DIABLO CANYON
INDEPENDENT SAFETY COMMITTEE ("DCISC")

(www.dcisc.org)

Committee Members: Robert J. Budnitz
Peter Lam
Per F. Peterson

* *

Thursday & Friday
June 20-21, 2024
Avila Lighthouse Suites

Point San Luis Conference Room
First and San Francisco Streets
Avila Beach, California

PUBLIC MEETING AGENDA

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PARTICIPATION

You may participate in the DCISC's public meeting in person or in real-time by accessing the Zoom webinar meeting via the weblink and the meeting ID and Passcode given above or by calling any of the phone numbers provided at the top of this agenda. Instructions on how to access, view and participate in remote meetings are also provided by visiting the DCISC's home page at http://www.dcisc.org. Attendees can make oral comments or ask questions of the Committee Members during the webinar meeting by using the "Raise Your Hand" feature or by pressing *9 on your telephone keypad if joining by telephone only. If you are unable to participate in real-time, you may email to dcsafety@dcisc.org with the subject line "Public Comment Item#___" (insert the item number relevant to your comment) or "Public Comment – Non Agenda Item." Comments will be reviewed and distributed before the meeting if received by noon on Wednesday, June 19, 2024. Comments received after that will be addressed during the item and/or at the end of the meeting. All comments received will be read into and become part of the record, subject to a time limit determined by the presiding officer. Subject to the requirements to publish an agenda in advance, the Committee will have the option to modify its actions on items based on comments received.

In accordance with the Bagley-Keene Open Meeting Act (CA Govt. Code §§11120 et seq.) and the Committee's Policies, for each item on the Agenda the Committee reserves the right, at the discretion of the presiding officer, to limit the total amount of time allocated for public comment on particular issues and/or for each individual speaker.

Morning Session - 06/20/2024 – 9:00 A.M.

I CALL MEETING TO ORDER - ROLL CALL

II INTRODUCTIONS AND COMMITTEE MEMBER COMMENTS

ADVISEMENT

The Committee may consider at any time requests to change the order of a listed agenda item. Information distributed to the Committee at a public meeting becomes part of the public record of the DCISC. A copy of written material, pictures, etc. must be provided to the Committee's Legal Counsel for this purpose. Correspondence received and sent by the Committee is on file with the Office of the DCISC Legal Counsel and copies are available upon request. Devices for attendees who may be hearing impaired are available upon request. The meeting will be webcast in real time.

III PUBLIC COMMENTS AND COMMUNICATIONS

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. (The public may comment on any matter listed on the morning's Agenda immediately following the time the matter is considered by the Committee.) *There may be a time limit for each topic and/or speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item, but they may be referred to staff for further study, response or action.*

IV INFORMATION ITEMS BEFORE THE COMMITTEE

A. Informational Presentations Requested by the Committee of PG&E:

1) Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC Inspection Reports and Notices of Violation, Issues Raised by NRC Resident Inspectors, Open Compliance Issues, Current and Future License Amendment Requests, and Other Significant Regulatory Issues/Requests.
2) Refueling Outage 2R24 Results (Including Initial License Renewal Inspection Results).
3) State of the Plant Update including Key Events, Highlights, Organizational Changes, Circumstances Around the March Exigent Technical Specification Change from the NRC, and Other Station Activities since the DCISC's February 2024 Public Meeting.
4) Update on Major Project Planning – Projects Completed in Refueling Outages 1R24 and 2R24, Including Intake Cove Dredging; Future Plans for Plant Improvements, Including Projects Planned for Refueling Outages 1R25 and 2R25.

V ADJOURN MORNING SESSION

Afternoon Session – 06/20/2024 – 1:00 P.M.

VI RECONVENE FOR AFTERNOON SESSION

VII COMMITTEE MEMBER COMMENTS

VIII PUBLIC COMMENTS AND COMMUNICATIONS

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. (The public may comment on any matter listed on the afternoon's Agenda immediately following the time the matter is considered by the Committee.) *There may be a time limit for each topic and/or speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item, but they may be referred to staff for further study, response or action.*

IX INFORMATION ITEMS BEFORE THE COMMITTEE

B. Informational Presentations Requested by the

5) Update on Spent Fuel Management – Planning and Scheduling for Upcoming Movements of Spent Fuel from Wet to Dry Storage; Update on License Renewal for the Independent Spent Fuel Storage Installation; and Update on the Procurement of New Spent Fuel Storage System from the Orano firm.

6) Update on Obtaining State and Local Approvals and Permits Necessary to Support Extended operations.

X TECHNICAL CONSULTANT REPORT; RECEIVE, APPROVE AND AUTHORIZE TRANSMITTAL OF FACT-FINDING REPORT TO PG&E

A. Consultant Richard D. McWhorter Jr.: Fact-finding Topics; Report on March 18-20, 2024, Fact Finding Report.

XI DISCUSSION, DIRECTION AND ACTION, AS APPROPRIATE, BY THE COMMITTEE, CONSULTANTS & COUNSEL

A. Status of Governmental Agency Interactions, Responses to SB846 Directives, Administrative Matters (including ratification of Amendment No. 3 to Consulting Agreement with Dr. Mark Kirk), Financial and Future Funding, and Other Committee Discussions.

B. Consider Request from PG&E and the Decommissioning Engagement Panel for a DCISC Member to Participate as an *ex-officio* Member of the Decommissioning Engagement Panel.

XII ADJOURN AFTERNOON SESSION

Evening Session – 06/20/2024 – 5:15 P.M.

XIII RECONVENE FOR EVENING SESSION

XIV COMMITTEE MEMBER COMMENTS

XV INFORMATION ITEM PRESENTED BY THE COMMITTEE

A. Informational Presentations by the Committee: Report on Evaluations of Public Concerns on Studies by Dr. Mark T. Kirk Evaluating Unit 1 Reactor Pressure Vessel Integrity; Committee Consideration of Endorsing the Kirk Studies and Their Conclusions in the DCISC 34th Annual Report.

XVI PUBLIC COMMENTS AND COMMUNICATIONS

The public may comment on the matter listed on the evening's Agenda immediately following the time the matter is considered by the Committee. Anyone wishing to address the Committee on matters not appearing on the Agenda may do so following those comments. *There may be a time limit for each topic and/or speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item, but they may be referred to staff for further study, response or action.*

XVII ADJOURN EVENING SESSION

Morning Session – 06/21/2024 – 9:00 A.M.

XVIII RECONVENE FOR MORNING SESSION

XIX COMMITTEE MEMBER COMMENTS

XX PUBLIC COMMENTS AND COMMUNICATIONS

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. (The public may comment on matters listed on the morning's Agenda immediately following the time the matter is considered by the Committee.) *There may be a time limit for each topic and/or speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item, but they may be referred to staff for further study, response or action.*

XXI ACCEPTANCE OF MINUTES

A. Minutes of February 21-22, 2024, Public Meeting. Accept

XXII ACTION ITEMS

A Nomination and Election of Chair and Vice-Chair for the July 1, 2024 - June 30, 2025 Term. Discussion/Action

B Discussion of Open Items List. Discussion/Action

XXIII DISCUSSION, DIRECTION AND ACTION, AS APPROPRIATE, BY THE COMMITTEE, CONSULTANTS & COUNSEL (Cont'd.)

C. Public Outreach, Site Visits and Other Committee Activities; Scheduling and Confirmation of Future Fact-Finding Visits and Public Meetings.

D. Documents Provided to the Committee.

XXIV TECHNICAL CONSULTANT REPORTS; RECEIVE, APPROVE AND AUTHORIZE TRANSMITTAL OF FACT-FINDING REPORT TO PG&E (Cont'd.)

B. Consultant R. Ferman Wardell: Fact-finding Topics; Report on and Approval of April 17-18, 2024, Fact Finding Report.

XXV ADJOURN MORNING SESSION

Afternoon Session – 06/21/2024 – 1:00 P.M.

XXVI RECONVENE FOR AFTERNOON SESSION

XXVII COMMITTEE MEMBER COMMENTS

XXVIII TECHNICAL CONSULTANT REPORT; RECEIVE, APPROVE AND AUTHORIZE TRANSMITTAL OF FACT-FINDING REPORT TO PG&E (Cont'd.)

