RESOLUTION NO. 2023- 07

RESOLUTION OF THE DIABLO CANYON INDEPENDENT SAFETY COMMITTEE RATIFYING THE APPROVAL OF THE REPORT ON FACT-FINDING MEETING AT DIABLO CANYON POWER PLANT (DCPP) ON SEPTEMBER 13-14, 2022

THE DIABLO CANYON INDEPENDENT SAFETY COMMITTEE HEREBY RESOLVES AS FOLLOWS:

WHEREAS, the above-caption draft report having come regularly before the Committee on the agenda for consideration for acceptance at the Committee's public meeting on September 28, 2022; and

WHEREAS, the Committee Members received and discussed the report; and

WHEREAS, an opportunity was provided for public comment on the report.

NOW, THEREFORE, the Diablo Canyon Independent Safety Committee hereby ratifies its approval of that certain report entitled "Report on Fact-Finding Meeting at DCPP on September 13-14, 2022 by Robert J. Budnitz, Member, and R. Ferman Wardell, Consultant," copy on file in the office of the Committee's Legal Counsel, and a copy of the approved report was made available to the public at the public meeting, posted on the Committee's website at www.dcisc.or and is attached to this resolution as Exhibit A.

THE FOREGOING RESOLUTION WAS ADOPTED at a regular meeting of the Diablo Canyon Independent Safety Committee held on the 28th day of June, 2023, by the following vote:

AYES: BUDNITZ. LAM. PETERSON
NOES: 0
ABSENT: 0
ABSTAIN:

Peter Lam, Chair

ATTEST:

Robert Rathie, Asst. Legal Counsel

Exhibit A

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE REPORT

Report on

Fact-Finding Meeting with DCPP
on September 13-14, 2022

by

Robert J. Budnitz, Member, and R. Ferman Wardell, Consultant

1.0 SUMMARY

The results of the DCISC Fact-finding meeting held on September 13-14, 2022, 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. Probabilistic Risk Assessment (PRA) Program Review
2. Safety Culture Update
3. Observe All Hands Meeting with PG&E Chief Executive Officer and Board of Directors
4. 2R23 Outage Safety Plan
5. Long-Term Seismic Program Update
6. Core Exit Thermocouple System Update
7. Cyber Security Update
8. Meet with Adam Peck, Site Vice-President
9. DCPP License Extension Update
10. Observe Evaluated Emergency Preparedness Exercise

2.0 INTRODUCTION

This Fact-Finding meeting with DCPP was made to evaluate specific safety matters for the DCISC. The objective of the evaluation was to determine if Pacific Gas and Electric's (PG&E's) performance is appropriate and whether any areas revealed observations, which are important enough to warrant further review, follow-up, or presentation at a public meeting. These safety matters include follow-up and/or continuing review efforts by the Committee, as well as those identified as a result of reviews of various safety-related documents.

Section 4-Conclusions highlights the conclusions of the Fact-Finding Team based on items reported in Section 3-Discussion. These highlights also include the team's suggested follow-up items for the DCISC, such as scheduling future Fact-Finding Meetings on the topic, presentations at future public meetings, and requests for future updates or information from DCPP on specific areas of interest, etc.

Section 5-Recommendations presents specific recommendations to PG&E proposed by the Fact-Finding Team. These recommendations will be considered by the DCISC. After review and approval by the DCISC, the Fact-Finding Report, including its recommendations, will be provided to PG&E. The Fact-Finding Report will also appear in the DCISC Annual Report.

3.0 DISCUSSION

3.1 Overall Probabilistic Risk Assessment (PRA) Program Review

The DCISC Fact-finding Team (FFT) met with Rasool Baradaran, Probabilistic Risk Assessment (PRA) Supervisor; Nathan Barber, Risk Initiatives Supervisor; Yongjie Xiong, Senior Engineer; and Jordan Tyman, Manager of Risk and Cyber Security, for an update on the current status of the PRA program under Mr. Baradaran's supervision. The program's principal responsibility is to maintain the station's PRA, update and upgrade the PRA as needed, and apply it to address safety and reliability issues affecting the plant. The principal topics discussed were the status of the PRA and its use in various applications to support plant safety. The DCISC last reviewed this program in September 2020 (Reference 6.1), when it concluded the following:

> *The DCPP Probabilistic Risk Assessment (PRA) group's work today is emphasizing the support of various PRA applications, some driven by NRC regulations and others driven by internal plant needs. The use of the PRA for these purposes continues effectively. The DCISC Fact-finding Team concludes that the PRA group is doing excellent work.*

Status of the PRA: In the last year or more, one important activity has been (as always) maintaining the main PRA model, and that work has continued without any problems. No important upgrades to the model have been undertaken, but "maintaining" or "updating" it means, among other things, keeping the model up to date with the plant's changing configuration and also keeping the failure data base current. To perform this work acceptably, the PRA team needs to monitor procedural and design changes, which they do regularly. [The distinction between a PRA update and an upgrade is well defined in the industry; it essentially differentiates using a new or different model (an upgrade) from using newer data or modeling a slightly different plant configuration (an update.) An upgrade requires a new peer review before the model can meet the ASME-ANS PRA standard and can then be used in NRC regulatory applications.] The PRA group reported that their next full update will be accomplished by April 2023.

Support for license renewal: The California legislation supporting the plant's license renewal beyond 2025 had been passed and signed less than two weeks before this Fact-Finding (FF) meeting. The PRA team described the several different ways in which their PRA model and insights will likely play a role in supporting the broader license-renewal work. Among the most important will be to provide risk insights concerning the roles of various individual plant safety functions, systems, equipment, and procedures in achieving safety. In the license-renewal analysis and documentation to be submitted to the NRC, the plant will describe and explain why each of the various functions, systems etc. that need not be modified is adequate as-is; or if not adequate, what differences in safety would be achieved if an upgrade, replacement, or other change is

proposed. The benefit of the PRA analysis in providing insights on the safety role of an individual component (or system or procedure) is that the safety role can be understood in the context of the overall safety of the plant-as-a-whole.

