

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

Report on

Fact-Finding Meeting at DCP on December 11-12, 2024

by

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1.0 SUMMARY

The results of the DCISC December 11-12 2024, Fact-Finding Meeting at the Diablo Canyon Power Plant (DCPP) in Avila Beach, CA, are presented. The subjects addressed and summarized in Section 3 are as follows:

1. Observe Plant Health Committee Meeting
2. Electronic Procedures and WiFi Expansion
3. Independent Spent Fuel Storage Installation Loading Campaign
4. Plans for a New Artificial Intelligence Process (Atomic Canyon)
5. Reactor Coolant System Process Control System Update
6. Workplace Seismic Safety Tour
7. Quality Verification Update
8. Meet with NRC Resident Inspectors
9. Meet with Senior Vice-President and Chief Nuclear Officer
10. Staffing for Long-Term Operations
11. License Renewal Update for the Independent Spent Fuel Storage Installation
12. Observe Operator Training: Extensive Damage Mitigation Guidelines

2.0 INTRODUCTION

This Fact-Finding Meeting at the DCP was held 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 (FFT) 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, presents specific recommendations to PG&E and/or to the DCISC proposed by the FFT. **SB 846 requires the DCISC to “make recommendations appropriate to enhance the safety of the operation at the Diablo Canyon powerplant.”** These recommendations will be considered by the entire DCISC. After review and approval by the entire DCISC, this Fact-Finding Report, including its recommendations, will be provided to PG&E. The Fact-Finding Report will also appear in the DCISC Annual Report.

3.0 DISCUSSION

3.1 Observe Plant Health Committee Meeting

The DCISC FFT met with Brandy Lopez, DCPD Liaison to the DCISC, to observe the December 11, 2024 meeting of the DCPD Plant Health Committee (PHC). The DCISC last reviewed a PHC Subcommittee meeting in July 2023 (Reference 6.1) when it concluded the following:

A July 26, 2023, Plant Health Subcommittee Committee meeting was conducted efficiently and effectively. Discussions were comprehensive and effectively supported good decision making with regards to prioritizing activities for resolving complex equipment issues at the station.

The PHC is governed by DCPD Procedure TS5.ID9, “Plant Health Committee,” Revision 6, a copy of which was provided to the FFT and found satisfactory. The PHC 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 station Top-Ten List
- Review and approval of action plans to address plant health issues that originated from system and component health reports, maintenance rule, operator workarounds, program health reports, and emergent issues
- Reviewing and approving action plans to resolve degraded, unanalyzed and non-conforming conditions
- Review and monitoring of plant health issue plans that are presented to the PHC
- Performing Preventive Maintenance Oversight Committee functions
- Quarterly review and monitoring of the Top Margin Issues list
- Approving and authorizing the PHC budget for solutions to plant health issues
- Approving system, component, and program long range plans

The meeting began with the Chair verifying that a quorum was present. The following attended:

- Station Director, PHC Chairman
- Maintenance Senior Director Delegate
- Operations Director Delegate
- Engineering Director Delegate
- Security Director Delegate
- Projects Director Delegate
- Outage Director

The agenda was as follows:

1. Safety and Human Performance Message/Responsibilities
2. Verify Quorum
3. Introduce Visitors and Operations Personnel
4. Meeting Purpose and Desired Outcomes
5. Action Item Review
6. Previous Meeting WELL (What Excellence Looks Like) Results
7. Refueling Outage 2R24 Critical Spares Report – spares inventory was at 96% available, slightly below the 97% goal.
8. Motor Life Cycle Management Plan: overall the Plan was in White health. Significant items were as follows:
 - Motor History Project initial findings allows for development of first draft of LCM.
 - Next step is to meet with Senior Leadership/Outage Management to align on implementation plan.
 - This plan will rely on HIT effectiveness to obtain new spares and rewinds.
 - Auxiliary Salt Water (ASW) temperature trending continues due to historical issues with end play setting.
 - ASW22 was overhauled with revised procedures and successfully installed.
 - Stator and Bearing temperatures are stable and as expected.
 - Partial Discharge (PD) on CWP11 elevated post 1R24 Neutral Swap. PD is decreasing and stabilizing.
 - At this time, indication is that a Swap Reversal will not be requested.
 - Normal interval of PD testing on remaining CWPs and RCPs. All trends acceptable
9. Inoperable Equipment Returned to Operable Status
10. Margin Management Quarterly Review (Top Margin Issues):
 - Ultimate Heat Sink: the project to raise the UHS technical Specification Limit has been put on hold until advanced fuel LARs are completed. Meanwhile, a strong operability basis is in place in case UHS temperatures exceed 70F.
 - Main Generator Minimum Pickup Open Synch to Grid: a temporary modification will be implemented.
 - Main Steam Safety Valve Margin: the dump control modification has been approved for implementation in the R25 outages.
11. Operations Feedback
12. Electric Issues Board
13. Top 10 Equipment Items
14. Action Item Review

15. Meeting Feedback and WELL Results

Much of the meeting was used to discuss Refueling Outage 2R24 Critical Spares, and the PHC meeting was a good forum for bringing all pertinent plant functions together for a real-time update and answers to significant questions.