C. Consultant Richard D. McWhorter Jr.:
Fact-finding Topics; Report on and Approval of
May 8-9, 2024, Fact Finding Report.

XXIX INFORMATION ITEM PRESENTED BY THE COMMITTEE (Cont'd.)

B. Receive May 30, 2024 Fact Finding Report Including Input Received from the Independent Peer Review Panel and a Further Update of the DCISC SB846-Mandated Comprehensive Seismic Safety Update of May 5, 2023; Review PG&E's Diablo Canyon Updated Seismic Assessment of March 6, 2024 - Required by SB846: and Approve March 18-20 and May 30, 2024 Fact-Finding Reports; and Authorize Their Transmittal to PG&E.

XXX PUBLIC COMMENTS AND COMMUNICATIONS

Anyone wishing to address the Committee on matters not appearing on the Agenda may do so only at this time. (The public may comment on any matter listed on the afternoon's Agenda immediately following the time the matter is considered by the Committee.) *There may be a time limit for each topic and/or speaker as designated by the presiding officer. No action will be taken by the Committee on matters brought up under this item, but they may be referred to staff for further study, response or action.*

XXXI RECOGNITION OF DCISC MEMBER DR. PETER LAM'S SERVICE

XXXII CONCLUDING REMARKS & DISCUSSION BY COMMITTEE MEMBERS OF FUTURE DCISC ACTIVITIES

A. Future Actions by the Committee.
B. Further Information to Obtain/Review.
C. Confirmation of Future Site Visits, and Public Meetings.

XXXIII ADJOURNMENT OF THE ONE HUNDRED AND EIGHTH PUBLIC MEETING

It is the DCISC's policy is to schedule its public meetings in locations that are accessible to people with disabilities and to remain in compliance with state guidelines on communicable disease prevention. Hand sanitizers and face coverings are available in the meeting room. The Avila Lighthouse Suites Point San Luis Conference Room is a wheelchair accessible facility. A person who needs a disability-related accommodation or modification in order to participate in the meeting may make a request by contacting the DCISC office (in CA 800-439-4688 or (831) 647-1044) or by sending a written request to the DCISC office at P.O. Box 4523, Carmel-by-the-Sea, CA 93921-4523. Providing your request at least five business days before the meeting will help ensure availability of the requested accommodation.

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE	
AGENDA TRANSMITTAL FORM	
MEETING DATE:	June 20, 2024
AGENDA ITEMS:	X-A, XXIV-B & XXVIII-C
AGENDA TITLE:	Consultant Reports; Receive, Approve and Authorize Transmittal of Fact Finding Reports.
CONSENT [ ] ACTION [X] INFORMATION [X]	

Staff Summary:

It is expected that oral and written reports will be presented at the meeting by Technical Consultants Mr. Wardell and Mr. McWhorter. These reports may be received by the Committee, approved as to form and content and be authorized for transmittal to PG&E for its consideration and response. The Committee reserves the right to revise any fact finding report prior to its inclusion in an Annual Report. Fact finding reports in their final "as approved form" become a part of the DCISC's next Annual Report.

Fact Finding Reports are posted on the Committee's website at www.dcisc.org prior to a public meeting and made available for public inspection immediately following their approval by the Committee at a public meeting.

The Fact Finding Reports were posted on the Committee's website prior to the public meeting.

RECOMMENDED COMMITTEE ACTION:

Receive and approve reports by Consultants and Members and approve resolutions certifying approval concerning fact-finding conducted on April 17-18, 2024, [Resolution 2024-05], on May 8-9, 2024, [Resolution 2024-06], receive report by a Consultant and a Member on and defer approval of March 18-20, 2024 [Resolution 2024-04].

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE	
AGENDA TRANSMITTAL FORM	
MEETING DATE:	June 20, 2024
AGENDA ITEM:	XI - A
AGENDA TITLE:	Status of Governmental Agency Interactions, Responses to SB 846 Directives, Administrative Matters (including ratification of Amendment No. 3 to Consulting Agreement with Dr. Mark Kirk) Financial and Future Funding and Other Committee Discussions.

CONSENT [ ] ACTION [X] INFORMATION [X]

Staff Summary:

On August 31, 2022, in the California Assembly, and on September 1, 2022,in the California Senate, the California Legislature passed and on September 2, 2022, Governor Newsom signed urgency legislation to invalidate the Joint Proposal which would have retired DCPP Unit 1 in 2024 and Unit 2 in 2025 in order to preserve the option of continued operation of DCPP beyond 2025 (California Senate Bill SB 846).

The legislation amends sections of the California Government Code, the Public Resources Code, the Public Utilities Code and the Water Code to require the Public Utilities Commission to consider setting new retirement dates for DCPP, conditioned upon the NRC extending the plant's operating licenses. On December 15, 2023, the CPUC issued Decision 23-12-036 Conditionally Approving Extended Operations at Diablo Canyon Nuclear Power Plant Pursuant to SB 846 until October 31, 2029 (Unit 1) and October 31, 2030 (Unit 2). Public Utilities Code §§712.1 and 712.8, added by SB846, require the Committee to undertake certain additional reviews and duties including concerning the transmittal of its findings and recommendations.

On November 7, 2023, PG&E submitted its License Renewal Application for Diablo Canyon to the NRC and on December 19, 2023 the Application was found by the NRC to be acceptable for docketing (NRC 2023-0192) and on December 14, 2023, the License Renewal Application was deemed acceptable by the NRC which permits the plant to continue to operate while the NRC completes its investigation and review.

It is anticipated the Members, Technical Consultants and Legal Counsel will hold a discussion and receive information including recent interaction with governmental agencies, financial, administrative and regulatory matters including the Committee's response to the passage of SB846 and the CPUC Order Instituting Rulemaking [R.23-01-007] including Phase 2 to address future funding for the Committee's operations during the period of extended operation.

The Committee is also expected to take up the ratification of Amendment No. 3 to the Agreement with Dr. Mark T. Kirk concerning Unit 1 Reactor Pressure Vessel integrity increasing compensation provided to Dr. Kirk, and discuss financial and future funding and other matters.

RECOMMENDED COMMITTEE ACTION:

Discussion and take action and/or provide direction as appropriate.

AMENDMENT No. 3
to
AGREEMENT FOR CONSULTING SERVICES
With MARK KIRK, Ph.D..

This Amendment No. 3 to the Agreement for Consulting Services between the Diablo Canyon Independent Safety Committee ("Committee") and Consultant Mark Kirk ("Consultant") is made as of _____ ____, 2024.

In consideration of the mutual promises contained herein, Committee and Consultant agree that the Terms and Conditions set forth herein are incorporated into the Agreement for Consulting Services between Committee and Consultant dated September 13, 2023 (the AAgreement@) as amended by Amendment No. 1 on December 11, 2023, and by Amendment Nol. 2 on February 21, 2024. Only the paragraph number of the Terms and Conditions of said Agreement which is being modified or otherwise revised is set forth in this Amendment.

Paragraph 2. "Compensation. Effective on the date first written above, for the services to be provided by Consultant under this agreement, Consultant shall be compensated at the hourly rate of $200.00 per hour, not to exceed the total amount of $81,000.00 without the written consent of the Committee's Chair. Time spent by Consultant for the services hereunder shall be recorded under generally accepted accounting practices and shall be itemized on any billings to the Committee. In addition to compensation for the Consultant's time above, the Committee shall also reimburse Consultant directly for all out-of-pocket expenses reasonably incurred by Consultant in connection with providing services to the Committee including, but not necessarily limited to, printing of any reports, photocopies, facsimile, postage, long-distance telephone and internet charges and for any travel specifically requested by the Committee and for lodging and subsistence (meals and incidental expenses) incurred during such travel. Time and expense reporting shall be in accordance with Committee Policy No. 6 "Consultant Guidelines" attached to the Agreement as **Exhibit "B."**

IN WITNESS WHEREOF the Chair of the Diablo Canyon Independent Safety Committee has executed this Amendment as evidence of the Chair's authorization for Consultant to exceed the "not to exceed" total amount of $61,000.00 provided by Amendment No. 2 in accordance with Committee Policy No. 6, Section 7, and the Consultant and the Chair have executed this Amendment on the date(s) and year written below. This Amendment No. 3 may be executed in counterparts, including counterparts transmitted by electronic mail in so-called pdf format and shall be legal and binding and have the same full force and effect as if paper originals with handwritten signatures had been exchanged. All executed counterparts shall constitute one agreement, and each counterpart shall be deemed an original.