Because evaluations will be needed for a very large number of individual components, systems, procedures, etc., there will be a significant workload for the PRA group in supporting the broader plant effort on license extension. However, the PRA group reported that their PRA models have been designed explicitly to support this type of analysis.

Another application related to license extension is the so-called "SAMA" analysis, where SAMA means "Severe Accident Mitigation Alternatives." As part of the license renewal submittal, the NRC requires a SAMA analysis of various design or operational alternatives that, if implemented, could improve the plant's ability to either reduce the likelihood or reduce the consequences of potential severe accidents. The PRA model is ideally suited to support this analysis, and the PRA group reported that they anticipate using it for that purpose.

Support for plant safety decision-making: The PRA model is used regularly to support a wide variety of different safety decisions. One application mentioned in the FF meeting is analyzing various operating procedures when a change is being considered, to understand how that change would affect the bottom-line risk insights emerging from the PRA. Another is using the PRA to evaluate the aging-management program that the plant needs to implement as part of its license-extension activities.

Still another application is supporting the "50.69 program." Under NRC regulation 10 CFR 50.69, *"Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors,"* components can be re-classified to a lesser classification than safety-related if the role of the component in achieving safety is unimportant or is of only minor importance. There are rigorous criteria applied to determine the classification, and it was reported that the Diablo Canyon PRA is routinely used to inform how the safety-classification determination is done.

Outage and out-of-service safety management: The PRA team continues to use the Phoenix software program to analyze proposals to take certain equipment out-of-service when online, and also to deterministically analyze planned outages in advance (or on short notice if the outage is unplanned). It is widely used throughout the industry and provides a useful tool for certain types of analyses for which using the full PRA model is not needed. Another application of the Phoenix software, or of the larger PRA model if needed, is helping the work-control process. Those work-control PRA analyses are done regularly as a part of the work-control process and used in preparing schedules for online maintenance activities.

Conclusion: The DCPP Probabilistic Risk Assessment (PRA) group's work today is emphasizing the support of various PRA applications, some driven by NRC regulations, especially for license extension (severe accident analysis and aging management), and others driven by internal plant needs, such as the impacts on safety of equipment removal from service. The use of the PRA for these purposes continues effectively. The DCISC Fact-finding Team concludes that the PRA group is doing excellent work.

Recommendations: None

3.2 Safety Culture Update

The DCISC FFT met with Jeff Harker, Manager of Maintenance and Technical Training and Chair of the DCPP Nuclear Safety Culture Monitoring Panel (NSCMP), for an update on DCPP Safety Culture. The DCISC last reviewed DCPP Safety Culture in August 2019 (Reference 6.2), when it concluded the following:

> *The DCPP Nuclear Safety Culture Monitoring Panel and the Safety Culture Leadership Team identified an Improvement Opportunity that employee perception of the station's ability to maintain a proficient workforce is causing distraction. This matches the DCISC concern about retention of qualified, experienced personnel necessary to operate DCPP at an appropriate level of safety. The DCISC should continue to monitor this area closely.*

A key element of nuclear power plant safe operations is safety culture, and the traits of a healthy nuclear safety culture include creating and maintaining an environment where employees will raise concerns even if the concerns are at a low level, and the plant management team will respond. It requires a collective commitment from leaders and individuals to emphasize safety over competing goals to ensure the protection of people and the environment. Key elements of a healthy nuclear safety culture include an individual commitment to safety, personal accountability, a questioning attitude, and effective safety communication as well as management's commitment to safety leadership, safety values and actions, decision-making, and a respectful work environment.

A Safety Conscious Work Environment (SCWE) is another key element of a healthy nuclear safety culture, which represents an environment where individuals feel free and are open and willing to identify and raise issues, questions or concerns, express differing professional opinions or viewpoints dealing with nuclear or radiological safety, quality, security, environmental or regulatory compliance and to do so without fear of retaliation. Issues identified within the context of a SCWE are addressed promptly with timely feedback provided to the initiator.

The DCPP Nuclear Safety Culture Monitoring Panel (NSCMP) assesses and reports on nuclear safety culture using the recommendations of Nuclear Energy Institute (NEI) publication 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 the Corrective Action Program, performance trends, NRC inspections, industry evaluations, audits, and operating experience, independent and self-assessments, and the Employee Concerns Program. The NSCMP monitors these inputs to identify early indications of potential concern in the work environment that merit additional attention by the organization.

The DCPP NSCMP is comprised of experienced personnel with diverse backgrounds. Membership is limited to protect the confidentiality of personal information, and its reports are provided to the site leadership team. Members of the labor unions serve on the NSCMP and within the Organizational Performance and Learning Services organization. DCPP believes the unions see

great benefit in having a healthy nuclear safety culture, and management and union efforts in support have proven to be a mutually beneficial partnership.

The process is directed by station procedures. The DCISC FFT received and reviewed the following two DCPP procedures:

1. OM16.ID1, "Nuclear Safety Culture and Safety Conscious Work Environment (SCWE)," which provides guidance on safety culture and safety conscious work environment.

2. OM16.ID2, "Nuclear Safety Culture Health Monitoring," which provides the process for assessing and reporting the health of the nuclear safety culture at DCPP.

The last meeting of the NSCMP was in July 2022. The minutes of that meeting were provided to and reviewed by the FFT, which found them to be satisfactory.

The DCPP Employee Concerns Program (ECP) provides an alternate venue for employees to raise concerns, seek intervention and consultation or request an independent investigation for resolution of nuclear safety and quality concerns. The ECP is comprised of three independent, qualified, team members who report directly to the Chief Nuclear Officer. As usual, no or few concerns have been raised recently at DCPP.