Conclusions: The December 11, 2024 Plant Health Committee meeting was carried out efficiently and effectively. All items on the agenda were covered, and there was good participation by attendees. The Plant Health Committee is an appropriate forum for assuring the health of DCPD systems and programs.

Recommendations to PG&E or DCISC: None.

3.2 Electronic Procedures and WiFi Expansion

The DCISC FFT met with Matt Birkel, Director of Performance Improvement and Innovation, and Erin Bowe, Supervisor, Performance Improvement, for an update on DCPD use of electronic procedures and expansion of WiFi in the plant powerblock. The DCISC last reviewed electronic procedures and DCPD WiFi in August 2023 (Reference 6.2) when it concluded the following:

DCPD has WiFi throughout office areas and workspaces in the Powerblock, except in Containment where WiFi is temporarily installed during outages. The use of electronic work packages has not been broadly successful at DCPD. However, electronic procedures may be a better fit, and the DCISC should consider reviewing their past, current and future potential use in a future fact-finding meeting.

DCPD has WiFi at multiple locations in the Powerblock, primarily in office areas and other regularly staffed work areas. WiFi is temporarily set up inside Containment during refueling outages. It is used most by Radiation Protection for remote radiation level monitoring. There were no current plans for WiFi expansion elsewhere in the Powerblock.

Regarding electronic procedures and work packages, DCPD had tried implementing both in 2023. Less complex procedures and work packages were worked acceptably in the new system; however, there were enough implementation issues that DCPD paused or temporarily dropped the effort. Now, after recent benchmarking, DCPD will again begin implementation starting with its Operations Procedures in 2025 using an electronic procedure platform from Next Axion, one used by several other plants (Prairie Island, Wolf Creek, and the Constellation Fleet). This platform integrates well with SAP, the software platform DCPD currently uses for data management, and has proven itself well enough for DCPD to begin its use. The platform is used with Apple iPads.

The DCISC FFT is pleased with DCPD's decision to implement electronic procedures and will monitor their progress. Electronic procedures have the capability to record more information as procedures are performed, such as the entry and exit times for procedure steps. The FFT believes the use of electronic procedures (and possibly work packages) will result in a more efficient

operation as well as in improved human performance due to built-in human performance features such as place-keeping, assurance of working on the correct unit and/or component, ability to document additional information using photographs, automatic independent verification, and automatic record-keeping. The additional data collected using electronic procedures can also enable more effective root cause analysis when problems occur. Because operations and maintenance staff can easily switch to different hand-held devices, the need to transfer paper records into and out of radiation control areas is eliminated. As experience is gained, more sophisticated capabilities can be implemented, such as hand-free procedures using voice recognition.

Conclusions: The DCISC FFT endorses DCP's decision to pursue electronic procedures. Electronic procedures provide many benefits in improving human reliability and documenting work, thereby creating substantial opportunities to improve the plant's operational safety.

Recommendation to the DCISC: Because expanded use of electronic procedures can enhance plant operational safety, the DCISC should review this topic regularly. (D12/24FF-3.2)

Recommendation to PG&E: The DCISC recommends that PG&E further expand their use of electronic-procedures-type applications because the improved human performance and documentation of work can directly improve the safety of operations. (P12/24FF-3.2)

3.3 Independent Spent Fuel Storage Installation (ISFSI) Loading Campaign

The DCISC FFT met with Al Bates, Director, Nuclear Fuel and Decommissioning; and Eric Brackeen, Manager Spent Fuel and Decommissioning. The DCISC last reviewed the movement of spent fuel from the Spent Fuel Pool to the ISFSI at its October 2024 Public Meeting (Reference 6.3).

The DCP ISFSI is sized to store all fuel thorough the DCP current operating licenses (2024/2025) with an additional 20 years' of operations storage available in the Spent Fuel Pools.

DCP has safely completed seven loading campaigns since 2009. They recently completed Campaign #8, which moved 12 Multi-Purpose Canisters containing 32 spent fuel assemblies each. The canisters were moved at a rate of one per week from July 22 to October18. DCP used the following procedures/techniques to assure safe and efficient operation:

- Robust procedures on all work activities
- PG&E management oversight of all work activities
- Contract partners (Holtec and Bragg) providing experienced crew members
- Pre-campaign training and dry runs
- Readiness reviews by external subject matter experts
- DCP readiness challenge boards
- ALARA (As Low As Reasonably Achievable) reviews of radiation protection

With the recent completion of Campaign #8, the DCPD ISFSI now contains 70 casks (2240 Spent fuel assemblies). DCPD reported that Campaign #8 was performed safely and without incident. An NRC site inspection yielded no violations and positive observations, and ALARA goals were met. Lessons-learned and suggested future improvements have been captured.

Conclusions: DCPD's Campaign #8 to move 2240 spent fuel assemblies from the Spent Fuel Pool to the Independent Spent Fuel Storage Installation (dry storage) was completed safely and without incident. This is good performance.

Recommendations to PG&E or DCISC None.