This Amendment No. 3 shall be subsequently ratified by vote of the Members at the June 20-21, 2024 public meeting

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

By Peter Lam 5/15/2024

Dr. Peter Lam. Chair Dated

CONSULTANT

By _____ 22 May 2024

Dr. Mark T. Kirk Dated

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE	
AGENDA TRANSMITTAL FORM	
MEETING DATE:	June 20, 2024
AGENDA ITEM:	XI-B
AGENDA TITLE:	Request from PG&E and the Decommissioning Engagement Panel
CONSENT [ ] ACTION [X] INFORMATION [X]	

Staff Summary:

On March 7, 2024, the Committee received the attached letter from Mr. Tom Jones, PG&E Senior Director, Regulatory, Environmental and Repurposing, with a request on behalf of PG&E and the Diablo Canyon Decommissioning Engagement Panel (DCDEP) for a DCISC Member to serve as an *ex officio* member of the DCDEP.

The DCDEP was convened in May 2018 by PG&E as a volunteer, non-regulatory body created to foster and encourage open communication, public involvement and education on DCPP decommissioning plans and activities. It is intended to serve as a forum for the local community to provide direct input to PG&E and regulatory agencies on matters related to DCPP decommissioning. The DCDEP functions solely in an informational and advisory capacity.

The DCDEP helps to inform PG&E's site-specific decommissioning plans including future land use and repurposing recommendations. Final decisions regarding decommissioning will be made by PG&E in conjunction with the appropriate regulatory agencies. PG&E intends to continue to engage with the DCDEP and solicit input from the public during the multi-year decommissioning process.

Ex Officio member(s) (which may include elected officials) may be selected by the Panel and PG&E to represent local interests. Up to three ex officio members may serve at any time. At the present time there are two ex officio panel members, Mr. Scott Lathrop representing the yak tityu tityu yak tilhini Northern Chumash Tribe and Ms. Susan Strachan, San Luis Obispo County Decommissioning Manager.

It is expected that the DCISC Members will discuss and consider the request for a member of he of the DCISC to participate on the DCDEP in an ex officio capacity.

RECOMMENDED COMMITTEE ACTION:
Discuss and consider request from PG&E and the DCDEP and provide response as appropriate.

Pacific Gas and Electric Company®

Thomas P. Jones
Senior Director
Regulatory, Environmental & Repurposing

Diablo Canyon Power Plant
P.O. Box 56
Avila Beach, CA 93424

805.459.4530
Tom.Jones@pge.com

PG&E Letter DCL-24-024

Diablo Canyon Independent Safety Committee
Office of the Legal Counsel
SW 4th & Mission, Suite 2, P.O. Box 4523
Carmel, CA 93921-4523

Subject: Invitation to Participate in Diablo Canyon Decommissioning Engagement Panel

Dear DCISC Members:

Pacific Gas and Electric Company (PG&E) and the Diablo Canyon Decommissioning Engagement Panel (DCDEP) are requesting that a member of the Diablo Canyon Independent Safety Committee (DCISC) participate as an ex-officio member of the DCDEP.

Since its creation in May 2018, the DCDEP has conducted public meetings and workshops on key topics of decommissioning, including use of Diablo Canyon lands, repurposing of Diablo Canyon facilities, emergency services, and storage of spent nuclear fuel. DCISC has frequently advised the DCDEP on safety related matters and provided technical expertise in the panel's public meetings.

On January 30, 2024, as part of the DCDEP's strategic planning meeting, PG&E and the DCDEP agreed to request the participation of DCISC in an ex-officio capacity. PG&E and the DCDEP believe that the panel and the public would benefit from DCISC's expertise on DCPP safety matters. Participation on the DCDEP provides the panel and the public additional opportunities to discuss operational safety at DCPP with the DCISC and will allow the DCISC representative to direct members of the public to the appropriate venue to have their suggestions, questions or concerns addressed. The panel typically holds public meetings quarterly and holds internal administrative meetings monthly.

Please contact me at (805) 459-4530 or by email at tom.jones@pge.com if you have any questions or would like to discuss further. PG&E greatly appreciates your attention to this important matter.

Sincerely,

Thomas P. Jones

Thomas P. Jones

March 7, 2024
Date

cc: Robert. J Budnitz, DCISC Member
Per F. Petersen, DCISC Member
Peter Lam, DCISC Member
Robert Rathie, DCISC Assistant Legal Counsel

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE

AGENDA TRANSMITTAL FORM

MEETING DATE:	June 20, 2024
AGENDA ITEM:	XV
AGENDA TITLE:	Report on Evaluations of Public Concerns on Studies by DCISC Consultant Dr. Mark T. Kirk Evaluating Unit 1 Reactor Pressure Vessel Integrity; Committee Consideration of Endorsing the Conclusions of Dr Kirk's Studies.

CONSENT [ ] ACTION [X] INFORMATION [X]

Staff Summary: Unit 1 Reactor Vessel Integrity Study.

This work was performed by Dr. Mark T, Kirk as a Consultant to the Diablo Canyon Independent Safety Committee to review the status of Unit 1's reactor pressure vessel integrity which has come under question. Mr. Bruce Severance, a member of the public, and also the groups San Luis Obispo Mothers for Peace (SLOMFP) and Friends of the Earth (FOE) have raised concerns through their consultant Dr. Digby Macdonald alleging that the Unit 1's reactor pressure vessel has exceeded its lifetime based on review of certain licensing documents and information. In its recent Safety Evaluation Report issued in 2011 as part of Diablo Canyon's original license renewal application, the Nuclear Regulatory Commission accepted Diablo Canyon's assessment of Unit 1's reactor pressure vessel indicating that it was acceptable for the additional 20-year license extension after expiration of the original operating licenses for the power plant in 2024 (Unit 1) and 2025 (Unit 2) under aging management program.

At the February 2024 public meeting the Committee and the public received an extensive report from Dr. Kirk on this topic and on Dr. Kirk's written report to the DCISC of January 26, 2024, entitled "An Evaluation of the Status of Diablo Canyon Unit 1 With Respect to Reactor Pressure Vessel Condition Monitoring and Prediction" which was presented in two parts comprised of "Part 1 Addressing Public Concerns" and "Part 2 Evaluation of Diablo Canyon Unit 1 Embrittlement." The full Report has been available on the DCISC website since February 1, 2024. At the February 2024 public meeting the Committee took action to accept Dr Kirk's report and discussed and directed that consideration of endorsing the conclusions in Dr. Kirk's Report be deferred to a later public meeting.

Following the February public meeting, in response to the Committee's invitation, on April 15, 2024, Mr. Severance provided his Comments to the Diablo Canyon Independent Safety Committee raising a number of issues with Dr Kirk's report and the discussion at the February 2024 DCISC meeting. On May 28, 2024, Dr. Kirk's Replies to Mr. Severance's Comments were posted to the Committee website with Mr. Severance's Comments included as an appendix.

RECOMMENDED COMMITTEE ACTION:

Discussion and consider endorsing the conclusions in Dr Kirk's report of January 26, 2024, as stated on pages 3, 4 and 5 of Part 2 of that Report and take such other action and/or provide direction as may be appropriate through the adoption of Resolution 2024-07. Whatever action taken by the Committee on this matter will form a part of the Committee's 34th Annual Report.

An Evaluation of the Status of Diablo Canyon Unit 1 With Respect to Reactor Pressure Vessel Condition Monitoring and Prediction

Part 2: Evaluation of Diablo Canyon Unit 1 Embrittlement

Consultant's report to the Diablo Canyon Independent Safety Committee

Submitted by
Mark Kirk
Phoenix Engineering Associates Inc.
Unity, New Hampshire, USA

Date: 26 January 2024

*P*hoenix
*E*ngineering
*A*ssociates
*I*nc.