Regarding the need to maintain a healthy nuclear safety culture during the period when the plant was proceeding to closure in 2025, DCPP recognized that its programs, including programs fostering nuclear safety culture, existed in an environment that was changing. The formation of the People Committee was a response to this to monitor and assess plans for continuing employee engagement, staffing, succession planning and other issues. Now that it appears that DCPP may continue operating for an additional five years until 2030, in which case the People Committee would be updated to focus on continued operations. Mr. Harker reported that most employees believe that things have improved with the opportunity to continue generation and that morale is better.

DCPP recognizes the need to assess how its employees continue to feel about raising issues or engaging with management and is conducting anonymous surveys, called Pulse Surveys, in that effort. These surveys reach out to approximately 5-10 plant staff at a time on a quarterly basis and the results of the Pulse Surveys are reviewed by the People Committee and are input to the NSCMP.

DCPP has undergone a number of NRC inspections that examined its nuclear safety culture. The NRC inspections, as well as recent NSCMP assessments, indicate that DCPP continues to exhibit the traits of a healthy nuclear safety culture. DCPP performed an assessment of its nuclear safety culture in December 2021. The assessment concludes the following:

> *The team concluded that Nuclear Safety Culture at Diablo Canyon is healthy and supported by DCPP Leadership and Organizational Effectiveness Models. The assessment team identified no deficiencies, one gap in the trait* Leadership Safety Values and Actions *and one enhancement in* Effective Safety Communication.

Conclusion: DCPP Nuclear Safety Culture appeared to continue to be healthy. This was confirmed by a plant assessment of its culture. The Employee Concerns Program, an important component of safety culture, continued to be strong with few concerns.

Recommendations: None

3.3 Observe All Hands Meeting with PG&E Chief Executive Officer and Board of Directors

The DCISC FFT joined a large contingency of plant employees for an "all hands" meeting with top PG&E management at the plant, which included the Chief Executive Officer (Patricia K. Poppe), several Executive Vice-Presidents, and several members of the Board of Directors. Ms. Poppe led the discussion, which centered around the following:

- The opportunity for five years' continued DCPP operation
- Appreciation for DCPP's excellent operating record
- A "One Team" culture for all areas of PG&E
- A stronger customer focus
- Application of successful DCPP processes to other areas of PG&E
- A question-and-answer session for attendees

Conclusions: The "all hands" meeting of DCPP employees with top PG&E executives and Board of Directors appeared successful in providing beneficial firsthand communications for all participants.

Recommendations: None

3.4 2R23 Outage Safety Plan

The DCISC FFT met with Jon Helm, Outage Window Manager in the Outage Management Group; Joe Verzon, Outage Manager; and Chip Dean, Operations Lead Refueling SRO (Senior Reactor Operator); to discuss the 2R23 Outage Safety Plan. The DCISC last reviewed an outage safety plan in March 2022 (Reference 6.3), concluding the following:

> *The Refueling Outage 1R23 Safety Plan and Safety Schedule appeared comprehensive and effective to maintain an appropriate safety margin during upcoming planned outage activities.*

Refueling Outage 2R23 was scheduled to be conducted from October 16 to November 20 2022 (35 days.). The outage managers provided the FFT with copies of the Refueling Outage 2R23 Safety Plan and Safety Schedule and reviewed their purposes. The purpose of the Outage Safety Plan was to provide information on outage safety requirements and highlight potential higher risk activities to plant staff. The intent of the Outage Safety Plan was 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.

The Outage Safety Plan provided background information for the logic contained in the Outage Safety Checklists. The Outage Safety Checklists are governed by Administrative Procedure AD8.DC55, "Outage Safety Schedule," Revision 43, a copy of which was also provided to and reviewed by the FFT. The Plan, Schedule and Checklists together ensure that the equipment and plant conditions assumed in the abnormal procedures for use during shutdown are met. The abnormal procedures contain guidance for providing passive core cooling as well as guidance on key safety system restoration. Outage safety planning is based upon being able to cope with a very severe event, which is assumed to be a loss of all AC power. Backup decay heat removal capability can be maintained during such events by assuring that the decay heat removal function remains capable of taking advantage of natural physical laws (natural circulation by gravity or boiling) to maintain passive cooling if Residual Heat Removal or Spent Fuel Pool cooling is lost. The Outage Safety Checklists are the primary means of verifying that normal and backup decay heat removal capabilities are maintained.

The Refueling Outage 2R23 Safety Plan contained the following topics:

- 2R23 Defense-in-Depth Non-Green Color Descriptions
- Infrequently Performed Tests or Evolutions
- Contingency Strategies
- Approved Outage Safety Checklist Exceptions
- Transition Periods and Testing
- Outline/Basis for Each of the Outage Safety Phases for 2R23:
    - Mode 5 (Cold Shutdown) Loops Filled
    - Mode 5 Loops Not Filled
    - Mode 6 (Refueling) Reactor Coolant System (RCS) Level at Greater than 111 feet
    - Core Offloaded

The Outage Safety Checklists were provided for each of the four basic plant outage phases listed and described above (along with the outage phase of Mode 6 RCS Level Less than 111 feet, which was not planned to be used during Refueling Outage 1R23). The Checklists were to be completed by Control Room Operators at least once during each shift, any time a piece of equipment was removed from service, and any time the plant entered or exited a transition period.

There was one major change to the checklists for this outage (and Outage 1R23) compared to previous outages: the Intake Structure will no longer be a vital security area. Physical access for operators was less restricted for performing any needed contingency actions such as establishing a crosstie between the two units' Auxiliary Salt Water (ASW) systems.

DCPP uses "Phoenix," a computer-based tool used online to analyze changes in risk using the PRA model when equipment is removed from service for maintenance. As the PRA model does not extend to shutdown conditions, Phoenix is used during outages via the loading of deterministic fault trees for shutdown conditions based on the Outage Safety Checklists. An "N+1" Defense in Depth (DID) approach, where N generally represents the minimum number of equipment sets

needed to maintain a key safety function, is then utilized by Phoenix to evaluate the availability of the key safety functions. This DID Status is represented by the following four-color definitions:

- Green – represents DID greater than N+1, where N is the minimum number of components needed to maintain a key safety function with more than one backup means of support.
- Yellow – represents DID equals N+1, which is considered the normal DID. Key safety functions are fully supported with at least one backup means of support.
- Orange – represents a DID equals N condition, where key safety functions are supported, but the normal desired DID is not met, and compensatory measures must be put in place.
- Red – represents a DID less than N condition in which key safety functions are not supported.