3.4 Plans for a New Artificial Intelligence Process (Atomic Canyon)

The DCISC FFT met with Matt Birkel, Director of Performance Improvement and Innovation, and Erin Bowe, Supervisor, Performance Improvement, for a review of DCPD's first studies on the potential application of Artificial Intelligence (AI), where DCPD is working with the company "Atomic Canyon." This was the first DCISC review of this subject.

The U.S. Nuclear Regulatory Commission, Canadian Nuclear Safety Commission, and the UK Office of Nuclear Regulation, have been studying potential applications of AI.¹ They noted that:

"The rapid pace of recent AI development is somewhat antithetical to the slow and methodical change process that the nuclear industry traditionally follows. Nevertheless, the primary goal for the nuclear industry and regulators with respect to AI systems will be maintaining adequate safety and security while benefiting from their deployment."

Atomic Canyon is a powerful, sophisticated document data search and retrieval engine, which is aimed at significant cost savings and improved operational efficiency. Regulatory agencies require reactor operators to manage huge amounts of technical documentation contained in multiple systems. Plant personnel spend large amounts of time and resources retrieving, sorting and organizing data and documents accurately and reliably such that they are understandable and useful.

The initial focus in applying AI will be on augmenting the capability to search data bases to find information. The new Atomic Canyon system will be integrated with current DCPD systems such as SAP, which has been used as the foundation for DCPD Corrective Action Program. Use of these types of AI systems will mean dramatic reductions in the human effort and the time required for performing data and document searches, organizing results, and developing reports. Generative AI (which creates new content) will not be used. The search capabilities provided by AI tools have significant potential to enhance plant safety if developed and implemented with care. The DCISC should follow closely DCPD's implementation of Atomic Canyon.

¹ "Considerations for Developing Artificial Intelligence Systems in Nuclear Applications" (September 2024), Canadian Nuclear Safety Commission UK Office for Nuclear Regulation, and US Nuclear Regulatory Commission (page 17).

Conclusions: DCPD's initiative to study and use an Artificial Intelligence platform developed by Atomic Canyon, for document and data search, retrieval, and reporting is positive. It has great potential for improving human performance in data analysis and reporting.

Recommendation to DCISC: Because the application of Artificial Intelligence tools has significant potential to change and to improve DCPD's operational safety, the DCISC should review this topic frequently. (D12/24-3.4)

Recommendations to PG&E: None.

3.5 Reactor Coolant System Process Control System Update

The DCISC FFT met with Graydon Strong, Instrumentation and Controls (I&C) Systems Supervisor; Jeff Madrid, Digital Engineering Engineer; and Mike Wright, I&C Systems Engineer; for an update on the DCPD Reactor Coolant System (RCS) Process Control System (PCS). The DCISC last reviewed this system in November 2016 (Reference 6.4), when it concluded the following:

The DCPD Process Control System (PCS), which controls key Reactor Coolant System and related systems is functioning satisfactorily, albeit with several issues which cause the component to be in White health. None of the issues adversely affects the PCS design function. The Component Engineer has an action plan to resolve the issues. He appeared knowledgeable and proactive about the PCS.

The PCS is considered part of the "brains" of the plant because it measures and controls most of the key process parameters (e.g., pressure, temperature, level, etc.) of the RCS and Secondary Systems such as the following:

- Pressurizer Level and Pressure
- Control Rod Speed and Direction
- Charging Flow
- Volume Control Tank Level
- Auxiliary Feedwater Runout Protection and Level
- Letdown Heat Exchanger Outlet Temperature
- Steam Dump Valves

The PCS also provides input signals to the Main Annunciator System, Plant Process Computer, and Hot Shutdown Panel. It consists of hundreds of instrument loops.

A related but independent system, the Process Protection System (Eagle 21), also called the Solid State Protection System (SSPS), monitors RCS parameters and protects the RCS, if parameters are out of preset limits, by shutting down the reactor and activating shutdown cooling.

The PCS originally consisted of analog controls. Because of system aging, component obsolescence, and calibration difficulties, DCPD replaced the PCS in Unit 1 in Refueling Outage 1R17 (May 2012) and in Unit 2 in Refueling Outage 2R17 (March 2013). The Unit 2 installation went smoothly due to lessons learned during the Unit 1 installation. The system was extensively tested with pre-installation factory acceptance tests, supplemental factory acceptance tests, plant acceptance tests, post-modification testing, and loop testing. All test results were satisfactory.

The replacement enhanced the interface with other DCPD digital upgrades, namely:

- Main Turbine Control System
- Digital Feedwater Control System
- Associated Instrument Rack
- Auxiliary and Fuel Building HVAC systems

DCPD reported that the PCS has operated better than expected since replacement in the following ways:

- Control and monitoring systems with no issues
- Decreases the required maintenance
- Responds better than the simulated response
- Provides operators with more information for monitoring and controlling the plant

The primary PCS equipment made by Triconix has been installed and operated in many nuclear and non-nuclear facilities world-wide for many years without any failures. Since installation, DCPD determined that the grounding design it used was inferior to that recommended by Triconix, and will revise the grounding to address possible vulnerabilities. DCPD currently has a temporary grounding modification installed on Unit 1 PCS.