Disclaimer

This report summarizes the consultant's evaluation of the state of embrittlement in the Diablo Canyon Unit 1 reactor pressure vessel and various questions related to this topic. The report is provided as information to the Diablo Canyon Independent Safety Committee (DCISC). The consultant has no responsibility for decisions made by the DCISC, or by any other body, based on the information in this report.

Executive Summary

From 2009 to 2018 the Pacific Gas and Electric Company (PG&E) pursued a 20-year license renewal for the nuclear power plant at Diablo Canyon with the Nuclear Regulatory Commission (NRC), an effort terminated in 2018 due to then-projected energy demands and economic factors. In 2022 the State of California directed the California Public Utilities Commission (CPUC) to direct PG&E to again pursue license renewal to the year 2030. Subsequently, members of the San Luis Obispo Mothers for Peace (SLOMFP), the Friends of the Earth (FOE), and Mr. Bruce Severance (a member of the public) placed before the Diablo Canyon Independent Safety Committee (DCISC) concerns regarding embrittlement of the Unit 1 reactor pressure vessel (RPV) and its continued operating safety. SLOMFP and FOE have expressed similar concerns to both the CPUC and NRC.

This is one of two reports prepared for the DCISC. The objective of this report is to evaluate the state of knowledge concerning the embrittlement of the Diablo Canyon Unit 1 reactor pressure vessel (RPV) and to review current safety evaluations performed by PG&E. The objectives of the companion report are to explain the current process for predicting material embrittlement and for establishing operating limits, and to address concerns raised by SLOMFP and FOE as well as by Mr. Bruce Severance.

This report reviews documents concerning PG&E's surveillance program, its embrittlement predictions for Unit 1, and the safety evaluations performed for both pressurized thermal shock and upper shelf energy. Supplemental analysis using more data than is required by the NRC and using recently proposed analysis techniques are performed to gain additional insights concerning the embrittlement condition of the Unit 1 RPV. Collectively these evaluations provide a basis to evaluate the need for and potential benefit of additional testing.

The information contained herein supports the following conclusions:

<u>Concerning Surveillance Testing</u>

- Surveillance requirements for the original 40-year license required testing of three capsules. This was completed in 2003 when Capsule V was withdrawn and tested. No further capsule testing was required by the 40-year license.
- Surveillance guidance during license renewal is established by the NRC. For the situation of Unit 1 testing of a fourth capsule is recommended between 40 and 60 years of operation. This will be achieved by PG&E's plan to test Capsule B, which is documented in its license renewal application. Withdrawal of Capsule B has been planned for the next refueling outage and should be completed before 2028 to be consistent with NRC guidelines.

- Several deferrals of Capsule B testing, which was originally planned for 2009, were all acceptable because, as stated, the 40-year requirements were for three capsules.
- While it does not affect surveillance capsule testing guidance it is nevertheless reassuring to note that Unit 1 has, since 2011, had data for its limiting weld to a fluence exceeding that projected for 60 years of operation. When Capsule B is withdrawn the new data, which must be reported to the NRC within 18 months of the capsule withdrawal date, will have a fluence well beyond that of the RPV after 60 years. Once obtained, these new data may change the outcome of the structural integrity estimates for long term operation (i.e., to 60 years), which are discussed next.

Concerning Safety Evaluations Performed to NRC Requirements

- Embrittlement predictions made by PG&E for Unit 1 are accurate and compliant with NRC procedures, including the characterization of credibility of the Charpy impact toughness transition temperature shift (ΔT_{41J}) data throughout Unit 1's operation.
- Based on data currently available, Unit 1 is not forecast to exceed the NRC's PTS screening criteria or the NRC's 68J screening criteria on Charpy upper shelf energy until sometime after 60-years of operation. Thus, Unit 1 currently satisfies NRC criteria associated with pressurized thermal shock and upper shelf energy through 60-years of operation.

Concerning Safety Evaluations Performed Using Supplemental Techniques

- Analyses were performed by this consultant using techniques supplemental to those now in regulatory and Code use to gain additional insights concerning the embrittlement condition of the Diablo Canyon Unit 1 RPV. These techniques make use of more data from other plants and more recently developed analytical techniques than now required by NRC. This information may inform DCISC and public judgments concerning the confidence that can be placed in existing techniques. Since these techniques are neither required nor currently endorsed by the NRC, this information has no impact on the licensing basis of Diablo Canyon Unit 1.
- For ΔT_{41J} and pressurized thermal shock, the supplemental analysis demonstrated that there is little likelihood that the plate material will become limiting during future operations. Using available direct fracture toughness (Master Curve) data for the Unit 1 limiting weld material demonstrated a conservatism of 20-30 °C in the current approaches adopted by the NRC.
- For upper shelf energy and the NRC's 68J screening criteria, the analysis forecasts that the Unit 1 RPV could fall below the 68J USE screening criteria during its license renewal period, likely sometime in 2029 or 2030. An equivalent margins analysis following Regulatory Guide 1.161 could be performed to demonstrate adequate safety margins for the RPV were it deemed necessary. Equivalent margins analyses performed on other reactors have, without exception, demonstrated that continued operation at USE values considerably below 68J is acceptable. In any event, the Unit 1 USE values

remain acceptable for the 5-year license extension period proposed by the State of California.

Concerning Additional Testing

- All analyses performed herein that follow current NRC requirements show PG&E has correctly assessed the Unit 1 RPV, and it meets all current regulatory requirements to 60 years of operation. As such, there is no need for testing to collect additional data at the current time. When Capsule B is tested, which is currently planned to occur after its withdrawal during the next refueling outage, those data will be considered with existing data could alter predictions for long term operation (i.e., to 60 years). If the new analysis suggests a degree of embrittlement that exceeds regulatory screening criteria for pressurized thermal shock or upper shelf energy before 60 years, compensatory actions would be required by NRC regulations. These actions may include changes to plant operating practices, performance of plant-specific analyses (for example using the alternate pressurized thermal shock rule and/or the NRC's guidance on assessment of low upper shelf steels) to demonstrate the adequacy of existing margins, collection of additional data, or some combination of all approaches. If additional data are collected, direct measurement of fracture toughness would be advisable as such data can be most clearly interpreted using existing regulatory and ASME Code procedures.

It should be recognized that NRC screening criteria do not represent failure conditions, but rather situations of very low failure probability in which further analysis, plant modifications, or additional data are used to demonstrate the maintenance of adequate safety margins, with high confidence. As such, an assessment that forecasts a screening criterion will be passed in the future is not a cause for alarm but, rather, indicates that additional analyses and actions are needed. The NRC requires these analyses and actions be completed three years before the screening criteria are passed.

Replies to Comments from Mr. Bruce Severance dated 15 April 2024

prepared by Mark Kirk for the DCISC · 22 May 2024

Overview

Following issuance of evaluations performed for the DCISC of public concerns regarding Diablo Canyon Unit 1 [Part 1 Report] and of PG&E's embrittlement forecasts for that plant [Part 2 Report], the DCISC invited members of the public to comment on those reports. This document provides my replies to comments provided by Mr. Bruce Severance to the DCISC in his document titled, "Is DCPP Unit 1 Reactor a 'Good Bet' for the People of California?" dated 15 April 2024. I have marked Mr. Severance's document:

_Severance Comments - 2024-04-15 - Marked for Reply.pdf

to highlight the specific comments to which I have replied in the remainder of this document. In many cases the comments are repetitive, although not exactly so. I have tried my best to cross-reference replies to minimize repetition. Also, I have, to the greatest extent possible, provided pointers to information in the Part 1 and Part 2 reports where this information helps to address the comments made by Mr. Severance. In a few cases figures and tables have been copied from the Part 2 report and incorporated into this document for clarity. Some of my replies may be repetitious, but I thought this approach better than allowing potentially significant public concerns to remain unanswered.