DCPP considers a status of Green or Yellow as acceptable for planned outage activities because key safety functions are fully supported with at least N+1 DID. The contingency plans provide an additional approach to DID, because they provide a backup safety function should a minimum safety function becomes unavailable. DCPP avoids planned activities which result in Orange conditions, and Red conditions are prohibited.

The Refueling Outage 2R23 Safety Plan at the start of the outage contained no Orange or Red conditions and six individual Yellow ones. The six planned individual Yellow conditions, which were detailed and explained in the safety plan, were as follows:

1. RCS Inventory Control – One Yellow condition was planned to occur when only one Safety Injection (SI) Pump would be operable with fuel in the core. (All three Centrifugal Charging Pumps out of service for testing and one SI pump out of service due to a planned maintenance outage of the 'F' Vital Electrical Bus.)
2. Reactivity Control – One Yellow condition was planned to occur for the same reason and coincident with the above Yellow condition for RCS Inventory Control.
3. Support Systems (Heat Sink) – Two Yellow conditions were planned to occur when one of two Auxiliary Saltwater System/Component Cooling Water System (CCW) trains would be out of service during lowered RCS inventory.
4. Vital AC Power – Two Yellow conditions were planned to occur due to a single offsite power source available. The first would occur when the plant was at lowered inventory while the Main Bank power supply was being removed from service at the start of the outage, and the second would occur when the Start-up Bank power supply was removed from service during lowered inventory late in the outage.

There would be no mid-loop operations required because there were no planned activities that would drain the RCS hot legs. (Mid-loop operations refer to relatively higher risk periods during an outage when the RCS is partially drained to facilitate maintenance activities, typically on Steam Generators or Reactor Coolant Pumps. During these periods there can be reduced reactor cooling safety margins that typically require special advance planning.)

Regarding unplanned schedule changes that might occur during the outage, the managers referred to the process and form contained in the controlling procedure which required a review to ensure that any unexpected schedule changes did not reduce the DID or affect any configurations covered by the checklists.

Conclusions: The DCISC concluded that the Refueling Outage 2R23 Safety Plan and Safety Schedule appeared comprehensive and effective in maintaining an appropriate safety margin during upcoming planned outage activities.

Recommendations: None

3.5 Long Term Seismic Program Update

The DCISC FFT met remotely by MSTEAMS with Jeff Bachhuber, Director, Geosciences Department: Nozar Jahangir, Manager of Seismic Engineering; and Albert Kotkee, LTSP Technical Manager, for an update on selected aspects of the PG&E Long Term Seismic Program (LTSP), which is the program under which PG&E has since 1987 carried out several projects to assure that the Diablo Canyon Power Plant is adequately designed and operated to assure safety against potential very large earthquakes. The LTSP is required by the NRC as a license condition for operating DCPP.

The LTSP was last reviewed by the DCISC during its March 2019 Fact-Finding meeting (Reference 6.4), when it concluded the following:

> *PG&E has carried out a "Long Term Seismic Program" for over 30 years to satisfy an NRC license condition. This program consists of several different aspects (understanding of the seismic hazard, of seismic ground motion and in-structure energy propagation, of the seismic fragility of components and structures, and of seismic plant-response), all aimed at assuring that the power plant can withstand very large earthquakes without a safety compromise. The DCISC concludes that this very extensive program is of excellent quality, and that the plans for further studies going forward are sensible and thorough.*

The LTSP program involves four different technical areas, covering the following:

1. Understanding of the seismic hazard
2. Seismic ground motion and in-structure energy propagation
3. Seismic fragility of components and structures
4. Seismic plant-response.

Although the last review in March 2019 covered a broad scope of LTSP projects, this FF meeting covered only selected parts of the LTSP scope, concentrating mostly on some of the geosciences parts of the LTSP scope. However, the introductory part of the FF session began with a discussion of the broader role of the PG&E Geosciences Department in the company, the scope of the LTSP,

the specific role played by the Geosciences Department in supporting various DCPP safety initiatives, and the support for the PRA group, which maintains an up-to-date seismic PRA that relies heavily on input from the LTSP seismology expertise.

Fault displacement modeling: Although vibratory seismic ground motion is the principal threat to the nuclear plant's facilities, understanding fault displacement is important too, partly to assure that no fault displacement hazard is present under the power plant but also to understand the displacement of the nearby faults (mainly the Hosgri and Shoreline faults) as part of understanding their slip-rate and other features. To that end, a multi-year project has been underway coordinated by an expert team at the University of California at Los Angeles, supported partly by PG&E and partly by various California state agencies. An international displacement benchmarking exercise was also undertaken this summer of 2022. The FF briefing reported that significant progress has occurred in recent years in lowering the uncertainties in displacement modeling and in helping to understand better how the displacement characteristics of a fault contribute to the overall seismic hazard at a given site like Diablo Canyon. This work is important and is being carried out in a thorough way.

Ground motion model development: An important long-term part of the LTSP research program has been developing non-ergodic (site-specific or local-vicinity-specific) models to understand the hazard at Diablo Canyon better without relying as much on information from distant earthquake faults or zones. The trade-off is that while local and regional site-specific information is more applicable, there is much less of it than the broad worldwide information that is typically brought into play in seismic-hazard modeling using ergodic methods. Continuing work in the larger seismology community has helped to improve the simulation methods used for this type of non-ergodic modeling, and PG&E's contributions to the larger effort worldwide have been important and were described. This is excellent work, some of it path-breaking compared to other research worldwide.