The Plant Simulator was modified prior to Outage 1R17 (May 2012) to allow operators to train on the new system.

To address cyber security, the PCS data output goes through a port aggregator, which allows only one-way communication, i.e., no incoming signals are permitted entry so as to protect against malicious signals. The NRC has approved this arrangement. The PCS equipment is located in a Vital Area with locked doors and tamper alarms. The SSPS, which performs basic plant protection and safety functions, is likewise independent of the PCS, providing an additional layer of cyber security.

Conclusions: DCPD's 2012/2013 replacement of its aging analog Reactor Coolant System Process Control System with a digital one was a significant upgrade to the operation of the plant. The system has performed better than expected and has had no significant issues.

Recommendations to PG&E or DCISC: None

3.6 Workplace Seismic Safety Tour

The DCISC FFT met with Mike Brass, Director, DCPM Maintenance, to perform a workspace seismic safety tour of the Training Building. The DCISC last reviewed workplace seismic safety in July 2024 (Reference 6.5), when it concluded the following:

The DCPM standards for bracing furniture, cabinets and storage racks are not being implemented consistently. A tall cabinet in the fact-finding meeting room had been recently installed without proper anchors or bottom weighting. The Maintenance Director has entered this noncompliance into the DCPM Corrective Action Program for resolution. Additionally, the Maintenance Director confirmed that personnel training and plant communications will be reviewed by DCPM to assess the extent of condition for workspace seismic safety and develop corrective actions. DCISC should review this notification and resulting corrective actions.

Following the identification of the unbraced cabinet during the DCISC's last review and upon entering the issue into the Corrective Action Program, corrective actions were made. These included adding proper bracing to the cabinet, improved training/awareness for personnel on workplace seismic safety, and reviewing other installations for extent of condition.

However, in the December 12, 2024 meeting with the DCPM Senior Vice-President and Chief Nuclear Officer, a tall, unbraced cabinet was found in her office, that had not been found in previous inspections. This unbraced cabinet was quickly entered into the Corrective Action Program. Ms. Gerfen advised the FFT that this cabinet would soon be moved to the other side of her office per a previous request that her office be rearranged.

Conclusions: The DCISC July 20, 2024 walkdown of seismic workplace safety in the Administration Building with the Director of Maintenance revealed one unbraced cabinet (which had been recently added to a conference room in the Administration Building). The problem was immediately added by Mr. Brass to the Corrective Action Program and was properly corrected. An extent of condition review revealed no additional problems. This December 11, 2024 Fact-finding Meeting follow-up to the July 20, 2024 revealed no new problems via a new walkdown of the Training Building, however, on December 12, 2024 the FFT found a tall, unbraced cabinet in the office of the DCPM Chief Nuclear Officer, which she advised would soon be moved to the other side of the room in a recent request. A Corrective Action Program Notification was quickly initiated for corrective action.

Recommendations to the DCISC: None

Recommendation to PG&E: PG&E should review why an extent of condition for an unbraced cabinet found by the DCISC in July 2024 did not prevent the identification of a similar condition by the DCISC in December 2024. (P12/24FF-3.6)

3.7 Quality Verification Update

The DCISC FFT met with Chris Newport, Acting Quality Verification Director for an update on DCPD Quality Verification (QV). This was a follow-up meeting to the Quality Verification report given at the October 9-10, 2024 Public Meeting (Reference 6.6), which was the last prior review of QV by the DCISC.

The QV Department acts as an independent group within DCPD, reporting directly to the Senior Vice-President and Chief Nuclear Officer. QV's responsibilities include the following:

- Audits
- Assessments
- Independent in-plant Inspections
- Plant Quality Control Inspections
- Vendor/Supplier Audits and Material Receipt Inspections

Both meeting reports were based on the November/December 2024 Nuclear Quality Digest, which provided the following information:

- Director's Corner: What's in QV's Sights
- Two Key Takeaways from Radiation Protection Audit
- Audit Findings from Recent Audits
- Upcoming Activities
- Performance Summaries of the 15 Functional DCPD Groups (see more below)
- QV Observations and Current Perspectives for the Period

The following Functional Groups were rated Yellow with improving trajectories:

- Operations Performance – continuing challenges in the areas of plant status control and execution of the clearance/tagging process
- Maintenance – Leadership generally focused on continuous improvement, task preview, place-keeping, and post-job critiques
- Strategic Projects – the Group is addressing gaps in prioritization of activities and support, and multiple plant processes, which it is actively addressing.

Conclusions: The Quality Verification report on DCPD Quality Verification show that they have been effective in providing expectations for high quality operations for the plant and in reporting quality plant performance.

Recommendations to PG&E or DCISC: None.

3.8 Meeting with NRC Senior Resident Inspector and Resident Inspector

The DCISC FFT met with Mahdi Hayes, NRC Senior Resident Inspector, and Eli Garcia, Resident Inspector for an update. The DCISC meets regularly with the NRC Resident Inspectors and last met with the Senior Resident Inspector during its November 2024 Fact-Finding Meeting (Reference 6.7), when it concluded the following:

The meeting with the NRC Senior Resident Inspector was beneficial, and the DCISC should continue the meetings.