While none of the details of Mr. Severance's inter-connected concerns should be overlooked, his most frequently expressed concerns fall broadly into three categories:

(A) Concerns regarding correct application of NRC procedures for embrittlement forecasting and assessment. This includes the following sub-topics:
   a. The NRC's credibility criteria by which surveillance data is used to forecast future embrittlement,
   b. The use of similar data from so-called "sister plants" to help inform future predictions of embrittlement for Diablo Canyon Unit 1,
   c. The amount of data on which the Diablo Canyon Unit 1 forecast is based, and
   d. The reasons why future embrittlement forecasts for Diablo Canyon Unit 1 have changed over time.

(B) Concerns regarding deferrals of plans to test surveillance Capsule B and evaluate the impact of data obtained from that capsule on future embrittlement forecasts.

(C) Concerns that the supplemental upper shelf energy (USE) analysis that appeared in Section 4.2 of the [Part 2 report] indicated that USE the limiting weld in the Diablo Canyon Unit 1 RPV could fall below the NRC's 68J USE screening criteria by 2029 or 2030.

In summary response:

(A) Chapter 2 of the [Part 1 report] attempted to explain and clarify the NRC's procedures for embrittlement forecasting and assessment, addressing all of the topics listed under Category (A). Unfortunately, Mr. Severance's Category (A) concerns all arise due to a continued misunderstanding of the NRC's procedures. I have attempted to further clarify and explain the NRC's procedures and how PG&E's data collection, analyses, and embrittlement forecasts are compliant with these procedures, in the following pages.

(B) Section 2.3 of the [Part 2 report] summarized the NRC's requirements for surveillance monitoring with a focus on the specific requirements for Diablo Canyon Unit 1. Mr. Severance's Category (B) comments claim to reveal a 2006 amendment to the operating license of Diablo Canyon Unit 1 that would have required testing of a fourth surveillance capsule (Capsule B) during the original 40-year license term. I have reviewed the 2006 document and determined that while the document does in fact discuss a license amendment and surveillance capsule testing, the amendment does not require testing of a fourth surveillance capsule (Capsule B) during the original 40-year license term. As summarized in Section 2.3 of the [Part 2 report], and as affirmed by the NRC in many documents, Diablo Canyon Unit 1 is a three-capsule plant for the original 40-year license term.

(C) Mr. Severance's Category (C) comments are correct in noting that a supplemental (non-NRC required) analysis of USE that appeared in Section 4.2 of the [Part 2 report] determined that the USE of the limiting weld in the Diablo Canyon Unit 1 RPV could fall below the NRC's 68J USE screening criteria by 2029 or 2030. However, as also stated elsewhere in that report, because the analysis was neither required nor endorsed by the NRC the outcome of the analysis has no impact on the licensing basis of the Diablo Canyon Unit 1 nuclear power plant. Also, an equivalent margins analysis following Regulatory Guide 1.161 could be performed to address any USE concerns. Equivalent margins analyses performed on other reactors have, without exception, demonstrated that continued operation at USE values considerably below 68J is acceptable. The uniformity of this result across all plants and embrittlement conditions speaks to the conservatism of the 68J screening criteria.

In summary, none of the concerns expressed by Mr. Severance change any of the conclusions with respect to Diablo Canyon Unit 1 as expressed in the [Part 1 report] and [Part 2 report]. I still conclude that embrittlement predictions made by PG&E for Unit 1 are accurate and compliant with NRC procedures, including the characterization of credibility of the Charpy impact toughness transition temperature shift (ΔT_{41J}) data throughout Unit 1's operation. Based on data currently available, Unit 1 is not forecast to exceed the

NRC's PTS screening criteria or the NRC's 68J screening criteria on Charpy USE until sometime after 60-years of operation. Also, the several deferrals of Capsule B testing, which was originally planned for 2009, were all acceptable because Diablo Canyon was required to test only three capsules during its original 40-year license, a requirement fulfilled in 2003.

The following pages provide my detailed replies to the various comments arising in Mr. Severance's document provided to the DCISC on 15 April 2024.

Page 1, Item A

Comment "The pre-2004 test data and PG&E's own 2006 calculations indicate this embrittlement will be reaching the Federal Code of Regulation "screening limits" [on pressurized thermal shock as expressed in 10 CFR 50.61][1] by 2025 (also confirmed by NRC in 2006)"

Reply The statement that, based on data available before 2004, Diablo Canyon Unit 1 was forecast to exceed the PTS screening criteria in 2025 is incorrect. This information does not agree with that submitted by PG&E as part of its 2009 license renewal application [Diablo2009 LRA], which was based on the pre-2004 surveillance capsule data from Diablo Canyon Unit 1 cited in this comment. [Diablo2009 LRA] provided the following information.

Maximum ID Fluence at 32 EFPY (40 operating years)	1.26×10^{19} n/cm^2	Table 4.2-1
Maximum ID Fluence at 54 EFPY (60 operating years)	2.06×10^{19} n/cm^2	Table 4.2-1
RT_{PTS} value for weld wire heat 27204, Lower shell longitudinal weld 3-442C, at 54 EFPY	280.4 °F (138 °C)	Table 4.2-4

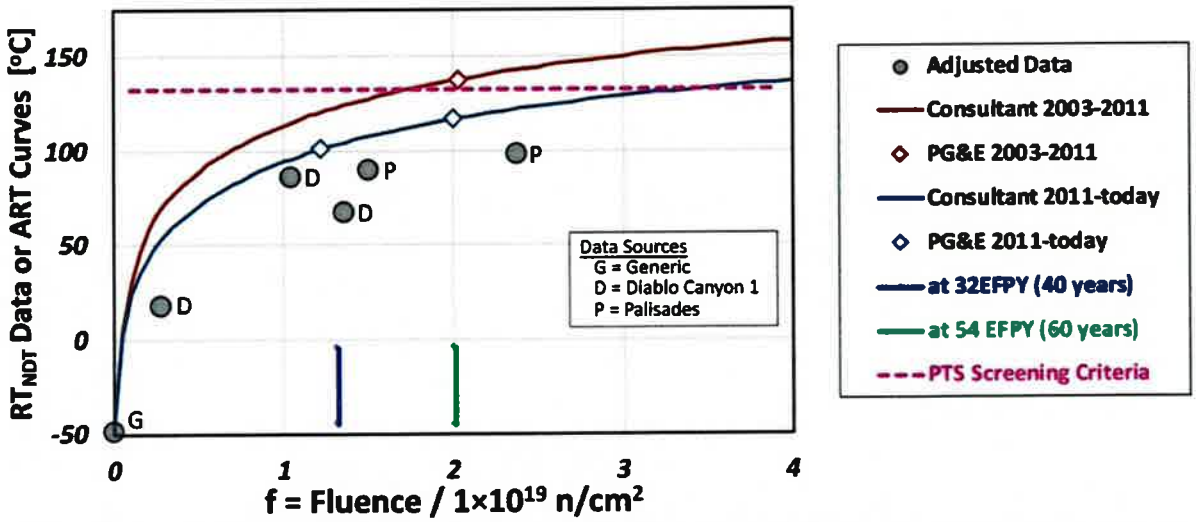
Figure 4 of the Part 2 report, which is copied below for convenience, validated this RT_{PTS} estimate to within 1 °C. The dark red curve on Figure 4 shows this estimate of RT_{PTS} to be below the PTS screening criteria (270 ° F or 132.2 °C) at the 32 EFPY fluence but above the screening criteria at the 54 EFPY fluence. The information from Figure 4 was used to determine that, using only information available before 2009, the PTS screening criteria was then forecast to be exceeded at a fluence of 1.8×10^{19} n/cm^2, which would occur at approximately 46 EFPY. However, in 2025 refueling outage Diablo Canyon Unit 1 is currently forecast to reach 35.2 EFPY. Thus, the statement

[1] In this document sections labeled "Comment" are a direct quotation from the 15 April 2024 document provide by Mr. Severance. Text appearing in square brackets has sometimes been added for clarity. Text within the square brackets is not a direct quotation.

in the comment that, based on data available before 2004, Diablo Canyon Unit 1 was forecast to exceed the PTS screening criteria in 2025 is incorrect.