Precariously balanced rocks: For several years, part of the LTSP program has been studying one particular local feature near Diablo Canyon, the so-called "Double Rock" formation a few miles west of the DCPP site that may be seen when driving to the DCPP site by car as they drive by.

The idea in layperson's terms is follows: The Double Rock formation is standing but parts of it are standing only precariously, and those parts have not toppled. If one could understand how big an earthquake it would take to topple the precarious features, then one would have confidence that no earthquake that large has occurred since the precarious aspects of the Double Rocks were formed many thousands of years ago. This information can help to improve our understanding of earthquake sizes in the vicinity. Because the Double Rock formation is so close to the plant site, this is truly local information.

To develop the needed understanding, it is necessary to bring together several different types of data and analysis: laboratory studies to understand the strength of the actual rock in engineering terms; local soil and site measurements at the Double Rock site; weathering information to understand how the current rocks differ from the same rocks many millennia ago; and ground-motion propagation studies from the nearby seismic sources such as the Hosgri and Shoreline Faults.

Much progress has been made in each of these areas, and the project is now at the stage at which, with some preliminary conclusions available, the PG&E team will be seeking outside review and critique by a panel of both seismology and engineering experts. In conclusion, the work so far shows much promise of adding significant additional insights into the local seismic hazard at the DCPP site. No final conclusions are available yet, however.

Siting the GTCC storage facility: PG&E has tentatively selected a site near the ISFSI (Independent Spent Fuel Storage Installation) site for a facility to store Greater-Than-Class-C (GTCC) radioactive waste that will be generated in significant amounts during the decommissioning that is being planned. These GTCC wastes are comprised primarily of neutron-activated metal components from inside the reactor vessel. The Geosciences team has been involved in performing geotechnical and geological investigations at the site, to support the design of that GTCC facility. The program was described to the FF team, and the future work explained. It involves surface geophysics, borehole surveys, and laboratory testing of the samples gathered. Both seismic information and general site geotechnical information are being gathered.

Broad overview: This FF meeting covered only a fraction of the numerous projects within the broader LTSP Program. A few years back, PG&E committed to continue the LTSP program's seismic-hazard work until decommissioning is complete, including both maintaining the instruments and continuing with the analytical effort to understand the seismic sources and the potential seismic ground motions at the site. The DCISC continues to find this very extensive program to be of excellent quality. The overall approach is fully satisfactory to the DCISC FF Team and has been reviewed by the NRC also with the same general conclusion.

Conclusions: PG&E has carried out a "Long Term Seismic Program" for over 30 years to satisfy an NRC license condition. This program consists of several different aspects (understanding of the seismic hazard, of seismic ground motion and in-structure energy propagation, of the seismic fragility of components and structures, and of seismic plant-response), all aimed at assuring that the power plant can withstand very large earthquakes without a safety compromise. This FF review covered only a fraction of the many different projects within the larger LTSP program. The DCISC concludes that the areas reviewed this time are of excellent quality, and that the plans for further studies going forward are sensible.

Recommendations: None

3.6 Core Exit Thermocouple System Update

The DCISC FFT met with Waleed Ahmed, Reactor Coolant System and Containment Spray Systems Strategic Engineer, for an update on the Core Exit Thermocouples. The DCISC last reviewed DCPP Nuclear Instrumentation in September 2020 (Reference 6.5), when it concluded the following:

The DCPP Nuclear Instrumentation System is in good health on both units. There have been several nuclear detectors needing replacements, which have been resolved satisfactorily.

The Core Exit (Incore) Thermocouple System is provided to monitor the fluid exiting the core for subcooling, saturation, or superheat for indication of a potentially core-damaging condition, and it includes:

(1) Incore thermocouples
(2) Penetration seals
(3) Monitoring equipment

System health is Green on both units; however, the System has appeared as an aging-related issue due to the decision to not replace failed core exit thermocouples. For System operability each core quadrant requires four total thermocouples with two thermocouples near the center of the core and two thermocouples near the core perimeter. Thus, failed thermocouples do not have to be replaced as long as the above minimum thermocouples are available. There are enough extra thermocouples installed such that adequate coverage is easily maintained.

Conclusions: The DCPP Core Exit Thermocouple System is in Green health with few issues.

Recommendations: None.

3.7 Cyber Security Update

The DCISC FFT met with Chance Siri, DCPP Cyber Security Program Manager, and Jordan Tyman, Rick and Compliance Manager, for an update on DCPP Cyber Security. The DCISC last reviewed Cyber Security at its October 2021 Public Meeting (Reference 6.6).

The DCISC's Charter is to review the operational safety of the power plant, and the Committee does not review security except from the perspective of how it interfaces with safety and one of the attributes of cyber security is that virtually every effort in furtherance of cyber security also improves the reliability of the station's computer systems in general and there is a strong alignment between cyber security and operational safety.

The DCPP Cyber Security Program was developed in full accordance with 10 CFR 73.54, the NRC Cyber Security Rule, and the intent of that rule is to provide a high assurance that digital computer and communications systems and networks are adequately protected against cyber attack. The DCPP Cyber Security Program is in compliance with the NRC's Cyber Security Plan and with the Nuclear Energy Institute's guidance document NEI 08-09, Revision 6, "Cyber Security Plan for Nuclear Power Reactors." DCPP achieved full implementation of its Cyber Security Program by December 2017 and has continued reviewing and improving the program. In March 2021 NRC completed an inspection of DCPP's Cyber Security Program and DCPP received favorable results from the inspection with no findings or violations. DCPP was one of the last plants to have its

Cyber Security Program evaluated by the NRC and the NRC noted it was unusual to have an inspection result in no violations or findings.

The purpose of the Cyber Security Program is to protect DCPP critical digital assets to both protect the plant and the health and safety of the public from the consequences of a cyber attack. Specifically, the Cyber Security Program provides protection of critical digital assets or systems that are associated with:

- Safety-related and important-to safety functions
- Security functions
- Emergency preparedness functions, including off-site communications
- Support systems and equipment for the above functions.