The items discussed in this meeting included the following:

- Recent NRC Inspection Activities and Non-Cited Violations
- Seismic Workplace Safety Review by DCISC FFT
- Agenda items for this Fact-finding Meeting

Conclusions: The meeting with the NRC Senior Resident Inspector was beneficial, and the DCISC should continue the meetings.

Recommendations to PG&E or DCISC: None.

3.9 Meet with Senior Vice-President and Chief Nuclear Officer

The DCISC FFT met with DCPD Senior Vice-President and Chief Nuclear Officer, Paula Gerfen, for a high-level update. The DCISC last met with a DCPD Officer in November (Reference 6.8) when it concluded the following:

The regular meetings with DCPD Officers and Directors is beneficial for both organizations and should be continued.

The participants discussed the current meeting agenda items and other items of mutual interest.

During the meeting, the FFT inspected furniture in the office for seismic bracing, and discovered that the office had a tall, unbraced cabinet. See Section 3.6 above.

Conclusions: The regular meetings with DCPD Officers and Directors are beneficial for both organizations and should be continued.

Recommendations to PG&E or DCISC: None.

3.10 Staffing for Long-Term Operations

The DCISC FFT met with Justin Rogers, Station Director, and Blair Jones, Director, Strategy, Policy, Organizational Effectiveness, and Chief of Staff, for an update on DCPD staffing for long-term operation. The DCISC last reviewed this subject in July 2023 (Reference 6.9), when it concluded the following:

DCPD was working to define and seek approval for a new employee retention program that would begin following the expiration of the Tier 2 incentive program

and continue incentive payments through the proposed extension of power operations to 2030.

DCPP reported that it was fully staffed for current and long-term operations, and that it had been filling critical positions prior to the end of the First Retention Period. It was now planning for natural and process improvement attrition of approximately 10% per year throughout the remaining retention periods. DCPP anticipated having no layoffs.

Conclusions DCPP reported that is it fully staffed for current and long-term operations and is planning for small future staffing decreases from normal and process improvement attrition.

Recommendations to PG&E or DCISC: None

3.11 License Renewal Update for the Independent Spent Fuel Storage Installation

The FFT met with Philippe Soenen, Strategic initiatives Director, for an update on the License Renewal Application (LRA) for the Independent Spent Fuel Storage Installation (ISFSI). The following from the California Department of Water Resources joined in remotely for this discussion:

- Jerry Bishoff, DWR Consultant
- Delphine Hou
- Dauphine Luchsinger
- Harpreet Bhalla

The DCISC last reviewed this item in July 2024 (Reference 6.10), when it concluded the following:

DCPP's procurement of a new spent fuel storage system from Orano was continuing. Site-specific analyses for use of the Orano system at DCPP were in progress and could result in the submission of a new amendment for the Orano Certificate of Compliance to the NRC. Procurement of 12 new Holtec Multi-Purpose Canisters was underway, and a spent fuel offload campaign was planned to be performed in the period July to November 2024. The License Renewal Application for the existing spent fuel storage system was recently amended to reflect the possibility of extended operations, and DCPP was working to respond to several Requests for Additional Information from the NRC.

PG&E submitted its NRC ISFSI LRA on March 9, 2022 for the continued use of Holtec Multi-Purpose Canisters (MPCs) at DCPP. The LRA requested renewal of the existing ISFSI site-specific license granted under 10 CFR Part 72 which would otherwise expire in March 2024. The LRA requested renewal of the license for an additional 40 years beyond the current expiration date. On August 10, 2023, Revision 1 to the LRA was submitted by DCPP to the NRC. Revision 1 included modifications to reflect the potential for DCPP's continuing operations beyond the expiration dates for the current operating licenses. Specific changes included updates to the financial qualifications and the Environmental Report Supplement necessary to address the

possibility of extended operations. The amendment stated that if DCPD continued to operate, PG&E's decommissioning plans for DCPD would likely remain the same, just deferred by the additional DCPD operation period for up to 20 years. These changes also addressed contentions allowed during a recent hearing on the LRA by the Atomic Safety and Licensing Board.

The amendment also stated, "PG&E currently has no plans to expand the DC ISFSI or develop a new ISFSI at the DCPD site for continued plant operations because there is sufficient spent fuel storage capacity between the DC ISFSI and spent fuel pools for 60 total years of DCPD operation. Furthermore, a possibility remains that, at some point during the 40-year DC ISFSI renewal period, either a consolidated interim storage facility or a permanent repository may become available, thus creating space at the DC ISFSI for the additional spent fuel transfer from the spent fuel pools." The FFT inquired regarding any plans that had been made for ISFSI expansion should additional space be needed in the future and an offsite repository was not available. PG&E responded that it had considered some conceptual ideas for additional onsite storage but was not currently planning to design or develop any additional onsite storage areas. It was also noted that the need for additional onsite storage also depended upon whether the plant continued to operate for only five years, as currently envisioned in SB846, or for a longer time period.