It should also be pointed out that the 2006 RT_{PTS} estimates cited by this comment are no longer current. Since 2011 additional information on the limiting weld (weld wire heat 27204) has been available in the form of two ΔT_{41J} measurements made by the Diablo Canyon's "sister plant" Palisades [WCAP-17315]. When incorporated into the PTS analysis, as required by the NRC, those data demonstrate that Diablo Canyon Unit 1 will not exceed the 10 CFR 50.61 screening criteria until long after 60 years of operation (see blue curve on the Part 2 report, Figure 4, which is copied below). The Part 2 report validated the [WCAP-17315] evaluation Diablo Canyon Unit 1 surveillance data as augmented by the sister plant data from Palisades (also see the figure).

Finally, it should be noted that while [WCAP-17315] was completed by Westinghouse and delivered to PG&E in 2011, PG&E did not place this information on the NRC docket until 2023 when they submitted an updated license renewal application [DCL-23-038]. I cannot speak to the reason, but it may be noted that the added plant lifetime demonstrated by the [WCAP-17315] calculations was not needed by PG&E until the decision in 2022 to again pursue license renewal.



Part 2 Report, Figure 4. Comparison of consultant's ART estimates (curves) with those of PG&E (diamonds) for the timeframe 2003-2011 [Diablo LRA 2009] and 2011-today [WCAP-17315]. The NRC's required process for adjusting data is described in the Part 1 report, Section 2.4.2.2.

Page 2, Item B

Comment "The critical question is whether NRC procedures were in fact followed in the process of reanalyzing the DCPP-1 pre-2004 stress test data, and whether the Kirk Report accurately represents the current state of Unit 1 embrittlement and confirms the Westinghouse assessment based on accurate interpretation of NRC procedure. I cannot claim to have all the answers, but there are serious questions about how data from two severely embrittled plants can be combined and integrated mathematically to yield far more favorable projections than either subset of data would suggest."

Reply Comments concerning the embrittlement of another plant, Palisades in this case, are not relevant to assessment of the embrittlement condition at Diablo Canyon Unit 1. The Diablo Canyon analysis has used, as is required by NRC, data from weld wire heat 27204 that was irradiated in a capsule installed at Palisades. While Diablo Canyon Unit 1 uses these data, the forecast degree of embrittlement at Palisades, which is controlled by data on a different weld wire heat (W5214), is of no consequence to Diablo Canyon Unit 1 [WCAP-17628].

Information presented in Chapter 3 of the Part 2 report provides extensive validation that, with one exception, PG&E's calculations have correctly followed NRC procedures for all data states that have existed since the plant began operation. The exception (see Section 3.2.2 of the Part 2 report) was a minor error in the USE analysis reported in [WCAP-15958] and that error produced a 1 Joule under-estimate of USE. This error, which was in a conservative direction and was corrected in 2015, had no effect on the assessment as both values are above the NRC's USE screening criteria of 50 ft-lb (68J).

This comment speculates about possible conclusions that may result if the Diablo Canyon Unit 1 surveillance data were analyzed separately from the Palisades sister plant data. However, analysis of data subsets is not permitted by the NRC's procedures in [10CFR50.61]. As explained in Section 2.4.2.2 of the Part 1 report, if sister plant data is available it must be analyzed together with the surveillance data of the plant in question to forecast the future embrittlement state. This forecast is then compared to the PTS screening criteria set forth in [10CFR50.61]. Chapter 3 of the Part 2 report validates that such analyses have been correctly performed by PG&E.

Page 3, Item C

Comment "While PG&E was allowed to review and edit Dr. Kirk's analysis, public advocates such as myself, were not afforded this privilege."

Reply The comment that PG&E edited the analysis is false. PG&E was specifically asked to review the Part 1 and Part 2 reports only to confirm that the data used was factually correct.

The comment that public advocates were not afforded the privilege of review is also false. The DCISC made the Part 1 and Part 2 reports available to the public on 31 January (21 days prior to the DCISC's public meeting held on 21 February 2024), and at the same time notified all parties on the DCISC's distribution list that the reports were available. The DCISC also extended the time for the public to review and comments on the reports to April 15. The DCISC also made accommodations for Mr. Severance and Dr. Macdonald to provide sufficient time to comment.

Page 3, Item D

Comment "Dr. Kirk's own independent analysis suggests Unit 1 will be approaching the maximum screening limits for embrittlement by 2029 (USE projection)."

Reply The analysis referred to was reported in Chapter 4 of the Part 2 report. As stated in the report while the techniques used evolve from currently accepted practices and in some cases are currently in codification review by ASME, none are currently endorsed or required by the NRC. Thus, the information presented in this chapter has no impact on the licensing basis of the Diablo Canyon Unit 1 nuclear power plant.

Please see the reply to Page 10, Item 10 below for a fully detailed reply to this comment.

Page 3, Item E

Comment "In my comment to the DCISC in February 2024, I pointed to a 2006 NRC document (Letter granting 37-month extension approval to Nov. 2024 in which PG&E has asserted and NRC confirmed that Unit 1 would be within 3% of maximum screening limits for embrittlement by Nov. 2024."

Reply The 2006 calculations of RT_{PTS} based on surveillance data have since been superseded by more recent calculations that are based on additional data provided by the sister plant Palisades [WCAP-17315, DCL-23-038]. These

newer calculations form the current licensing basis for Diablo Canyon Unit 1, which demonstrate that the PTS screening limit will not be reached until well after 60 years of service.

Please see the reply on Page 9 Item 1 below for a fully detailed reply to this comment.

Page 3, Item F

Comment "Neither the Kirk nor Westinghouse Reports makes mention of the 2006 PG&E PTS Evaluation that accompanied the application for a 37-month license extension. The 2006 NRC document granting the extension clearly states that the 37-month extension granted by this document amends the surveillance program requiring a fourth capsule be tested by roughly 2009."

Reply Despite the assertation of the commenter, the referenced letter [NRC 2006] does not amend the Diablo Canyon Unit 1 license to require an additional capsule test (Capsule B) be conducted by 2009. Capsule B testing was not a requirement during the initial 40-year license period.

Please see the reply to Page 9, Item 5 below for a fully detailed reply to this comment.

Page 4, Item G

Comment "PG&E and the NRC based their 2006 PTS analysis and embrittlement projections based upon the premise that the pre-2004 test data met the credibility requirements as stated in RG1.99 and the NRC's independent assessment produced calculated results that were within less than 1% deviation from PG&E's assessment. The extreme correlation between PG&E's and the NRC's independent results should be noted. Yet the 2006 NRC-PG&E projection that Unit 1 will reach embrittlement screening limits is not even mentioned in either the 2011 PTS Evaluation or by Dr. Kirk. This PTS analysis that only pre-dates the 2011 Westinghouse PTS Evaluation by five years, and it is not even mentioned as a reference as is customary in such reports to the NRC. The omission is notable and perhaps contrary to NRC procedures. Wichman's 1998 clarification of GL92-01 (NRC PTS calculation procedures) clearly states:"

> "..., licensees shall consider plant-specific information that could affect the level of embrittlement. This information includes but is not limited to the reactor vessel operating temperature and any related surveillance program5 results."

Footnote 5 noted above states:

"Surveillance program results means any data that demonstrates the embrittlement trends for the limiting beltline material, including but not limited to data from test reactors or from surveillance programs at other plants with or without surveillance program integrated per 10 CFR Part 50, Appendix H.".

Reply

The 2006 analysis referred to in this comment appears in [DCL-06-045]. While I did not review this document while preparing the Part 1 and Part 2 reports, it merely repeats the PTS analysis of the time, providing no new information. The 2006 analysis could only be based on the data available at the time (that is: data from Diablo Canyon Unit 1 Capsules S, Y, and V). These same data were assessed as not-credible in both the Capsule V report in 2003 [WCAP-15958] and in the 2009 license renewal application [Diablo LRA 2009], both documents that I did review. These calculations were validated in Section 3.1 of the Part 2 report.

[DCL-06-045] gives a RT_{PTS} value for the limiting weld of 258.7 °F (125.9 ° C) at a fluence of 1.43×10^{19} n/cm^2. This value compares with my calculations that appear as the dark red curve in the figure that on page 4 of this document. At a fluence of 1.43×10^{19} n/cm^2. The dark red curve has a RT_{PTS} value of 258.9 °F (126.1 °C), confirming the PG&E result from [DCL-06-045]. The close agreement noted here is as expected given that the calculation is algebraic and that both PG&E and I used the same input data.