The Cyber Security Program maintains capability for timely detection and response to a cyber attack and to mitigate the consequences of such an attack and restore affected systems, networks or equipment. Comprehensive measures have been implemented including procedures and processes to ensure DCPP's regulatory requirements are met and maintained, and controls are used to harden critical digital assets to ensure they are protected or that they can be restored if compromised. The DCPP cyber security team constantly monitors threat feeds in conjunction with PG&E's corporate Security Information Operations Center to identify and evaluate new threats, and if vulnerabilities are found, they are promptly patched or otherwise mitigated. The team attends annual training conducted by the SANS (SysAdmin, Audit, Network and Security) Institute, participates in industry benchmarking,* and conducts an annual cyber security drill. DCPP partners with other nuclear power plants to leverage the different tools available and has a wide range of tools available to ensure its systems are protected.

Two recent cyber attacks, the Solar Winds and the Colonial Pipeline events, were evaluated for evolving threats and DCPP participated in industry conference calls and response meetings. The determination concerning both events was that DCPP was not vulnerable to either the compromised software issues which gave rise to the Solar Winds vendor issue or to the ransomware Colonial Pipeline event as DCPP's controls and processes were found to provide sufficient protection in both cases. The tactics used in those events were evaluated as were the lessons learned in the development of DCPP cyber security drills.

The next action for the DCPP Cyber Security Program will be to continue the path to continuously evaluate incoming threat intelligence and plant systems and controls and participate in first responder meetings when threats are identified. DCPP has partnered with Cal Poly to develop a cyber security education program and a lab at the university.

DCPP continuously evaluates cyber security controls and the constantly evolving threat environment for new threats to ensure protection remains adequate. The DCPP cyber organization

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* Benchmarking is the practice of comparing business processes and performance metrics to industry bests and best practices from other companies.

consists of one supervisor and three full time employees, is constantly evaluating staffing levels, and is in the process now of increasing staffing. Force-on-force drills are not conducted for cyber security, but internal cyber security drills are conducted on an annual basis. DCPP employs a graded approach to its critical digital assets including classifying them by function as well as by their ability to be compromised. The station does not treat every critical digital asset equally and has developed a defense in depth strategy based on the criticality of the asset that determines the level or rigor of the controls that are applied.

Unlike the parent (PG&E corporate) organization's internet and email systems, DCPP's critical digital assets have no direct connections to the internet. All safety systems and controls, power producing systems, and related technical systems are triple-isolated from the outside, such that no probe or attack can enter and disable any functions. The same is true for devices brought into the station, i.e., they are screened and used in isolation mode until cleared for connection to station systems.

Conclusions: **The DCPP Cyber Security System and Program appear highly effective in detecting and preventing probes and attacks on plant safety and power-producing systems.**

Recommendations: None.

3.8 Meet with Adam Peck, Site Vice-President

The DCISC FFT met with Adam Peck, Site Vice-President, to discuss items from this fact-finding meeting and other items of mutual interest. The DCISC last met with a DCPP Officer in August 2022 (Reference 6.7), concluding the following:

> *The regular meetings between DCISC and DCPP Officers and Directors continue to be beneficial for both organizations.*

Conclusions: The regular meetings between DCISC and DCPP Officers and Directors continue to be beneficial for both organizations.

Recommendations: None

3.9 DCPP License Extension Update

The DCISC FFT met with Tom Jones, Senior Director, Strategic Initiatives, and Philippe Soenen, Director of License Extension and Decommissioning, for an update on DCPP License Extension. The DCISC last reviewed this topic in August 2022 (Reference 6.8), concluding the following:

> *The DCISC has been reviewing DCPP decommissioning up to now but will shift to also review life extension if state policy changes to direct PG&E to pursue extension. Because extension involves significant work and it will remain possible*

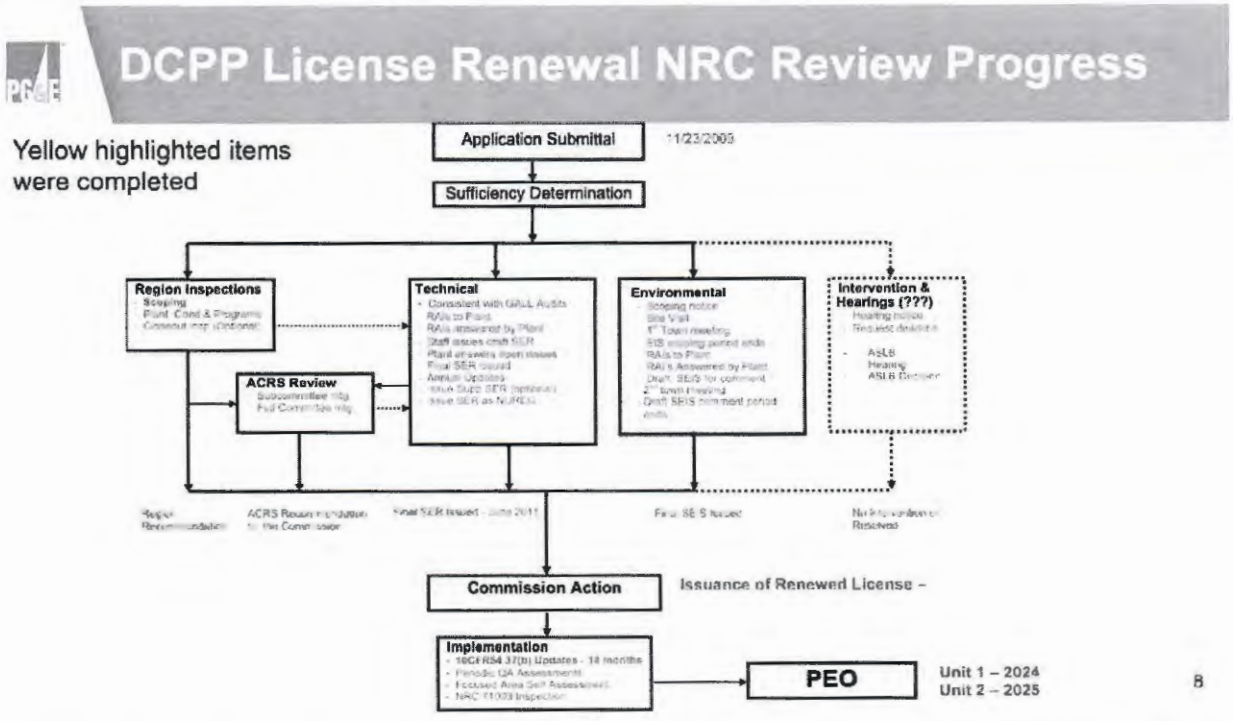
that DCPP may still decommission, the DCISC should also continue to review decommissioning-related topics.