In July 2023, PG&E received from the NRC a series of Requests for Additional Information (RAIs) for the ISFSI LRA. Responses to the RAIs were submitted to NRC in September 2023. DCPD did not believe that any of the RAIs represented significant technical or regulatory issues.

Conclusions: The License Amendment Request to extend the 10 CFR Part 72 license for the Independent Spent Fuel Storage Installation was proceeding normally within the NRC. The NRC has issued several Requests for Additional Information to which PG&E has responded quickly. DCPD expects to receive NRC approval during 2025.

Recommendations to PG&E or DCISC: None

3.12 Observe Operator Training: Extensive Damage Mitigation Guidelines

The FFT met with Adrien Van Boudon, Instructor, to observe a class on Extensive Damage Management Event Guidelines (EDMGs) for licensed operators in their continuing training. The DCISC last observed DCPD training in April 2023 (Reference 6.11) when it concluded the following:

A Licensed Operator Continuing Training simulator session was well prepared, contained appropriate objectives, and was professionally conducted by the Training staff. Operators performed well in responding to the simulated off-normal events.

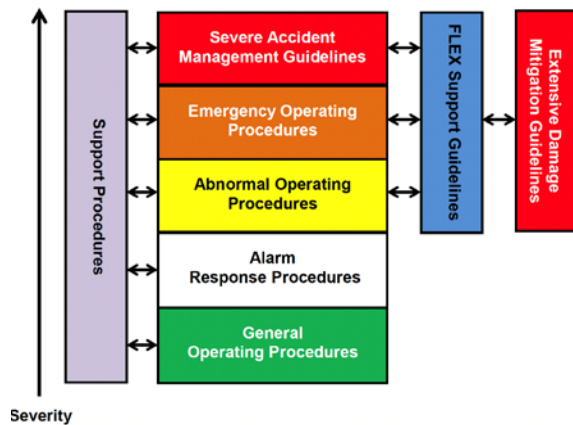
Background

U.S. nuclear power plant licensees currently maintain the capability to implement beyond design basis accident mitigation and management strategies developed through several separate initiatives. Each

strategy has been converted into implementing actions and recommendations within four separate sets of procedures and guidelines:

1. Emergency Operating Procedures (EOPs),
2. Severe Accident Management Guidelines (SAMGs)
3. Extensive Damage Mitigation Guidelines (EDMGs).
4. FLEX Support Guidelines (FSGs)

These four sets of procedures and guidelines are related as shown in the following diagram and further explained in the Appendix.



Extensive Damage Mitigation Guidelines (EDMGs)

EDMGs refer to a set of procedures and strategies designed to maintain or restore critical functions like core cooling, containment integrity, and spent fuel pool cooling within a nuclear power plant, even in scenarios where large portions of the plant have been severely damaged by events like explosions or fires, exceeding the plant's normal design basis; essentially, it outlines how to manage a catastrophic situation beyond the expected design parameters of the facility.

The 18 EDMGs are divided into three areas as follows:

EDMG	Title
Large Events that may Result in Damage to the Plant Beyond the Design Basis	
EDMG-1	Extensive Damage Mitigation Guideline
EDCG-1	ERO Guidance for Extensive Plant Damage Mitigation
EDWM-1	Fire System Management Strategies
EDG-5	Refueling Water Storage Tank Makeup
EDG-6	Makeup to Condensate Storage Tank
EDG-7	Manually Depressurize SGs to Minimize RCS Inventory Loss
EDG-8	Manual Operations to Control Steam Generator Water Level
EDG-9	Use of Fire Engine to Supply Water to Steam Generators
EDG-10	Containment Flooding with Portable Pump
EDG-11	Vent Containment
EDG-12	Start Diesel Generator without DC Power
EDG-13	Portable Sprays
EDG-16	Pressurize Diesel Generator Starting Air Receivers with a Portable Compressor
Large Spent Fuel Pool Leaks	
EDG-1	Internal Spent Fuel Pool makeup
EDG-2	External Spent Fuel Pool makeup
EDG-3	Spent Fuel Pool Cooling via Spray
EDG-4	Spent Fuel Pool Leakage Control Strategies
Equipment Inventory	
EDG-14	EDMG Equipment Annual Inventory

Entry into EDMGs is initiated by the following:

1. Command and control cannot be established at the Control Room or Hot Shut Down Panel (HDSP)

Or

2. Spent Fuel Pool (SFP) damage has occurred that results in leakage greater than the capability of normal make-up to the SFP.

EDMGs play a different role than Emergency Operating Procedures. The EDMGs are written using equipment likely to survive. Because of the nature of the event, the available equipment is unknown. The equipment described in the guidelines may not be available or accessible to complete the required actions. EDMGs are intended to provide operators with a “toolbox” of capabilities that can be used to respond to unpredictable damage from large fires and explosions. EDMGs also serve as a bridge between the plant operational command and control and the command and control that is provided by the plant’s emergency response organization. Additionally, the nature and complexity of EDMGs would seem to require in-plant training sessions so operators would be familiar with both in-plant and portable equipment and their connection locations. For this reason DCPP has a second session called the “FLEX Refresher,” which is one hour in the classroom and then two hours in the field walking down the equipment with procedures. This satisfies both EDMG and FLEX training as both use the same equipment.

