mr. & Mrs. Jan & Verena Von Engel	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Ms. Gustave Beger	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Mr. & Mrs. Gus & Raeanna Thomasson	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Mr. David Runley	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Mr. Scott Cardinali	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Mr. & Mrs. Apurva & Heneleta Dandekar	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Ms. Tina Metzger	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Ms. Marie Cowan	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Mr. & Mrs. William & Patsy Marshall	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Mr. & Mrs. John & Victoria Connerley	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Ms. Jill Coomer	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Mr. Voss Harley	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
9/29/2014	Mr. & Mrs. Frank & Margaret Montgomery	Complete	Re DCISC October 15, 2014 public tour of DCP; confirmed
10/16/2014	Mr. Bill Powers, Powers Engineering	Complete	Email recd. w/attached Powers Engineering final comment Letter on behalf of FOE re DCISC evaluation of draft Bechtel Addendum. 10/17/14 Email acknowledgement sent 10/17/14 Email recd. acknowledging questions posed in DCISC 10/17 response 10/26/14 Email recd. Re DCISC questions 10/29/14 Email response sent

			11/1/14 Email recd. Re “agree to disagree” re potential for salt deposition at DCP from cooling tower proposal
10/21/2014	Mr. Eric Hale	Complete	Email recd. with inquiry on copies of presentations at Oct PM 10/21/14 Email response sent
10/24/2014	Mr. Harvey Sherbeck	Complete	Email recd. Re closing DCP 10/24/14 Email acknowledgement sent.
12/10/2014	Ms. Donna Gilmore, San Onofre Safety	Complete	Email to Dr. Peterson recd. w/ information on stress corrosion cracking of dry cask storage canisters 12/10/14 Copies provided to this office and Members & Consultants by Email from Dr. Peterson 1/22/14 Email recd. Re dry cask cracking. 1/22/14 Email response provided by Dr. Peterson. 6/16/15 Email recd. By Dr. Peterson re Diablo canisters cracking conditions 6/16/15 Added to DCISC record
1/19/2015	Ms. Darlene Bowman	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Mr. Jimmie Decker	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Mr. & Mrs. Jim and Susan Dumelle	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Mr. Steven Van Tassell	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Mr & Mrs. Leslie & Linda McBride	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Mr. Ronald Gottesman	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Mr. Stan Broadfoot	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Ms. Joyce Carpenter	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Mr. Douglas	Complete	Re DCISC February 4, 2015 public

	Genereux		tour of DCP; confirmed
1/19/2015	Mr. John Lindquist	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Mr. & Mrs. William & Christine Shell	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Ms. Christine Steiner	Complete	Re DCISC February 4, 2015 public tour of DCP; confirmed
1/19/2015	Mr. Theodore De Mont	Complete	Re DCISC February 4, 2015 public tour of DCP; wait listed
1/19/2015	Mr. & Ms. Jerome II & Lauralee Kleinhans	Complete	Re DCISC February 4, 2015 public tour of DCP; wait listed
2/23/2015	Anonymous	Complete	Letter recd. By mail with concern re nuclear power issues.
3/4/2015	Mr. Ben Davis	Complete	Email recd. w/inquiry on ground motion characterization workshop and SSHAC Level 3 analysis 3/5/15 Email response provided. 3/5/15 Email recd. w/follow up inquiry 3/5/15 Email response sent. 3/12/15 Email recd. w/inquiry 3/12/15 Email response sent 3/17/15 Email recd. w/inquiry. 3/17/15 Email response sent 3/21/15 Email sent with clarification of 3/17/15 email response 4/3/15 Email recd. w/inquiry. 4/17/15 Email response sent 4/23/15 Email recd. w/inquiry 4/24/15 Email response sent 4/24/15 Email recd. w/inquiry. 4/24/15 Email response sent.
3/16/2015	Dr. John Uebersax	Complete	Email recd. re PRAs conducted on DCP safety and risk 3/16/15 Email acknowledgement sent 6/1/15 Email sent with links provided by PG&E
4/20/2015	Mr. Colin Rigby, New Times newspaper	Complete	Email recd. w/inquiry re RT Sewell 20013 Tsunami Study and DCISC engagement to Dr. Sewell 4/21/15

			Response provided by telephone.
5/1/2015	Mr. Ryan Guillen, State Sen. William Monning, SLO office	Complete	Telephone call to discuss history and role of the DCISC 5/4/15 Email follow up sent
6/1/2015	Mr. Joseph Winters	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed/cancelled
6/1/2015	Mr. & Mrs. Jerrold & Olivia Larson	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Mr. John Paolini	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed/cancelled
6/1/2015	Mr. James Paolini	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed/cancelled
6/1/2015	Mr. & Mrs. Brian & Deborah Schwartz	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Mr. & Mrs. Jim & Charlene Hopp	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Mr. Horace Morana	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Mr. Bill Troutner	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Ms. Cynthia Dietrick	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Ms. Winnie Lam	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Mr. Kevin Dolder	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Ms. Margaret May	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Ms. Diane Cotter	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Mr. David Habr	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Ms. Edith Lycke	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Mr. & Mrs. Tom & Janet Pedersen	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Ms. Melanie Black	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Ms. Gay Richards	Complete	Re DCISC June 17, 2015 public tour

			of DCP; confirmed
6/1/2015	Mr. Bo Lycke	Complete	Re DCISC June 17, 2015 public tour of DCP; confirmed
6/1/2015	Ms. Melody Bullis	Complete	Re DCISC June 17, 2015 public tour of DCP; wait listed/confirmed
6/1/2015	Mr. Lester Goldfisher	Complete	Re DCISC June 17, 2015 public tour of DCP; wait listed
6/1/2015	Mr. Nicholas Girardi	Complete	Re DCISC June 17, 2015 public tour of DCP; wait listed
6/1/2015	Mr. John R. Young	Complete	Re DCISC June 17, 2015 public tour of DCP; wait listed
6/1/2015	Ms. Doreen Gardner	Complete	Re DCISC June 17, 2015 public tour of DCP; wait listed
6/1/2015	Mr. & Mrs. John & Anita Reyes Wells	Complete	Re DCISC June 17, 2015 public tour of DCP; wait listed/confirmed

[25th Annual Report by the Diablo Canyon Independent Safety Committee, July 1, 2014—June 30, 2015](#)

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[25th Annual Report](#), [Volume 2](#), 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](#), [B.12](#) and [B.15](#).