A few days prior to the time of this fact-finding meeting the CA Governor announced the need to continue DCPP's power operation to help avoid electricity shortages, to terminate the Joint Proposal, which would have ended power operations in 2025, and to permit extension of DCPP operations for five additional years beyond 2025. Additionally, the CA Legislature passed a bill on August 31, just two weeks prior authorizing continued operation of DCPP until 2030. The following steps would likely follow:

- PG&E expects to submit Civil Nuclear Credit program application to Department of Energy
- PG&E then requests federal (NRC) regulatory approvals needed for license renewal and continued operations
- Potential federal legislation

This license renewal would require reactivation of the NRC license renewal review, which normally adds 20 additional years to the plant operating license. NRC's review of DCPP's original license renewal application had proceeded to the point of almost issuing their Safety Evaluation Report, when PG&E requested a halt to NRC review.

DCPP used the following graphic to show the history and current status of its 2008 application to the NRC for a 20-year license renewal.



Thus, reactivation of the process would pick up at that point with consideration of any new NRC requirements. PG&E recently met with the NRC on this matter (and believes timely NRC approval

is realistic) and plans to meet with NRC again the week following this FF meeting on how and when to submit information for the license renewal review. One additional consideration in life extension is reworking the schedule for DCPP spent fuel discharge, wet and dry storage, and cask scheduling, which was previously based on plant shutdown in 2025.

DCPP reported that Brian Kettleson will oversee decommissioning for PG&E.

Conclusion: DCPP life extension has been authorized by the CA Legislature for operation through 2030. This will require reactivation of the NRC 20-year license renewal review process, which was nearly complete when PG&E requested it be halted in 2016. PG&E will meet soon with NRC to determine the schedule and content of information submittals. In parallel with its new major focus on life extension, PG&E will continue on its path to decommissioning, although at a slower pace.

Recommendations: None

3.10 Observe Evaluated Emergency Preparedness-Exercise

The DCISC FFT met with Andy Warwick, Manager of DCPP Emergency Preparedness, to observe the September 14, 2022 NRC-evaluated emergency exercise. The DCISC last observed an evaluated emergency exercise in September 2021 (Reference 6.9), concluding the following:

> *DCPP's September 15, 2021, Emergency Preparedness Exercise was successfully designed and implemented by PG&E, and it demonstrated that DCPP's staff could effectively implement the facility's Emergency Plan.*

The DCISC FFT began its observation in the simulated Control Room, which was the Reactor Simulator. The exercise scenario proceeded as follows:

7:00 am – Controller Briefing

7:55 am – Initial Conditions: Units 1 & 2 at 100% power. RHR Pump 1-2, ASW Pump 1-2, EDG 1-3 and N-32 OOS. [RHR = Residual Heat Removal, OOS = Out of Service, ASW = Auxiliary Saltwater, EDG = Emergency Diesel Generator, N-32 = Containment Radiation Monitor.]

8:15 am – Heater 2 Drip Pump supply breaker 52HE6 trips. Automatic runback fails to occur. Manual ramp to 770MW per procedure. Minor fuel defect occurs (loss of fuel clad barrier). General area dose rates near letdown piping begin to rise. Chemistry sample of RCS. [RCS = Reactor Coolant System.]

8:24 am – Turbine trip signal generates a reactor trip signal. ATWS occurs. Manual trip actions in the CR are not successful. Manual trip actions outside the CR are successful. Fuel damage increases. UNUSUAL EVENT declared. Dose rates

rise. ALERT declared. [ATWS = Anticipated Transient Without Scram, CR = Control Room.]

8:53 am – Source range nuclear instrument fails. CR calls for repair.

9:10 am – Loss of Vital 4kV power. No RHR.

The DCISC FFT travels to the EOF. [EOF = Emergency Operations Center]

9:25 am – EOF and JIC activated. EOF takes control of the event from the CR. JIC begins public reports. [JIC = Joint Information Center]

10:20 am – SG 1-3 has large tube rupture (loss of RCS barrier). SITE AREA EMERGENCY declared. Site assembly, accountability, and evacuation of non-essential personnel declared.

10:22 am – EDG 1-3 fails to start.

11:01 am – Non-isolable steam line fault occurs. (Loss of Containment barrier.)

11:25 am – GENERAL EMERGENCY declared. PAR to evacuate Zones PAZ-1, PAZ-2, and Ocean to 5 NM declared. UDAC performs radiation release calculations and measurements with FMTs. [PAR = Protective Action Recommendation, PAZ = Protective Action Zone, UDAC = Unified Dose Assessment Center, FMT = Field Monitoring Team.]

The DCISC FFT travels to the JIC.

11:47 am –JIC spokespersons give media briefings and issue news releases. ASW Pump 1-1 fails. ASW crosstie to Unit 2 performed. Unit 1 cooldown to below 200 degrees F. Radiation release terminated.

1:30 pm – Exercise terminates. Critiques begin.