The guidance in the Appendix is based on industry understanding put together by the Nuclear Energy Institute as guidance for all nuclear power plants. The FFT wanted a better understanding of how these guidelines and procedures fit together and how they would be used at DCPD.

Conclusions: The classroom setting for the licensed operator continuing EDMG training appeared satisfactory with materials appropriate for this subject and for the type of work operators are licensed to perform. The instructor was knowledgeable on the subject and was good at interacting with the students.

Recommendations

Recommendation to DCISC: Review in future fact-finding meeting how/when various accident mitigation and management strategies and guidelines are used at DCPD. (D12/24FF-3.12)

Recommendations to PG&E: None

4.0 CONCLUSIONS

- 4.1 The December 11, 2024 Plant Health Committee meeting was carried out efficiently and effectively. All items on the agenda were performed, and there was good participation by attendees. The Plant Health Committee is an appropriate forum for assuring the health of DCPD systems and programs. (Section 3.1)**
- 4.2 The DCISC FFT endorses DCPD's decision to pursue electronic procedures. Electronic procedures provide many benefits in improving human reliability and documenting work, and they create substantial opportunities to improve the plant's operational safety. (Section 3.2)**
- 4.3 DCPD's Campaign #8 to move 2240 spent fuel assemblies from the Spent Fuel Pool to the Independent Spent Fuel Storage Installation (dry storage) was completed safely and without incident. This is good performance. (Section 3.3)**
- 4.4 DCPD's move to launch an Artificial Intelligence platform like Atomic Canyon for document and data search, retrieval, and reporting is positive. It has great potential for saving time and improving human performance in data analysis and reporting. (Section 3.4)**
- 4.5 DCPD's 2012/2013 replacement of its aging analog Reactor Coolant System Process Control System with a digital one was a significant upgrade to the operation of the plant. The system has performed better than expected and has had no significant issues. (Section 3.5)**

- 4.6 The DCISC July 20, 2024 walkdown of seismic workplace safety in the Administration Building with the Director of Maintenance revealed one unbraced cabinet (which had been recently added to a conference room in the Administration Building). The problem was immediately added by Mr. Brass to the Corrective Action Program and was properly corrected. An extent of condition review revealed no additional problems. This December 11, 2024 Fact-finding Meeting follow-up to the July 20, 2024 revealed no new problems via a new walkdown of the Training Building, however, on December 12, 2024 the FFT found a tall, unbraced cabinet in the office of the DCPD Chief Nuclear Officer, which she advised would soon be moved to the other side of the room in a recent request. A Corrective Action Program Notification was quickly initiated for corrective action. (Section 3.6)
- 4.7 The Quality Verification report on DCPD Quality Verification show that they have been effective in providing expectations for high quality operations for the plant and in reporting quality plant. (Section 3.7)
- 4.8 The meeting with the NRC Senior Resident Inspector was beneficial, and the DCISC should continue the meetings. (Section 3.8)
- 4.9 The regular meetings with DCPD Officers and Directors are beneficial for both organizations and should be continued. (Section 3.9)
- 4.10 DCPD reported that it is fully staffed for current and long-term operations and is planning for small future staffing decreases from normal and process improvement attrition. (Section 3.10)
- 4.11 The License Amendment Request to extend the 10 CFR Part 72 license for the Independent Spent Fuel Storage Installation was proceeding normally within the NRC. The NRC has issued several Requests for Additional Information to which PG&E has responded quickly. DCPD expects to have NRC approval during 2025. (Section 3.11)
- 4.12 The classroom setting for the licensed operator continuing EDMG training appeared satisfactory with materials appropriate for this particular subject and for the type of work operators are licensed to perform. The instructor was knowledgeable on the subject and was good at interacting with the students. (Section 3.12)

5.0 RECOMMENDATIONS

SB 846 requires the DCISC to “make recommendations appropriate to enhance the safety of the operation at the Diablo Canyon powerplant.”

Recommendations to DCISC

5.1 Recommendation to DCISC: Because expanded use of electronic procedures can

enhance plant operational safety, the DCISC should review this topic regularly. (D12/24FF-3.2; Section 3.2)

5.2 Recommendation to DCISC: Because the application of Artificial Intelligence tools has significant potential to change and to improve DCP's operational safety, the DCISC should review this topic frequently. (D12/24FF-3.4; Section 3.4)

5.3 Recommendation to DCISC: Review in future fact-finding meeting how/when various accident mitigation and management strategies and guidelines are used at DCP. (D12/24FF-3.12; Section 3.12)

Recommendations to PG&E

5.4 Recommendation to PG&E: The DCISC recommends that PG&E expand their use of electronic procedure-type applications because the improved human performance and documentation of work can directly improve the safety of DCP operation. (P12/24FF-3.2; Section 3.2)