Page 4-5, Item H

Comment

"There are aspects of the Kirk Report which appear to me to be misleading. Kirk states: ***"Currently available surveillance data pertinent to Diablo Canyon Unit 1 RPV have already quantified embrittlement at exposure levels that the [DCPP-1] RPV will not reach until after 60 years...indicating that the deferral of the withdrawal and testing of Capsule B has not compromised safety."*** The Palisades data to which Dr. Kirk refers to here did not give Entergy license to operate for 60 years and only gave them an extension to operate under the standard 50.61 regulations until 2017, or for about 5-6 years beyond their original 40-year license. In 2014, it was clear that Palisades could not comply under 50.61 rules beyond 2017 and that they applied for an extension to 2031 on the basis of 50.61a rules (which Dr. Kirk wrote for the NRC). Their embrittlement data failed to meet the test to comply in any other manner."

Reply

Comments related to licensing of the Palisades plant (Entergy was the operator of Palisades) are not pertinent to Diablo Canyon Unit 1. It is true the Diablo Canyon Unit 1 shares a "sister plant" status with Palisades because

they both used weld wire heat 27204 in the fabrication of their RPV. However, the weld wire heat 27204 in Palisades is a circumferential weld while it is an axial weld in Diablo Canyon Unit 1. Also, the weld wire heat 27204 data was not the limiting weld in the Palisades evaluation using the alternate PTS rule and as such did not influence its licensable life. In Palisades axial welds made from weld wire heat W5214 were limiting [WCAP-17628].

The ***quotation above*** (***highlight*** added) taken from the Executive Summary of the Part 1 report was not a comment related to plant licensing. The quotation summarizes available evidence pertinent to Diablo Canyon Unit 1, which includes both the plant's own surveillance data as well as the Palisades sister plant data. These data provide information on embrittlement to a fluence that exceeds the projected 54 EFPY (60 year) fluence for Diablo Canyon Unit 1 (see the figure on page 4 of this document).

Page 5, Item I

Comment "The fact that Dr. Kirk makes representations that the Palisades "sister plant" data has assured their safe operation for the 60-year operation period is inaccurate. That plant can only qualify under the alternative rules and Dr. Kirk was the primary reviewer of the Palisades 50.61a license application in 2014. He is well aware that Palisades is severely embrittled and that the Palisades operating conditions are entirely different from DCPP-1, and that it was operating under the alternative rules from 2017 until it closed in 2022. If the reference is to the 2011 Westinghouse PTS Evaluation for DCPP-1, that report was never submitted to the NRC until December of 2023 and the analysis is still under review by the NRC. Neither interpretation is a justification for delaying withdrawal and testing of Capsule B."

Reply As stated in my reply to Page 4-5, Item H above, the operating and embrittlement status as well as the licensing of the Palisades nuclear plant in Michigan have no bearing on Diablo Canyon Unit 1. The only nexus between Palisades and Diablo Canyon Unit 1 is that data on weld wire heat 27204 was available from the Palisades surveillance program. However, as stated in my reply to Page 4-5, Item H, this weld wire heat was not limiting in Palisades and, as such, played no role in that plant's decision to comply with the NRC's PTS requirements via use of the alternative rule [10CFR50.61a].

As stated in Section 2.3.1 of the Part 2 report, the multiple deferrals of Capsule B withdrawal and testing have been appropriately requested by PG&E and granted by the NRC because Diablo Canyon Unit 1 was required to test only three capsules as part of its original 40-year license, a requirement

fulfilled by 2003. Testing of a fourth capsule (Capsule B) was not required for any purpose during the 40-year initial license period.

The PTS analysis of [WCAP-17315] has no bearing on the capsule withdrawal schedule, so it is unclear why this report is mentioned in the context of the planned Capsule B withdrawal. My reply to the Page 1 Item A above discusses a possible reason for PG&E's delay in placing [WCAP-17315] on the NRC's docket after they received the report from Westinghouse in 2011.

Page 5, Item J

Comment "While Dr. Kirk's report seems to repeatedly reassure that "conservatisms" are incorporated into the Westinghouse PTS Evaluation, it appears the opposite is the case."

Reply Statements I made in the reports concerning the conservatism of the RPV assessment process go beyond analysis procedures for surveillance data. For example, in RPV safety analyses flaws are consistently over-size, loads are consistently over-estimated, and fracture toughness is consistently under-estimated.

Please see my reply to Page 10, Item 8 below for a fully detailed reply to this comment.

Page 5, Item K

Comment "It is simply remarkable and somewhat implausible that by combining the test data from these two severely embrittled "sister plants", a new mathematical projection is achieved that shows both plants having substantially lower embrittlement (as much as a 64% shift in the data as compared with prior reports)."

Reply The analyses performed by PG&E do not address "both" plants (meaning Diablo Canyon Unit 1 and Palisades); PG&E analyses address only Diablo Canyon Unit 1. The 2011 analysis [WCAP-17315] updates previous analyses to consider data from two capsules tested as part of the Palisades surveillance program on weld wire heat 27204. Section 3.1 of the Part 2 report validates that PG&E's analysis of its surveillance data, including its treatment of sister plant data, has been correctly performed. Use of sister plant data from 2011 onwards is not a "new mathematical projection;" rather it uses the NRC's established procedure (same mathematics) with consideration of new data from the sister plant that was unavailable before 2011.

Use of the adjective "severely" does not clearly communicate that both plants nevertheless meet (or met in the case of Palisades) the NRC's PTS screening criteria. Diablo Canyon Unit 1 and Palisades both experience neutron irradiation embrittlement. Because their welds have a relatively high copper content the magnitude of this embrittlement is higher than in other plants, but the NRC's criteria have always been met by both plants.

Page 5, Item L

Comment "Where the prior hard test data and the 2006 PTS analysis revealed that the DCPP-1 reactor materials demonstrate a propensity toward brittle fracture characteristics in lab tests, the new math lowers the value of 'chemistry factors' (CF) that account for the embrittled material properties."

Reply Differences between 2006 and later PTS analyses is not the use of "new math" but, rather the result of the availability of additional data on weld wire heat 27204. Taking account of these new data using the NRC's required analysis procedures provides an improved estimate of the current and future embrittlement behavior of weld wire heat 27204. The updated estimate showed that these new data reduced the embrittlement estimate slightly (reduced the chemistry factor); however, this reduction in chemistry factor was not a foregone conclusion. Whenever additional data is incorporated, the resulting estimate could either reduce or increase the chemistry factor.

Before 2006 the only data available for the Diablo Canyon Unit 1 weld wire heat 27204 came from the plant's own surveillance program. At that time PG&E estimated the chemistry factor and margin term following the NRC's guidance, which is described in Section 2.4.2 of the Part 1 report. Since 2011, these data were supplemented by the sister plant data from Palisades. Again, the chemistry factor and margin term was estimated following the NRC's guidance, which is described in Section 2.4.2 of the Part 1 report. In both cases the equations used, the data treatment, and the procedure follows the NRC's guidance exercised on different data sets. In section 3.1 of the Part 2 report, I have validated that PG&E has made these calculations correctly. Table 6 of the Part 2 report, which is repeated below for convenience, shows that following these procedures both the chemistry factor and the margin term are reduced when the sister plant data is considered.

Part 2 Report, Table 6. Evolution of estimates of chemistry factor (CF) and margin for the limiting weld in Diablo Canyon Unit 1 with time.

Year	Event	Number of ΔT_{41J} Data	Chemistry Factor (CF) in eq. (3-1) [°C]	Margin in eq. (3-1) [°C]	Are ΔT_{41J} Data Credible?
1985	Unit 1 Start	0	126.0	36.5	No
1987	Capsule S tested	1	126.0	36.5	No
1993	Capsule Y tested	2	123.2	24.5	Yes
2003	Capsule V tested	3	126.0	36.5	No
2011	Sister plant data from Palisades added to analysis	5	118.8	24.5	Yes

Page 6, Item M

Comment "... .21% copper and .98% nickel. Those values should not change over time and the regulations incorporate tables to determine "chemistry factors" (CF) based on material property analysis (RG1.99, pg1.99-4). In some references the "table CF" which are extrapolated from the RG1.99-4 table are shown to be 222F, and in other references shown to be 226.8F."