The DCISC FFT observed that the exercise was well planned and implemented in a professional and effective fashion. Controller teams appeared to be well prepared in facilitating the exercise, and controller briefings were thorough. Control Room (Simulator) operators responded appropriately to simulated conditions and exhibited excellent three-way communications, use of phonetic terminology, and clear and effective briefings. The Control Room Shift Manager made event level declarations correctly in a timely manner. Emergency response personnel staffed emergency response facilities on time and efficiently. In the EOF, the Emergency EOF Manager and the Emergency Event Manager were effective at leading PG&E's response to the event. Supporting teams (Engineering, Radiation Protection, Chemistry, Government Contacts, Security, Maintenance, etc.) appeared to work together well.

Emergency classifications appeared to have been declared properly and timely. Communications were generally clear and effective. Recommendations from the EOF to county and state officials for protective actions (notifications and evacuations) appeared to be properly made. In the JIC, simulated press briefings and numerous media releases were made, and they communicated details of the situation to the public in a clear and concise manner. Mock press conferences were also held, in which PG&E provided audience personnel who effectively simulated media representatives.

Following the exercise, each location/function entered into its critique session, and later all groups participated in a joint overall critique. The DCISC FFT was not able to observe the critiques, nor was the approved overall critique report available in time to reference in this report. The FFT recommends that another FFT follow up on the critique results as well as NRC's evaluation.

Conclusion: The DCPP September 14, 2022 Evaluated Emergency Exercise appeared to have been planned and implemented effectively. The scenario was challenging, and emergency personnel handled it properly. Each emergency location activated on time and set up properly. Emergency Action Levels and Protective Action Recommendations were declared correctly.

Recommendations: None

4.0 CONCLUSIONS

4.1 The DCPP Probabilistic Risk Assessment (PRA) group's work today is emphasizing the support of various PRA applications, some driven by NRC regulations, especially for license extension (severe accident analysis and aging management), and others driven by internal plant needs, such as the impacts on safety of equipment removal from service. The use of the PRA for these purposes continues effectively. The DCISC Fact-finding Team concludes that the PRA group is doing excellent work.

4.2 The DCISC concluded that the Refueling Outage 2R23 Safety Plan and Safety Schedule appeared comprehensive and effective in maintaining an appropriate safety margin during upcoming planned outage activities.

4.3 The "all hands" meeting of DCPP employees with top PG&E executives and Board of Directors appeared successful in providing beneficial firsthand communications for all participants.

4.4 The DCISC concluded that the Refueling Outage 2R23 Safety Plan and Safety Schedule appeared comprehensive and effective in maintaining an appropriate safety margin during upcoming planned outage activities.

4.5 PG&E has carried out a "Long Term Seismic Program" for over 30 years to satisfy an NRC license condition. This program consists of several different aspects

(understanding of the seismic hazard, of seismic ground motion and in-structure energy propagation, of the seismic fragility of components and structures, and of seismic plant-response), all aimed at assuring that the power plant can withstand very large earthquakes without a safety compromise. This FF review covered only a fraction of the many different projects within the larger LTSP program. The DCISC concludes that the areas reviewed this time are of excellent quality, and that the plans for further studies going forward are sensible.

4.6 The DCPP Core Exit Thermocouple System is in Green health with few issues.

4.7 The DCPP Cyber Security System and Program appear highly effective in detecting and preventing probes and attacks on plant safety and power-producing systems.

4.8 The regular meetings between DCISC and DCPP Officers and Directors continue to be beneficial for both organizations.

4.9 DCPP life extension has been authorized by the CA Legislature for operation through 2030. This will require reactivation of the NRC 20-year license renewal review process, which was nearly complete when PG&E requested it be halted in 2016. PG&E will meet soon with NRC to determine the schedule and content of information submittals. In parallel with its new major focus on life extension, PG&E will continue on its path to decommissioning, although at a slower pace.

4.10 The DCPP September 14, 2022 Evaluated Emergency Exercise appeared to have been planned and implemented effectively. The scenario was challenging, and emergency personnel handled it properly. Each emergency location activated on time and set up properly. Emergency Action Levels and Protective Action Recommendations were declared correctly.

5.0 RECOMMENDATIONS

None

6.0 REFERENCES

6.1 "Diablo Canyon Independent Safety Committee Thirty-first Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2020 – June 30, 2021", Approved October 15, 2020, Volume II, Exhibit D.3, Section 3.10, "Overall Probabilistic Risk Assessment Program Update."

6.2 "Diablo Canyon Independent Safety Committee Twenty-ninth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2019 – June 30, 2020", Approved October 15, 2019, Volume II, Exhibit D.2, Section 3.9, "Nuclear Safety Culture".

6.3 "Diablo Canyon Independent Safety Committee Thirty-second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2021 – June 30, 2022", Approved September 28, 2022, Volume II, Exhibit D.7, Section 3.1, "Refueling Outage 1R23 Safety Plan."

6.4 "Diablo Canyon Independent Safety Committee Twenty-eighth Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2018 – June 30, 2019", Approved October 20, 2019, Volume II, Exhibit D.7, Section 3.4, "Long Term Seismic Program Update."

6.5 "Diablo Canyon Independent Safety Committee Thirty-first Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2020 – June 30, 2021", Approved October 15, 2020, Volume II, Exhibit D.3, Section 3.9, "Nuclear Instrumentation Update."

6.6 "Diablo Canyon Independent Safety Committee Thirty-second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2021 – June 30, 2022", Approved September 28, 2022, Volume II, Exhibit B.3, "Cyber Security Program Update."

6.7 "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 XX, 2023, Volume II, Exhibit D.2, Section 3.11, "Meeting with DCPP Officer."

6.8 Ibid., Exhibit D.2, Section 3.2, "License Extension Update."

6.9 "Diablo Canyon Independent Safety Committee Thirty-second Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations, July 1, 2021 – June 30, 2022", Approved September 28, 2022, Volume II, Exhibit D.3, Section 3.12, "Emergency Preparedness Exercise Observation."