5.5 Recommendation to PG&E: PG&E should review why an extent of condition for an unbraced cabinet found by the DCISC in July 2024 did not prevent the identification of a similar condition by the DCISC in December 2024. (P12/24FF-3.6; Section 3.6)

6.0 REFERENCES

- 6.1 "Diablo Canyon Independent Safety Committee Thirty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2023 – June 30, 2024," Approved October 10, 2024, Volume II, Exhibit D.3, Section 3.6, "Observe Plant Health Committee Meeting."
- 6.2 Ibid., Exhibit D.2, Section 3.2, "Powerblock WiFi and Electronic Work Packages and Procedures."
- 6.3 "Diablo Canyon Independent Safety Committee Thirty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2024 – June 30, 2025," Approved October 22, 2025, Volume II, Exhibit D.1, Section 3.8, "Meet with NRC Senior Resident Inspector."
- 6.4 "Diablo Canyon Independent Safety Committee Twenty Seventh Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2016 – June 30, 2017," Approved October 14, 2017, Volume II, Exhibit D.4, Section 3.5, "Reactor Coolant System Process Control System Health/Update."
- 6.5 "Diablo Canyon Independent Safety Committee Thirty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2024 – June 30, 2025,"

Approved October 22, 2025, Volume II, Exhibit D.1, Section 3.4, “Workplace Seismic Safety.”

- 6.6 “Diablo Canyon Independent Safety Committee Thirty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2024 – June 30, 2025,” Approved October 22, 2025, Volume II, Exhibit B.3, “Quality Verification Update.”
- 6.7 Ibid., Exhibit D.4, 3.7, “Meeting with the NRC Senior Resident Inspector.”
- 6.8 “Diablo Canyon Independent Safety Committee Thirty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2024 – June 30, 2025,” Approved October 22, 2025, Volume II, Exhibit D.4, Section 3.1 “Meeting with DCPD Officer.”
- 6.9 “Diablo Canyon Independent Safety Committee Thirty-Fourth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2023 – June 30, 2024,” Approved October 10, 2024, Volume II, Exhibit D.9, Section 3.10, “Plant Tour.”
- 6.10 “Diablo Canyon Independent Safety Committee Thirty-Fifth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2024 – June 30, 2025,” Approved October 22, 2025, Volume II, Exhibit D.1, Section 3.9 “ISFSI Relicensing.”
- 6.11 “Diablo Canyon Independent Safety Committee Thirty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2022 – June 30, 2023,” Approved October 22, 2023, Volume II, Exhibit D.1, Section 3.9 “ISFSI Relicensing.”

Appendix

Description and Relationship of the Five Sets of Nuclear Emergency Procedures/Guidelines*

Abnormal Operating Procedures (AOPs)

AOPs are procedures that direct operator actions for restoring a function, system, or component to normal operating conditions following a transient or event. AOPs may also be used to mitigate an event or condition that is not severe enough to require use of an Emergency Operating Procedure (EOP), such as primary system leakage. Further, AOPs may provide direction for responding to a wide range of off-normal and emergency conditions including, but not limited to, design basis-related events such as a Control Room evacuation, a fire, or a security threat; events initiated during shutdown or refueling operating modes; & natural & man-made hazardous conditions such as severe weather or toxic gas releases.

Emergency Operating Procedures (EOPs)

EOPs are procedures that direct operator actions for mitigating the consequences of transients and accidents that cause plant parameters to exceed reactor protection system or engineered safety features actuation setpoints. These procedures are developed using guidelines promulgated by the applicable Owners Group in response to NUREG-0737, *Clarification of TMI Action Plan Requirements*; Clarification Item I.C.1, “Guidance for the Evaluation and Development of Procedures for Transients and Accidents.”

FLEX Support Guidelines (FSGs)

FSGs are guidelines that provide strategies relying upon the use of installed and portable equipment and resources to maintain or restore core cooling, containment, and SFP cooling capabilities during beyond design basis events. The strategies and capabilities reflected in these guidelines address the requirements of NRC Order EA-12-049, *Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events*. Guidance concerning the development of FSGs is contained in Nuclear Energy Institute (NEI) 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*.

Severe Accident Management Guidelines (SAMGs)

SAMGs are guidelines that provide strategies to manage the consequences of an accident or event which would be implemented upon receipt of specific plant parameter values indicative of imminent or actual damage to irradiated fuel (e.g., high core exit thermocouple temperatures or low RPV water level). These guidelines employ strategies intended to arrest the progression of fuel damage, maintain the capability of the containment as long as possible, and minimize radiological releases.

Extensive Damage Mitigation Guidelines (EDMGs)

EDMGs refer to a set of procedures and strategies designed to maintain or restore critical functions like core cooling, containment integrity, and spent fuel pool cooling within a nuclear power plant, even in scenarios where large portions of the plant have been severely damaged by events like explosions or fires, exceeding the plant's normal design basis; essentially, it outlines how to manage a catastrophic situation beyond the expected design parameters of the facility.

*Source: Nuclear Energy Institute, NEI 14-01 [Revision 1] *Emergency Response Procedures and Guidelines for Beyond Design Basis Events and Severe Accidents*, February 2016.