Reply It is correct to note that CF depends only on chemistry and product form. For example, the weld in the vessel and the surveillance weld can have slightly different chemistries which will result in slightly different chemistry factors. For example, footnote (c) in Table 5.1-1 which appears in [WCAP-17315] gives the following:

- CF = 226.8 °F for the 27203 weld in the Diablo Canyon Unit 1 vessel
- CF = 222.3 °F for the 27203 weld used in the Diablo Canyon Unit 1 surveillance program.

Without further information I am unsure which references are referenced by the comment; however, the small differences illustrated here may be the basis for this comment.

Page 6, Item N

Comment "Additionally, the 1995 Update to 10 CFR50.61 spells out clear criteria for qualifying "sister plants". Dr. Kirk has stated repeatedly in his report that "NRC requires" that sister plant data be integrated. That is a misstatement. NRC encourages reference to sister plant data, but to use that data to reduce chemistry factors and margin in a sum of squares procedure, the licensee must first demonstrate that the two "sister plants" have similar

designs and operating conditions as defined by the 1995 Update to 10CFR50.61. (See footnote 8 and Appendix C) No such sister plant analysis has been performed to date, and the 2011 Westinghouse PTS Evaluation makes no reference to this NRC requirement. Dr. Kirk dismisses the importance of this NRC requirement and asserts that one can safely assume operational similarities between sister plants. He makes the argument that operational differences are accounted for through application of temperature adjustments. However, it remains an NRC procedure that is clearly required and has not been followed by the 2011 Westinghouse PTS Report. Dr. Kirk's suggestion that the sum of squares procedure for integrating data from other plants is "required", fails to address this important qualification criteria."

Reply

The NRC criteria to which this comment refers (Appendix C in the 15 April 2024 Severance document) does not apply to qualification of sister plant data for use in a PTS analysis. Rather the quoted section of the 1995 rulemaking document [FR60No243] refers to Section III(C) of Appendix H to 10 CFR Part 50, which describes the NRC's requirement for an integrated surveillance program [10CFR50 App-H]. An integrated surveillance program is both a legal and a technical arrangement between plants whereby surveillance data from one plant is used to inform embrittlement predictions at other plants. The NRC places certain requirements on integrated surveillance programs in Section III(C) of [10CFR50-AppH], but these requirements do not apply to the use of sister plant data. Diablo Canyon Unit 1 does not participate in an integrated surveillance program under [10CFR50-AppH] so the NRC's requirements for an integrated surveillance program do not apply to Diablo Canyon.

As described by Section 2.4.4.1 of the Part 1 report, language in the NRC's PTS rule, [10CFR50.61] establishes what has come to be referred to the requirement for consideration of "sister plant" data. The applicable language from [10CFR50.61] is as follows (***emphasis*** added):

> (v)(2) To verify that RT_{NDT} for each vessel beltline material is a bounding value for the specific reactor vessel, ***licensees shall consider*** plant-specific information that could affect the level of embrittlement. This information includes but is not limited to the reactor vessel operating temperature and any related surveillance program[FOOTNOTE 5] results.
>
> FOOTNOTE 5 Surveillance program results means any data that demonstrates the embrittlement trends for the limiting beltline material, including but not limited to data from test reactors ***or from surveillance***

programs at other plants with or without surveillance program integrated per 10 CFR part 50, appendix H.

As stated in Section 2.4.4.1 of the Part 1 report, ***these words*** make clear that the NRC requires the analysis of surveillance data performed in support of any particular plant to consider data obtained from the surveillance programs of other plants. However, these words do not describe a process for determining which data from other plants should be considered and which should not. Information on this process can be inferred from the example cases presented by the NRC in 1998 [Wichman 1998]. [Wichman 1998] provides an example (Case 4) that considers "surveillance data from plant and other sources" where plants containing the same weld wire heat are the "other sources" of data. A 1993 EPRI report introduced the term "sister plants" to describe different plants having welds made from the same heat of material [EPRI 1993].

Since 1998 the industry has consistently interpreted "sister plant data" as coming from the same weld wire heat but being irradiated in different plants. The only adjustment for plant operating conditions that is performed is to take account of operating temperature effects on embrittlement magnitude as outlined in [Wichman 1998]. The NRC has consistently agreed with this interpretation. More detailed assessments of the plant-to-plant similarity, as is required for plants that participate in an integrated surveillance program (see Appendix C of the April 2024 Severance document), have never been required for sister plant analysis by the NRC.

Section 3.2.4.2 of the Part 1 report reviews the effect that of environmental and operational factors other than plant operating temperature on ΔT_{41J} for plants operating in the USA. (The effect of temperature on ΔT_{41J} is explicitly accounted for following NRC guidance when sister plant data are used.) This review concludes that these effects are either conservatively treated by the current procedure or are small relative to Charpy measurement uncertainty. As such, when sister plant data is taken from a US operating reactor no considerations other than similarity of the weld wire heat and differential operating temperature between the plants in question need be considered.

Page 6, Item O

Comment "The operational conditions between the two plants (PNP and DCPP) are significantly different, and not at all similar as Dr. Kirk's report suggests would be safe to assume. Earlier capsule testing at Palisades indicated rapid embrittlement of the RPV welds and there was concern that the plant would have to close as early as 1999. For this reason, and from 1999

onwards, Palisades implemented an "Ultra Low Leakage Core Strategy" to reduce the flux (radiation exposure) at the critical welds. This involved a change in the fuel configuration, reduction of generation capacity to 90% (to reduce radiation damage), and the addition of stainless steel shielding to protect the most vulnerable welds. Although DCPP operated at 97.9% of its current capacity (3338MWt) until the 10th fuel cycle (about 1992), it has operated at its current 100% capacity (3411MWt) since then. Most significantly, DCPP1 has not employed stainless steel shielding at its limiting welds as PNP has, and there is no accounting of this in the Westinghouse PTS Evaluation."

Reply

Operational conditions are accounted for by the dosimetry calculations that are used to estimate the fluence at each location. The operational factors mentioned in this comment largely affect the differences in fluence experienced by the vessel wall and at the capsules themselves, which are addressed by the dosimetry calculations. Different calculations are performed to estimate the fluence at the capsule location and in the vessel wall, each accounting for factors particular to that situation such as reactor power level, fuel assembly loading patterns, and shielding.

Page 7, Item P

Comment

"The Kirk Report suggests that all of these variables are captured by the operating temperature adjustments that made when sister plant is integrated, and while that may be true of the capacity reduction, it would not likely be true of shielding or fuel configuration changes that move fuel away from critical welds. Some of these operational changes may be accounted in the dosimetry (radiation sensors), but that is not safe to assume. The fact that a detailed discussion of such variables and regulatory requirements is completely overlooked by the Westinghouse PTS Evaluation and the Kirk Report is a significant analytical omission."

Reply

As stated in reply to Page 6, Item N above the regulatory requirement cited in that comment pertained to integrated surveillance programs not to sister plant data. All other factors are either accounted for in the fluence estimation, are addressed conservatively, or are of small magnitude relative to Charpy measurement uncertainty. Please see also the reply to Page 6, Item O above.

Page 7, Item Q

Comment

"It is important to note that Dr. Kirk dismisses the concerns expressed by Dr. Macdonald and myself about the manner in which PG&E has tried to judge

its pre-2004 data "not credible" and in several sections of Part 1 of his report, attributes this to an "apparent misunderstanding of NRC's definition of credibility in the context of embrittlement analysis.""

Reply

It still appears that there is an apparent misunderstanding of data credibility on the part of Mr. Severance and Dr. Macdonald. Please see reply to Page 9, Item 6 below which discusses credibility criteria in more detail. Section 4.2.2.2 of the Part 1 report describes these criteria and how they are applied. The comment made as Page 9, Item 6 below only makes sense if credibility is assessed on individual datum, rather than on the data set as a whole; however, the NRC's requirements do not allow analysis of the data in this fashion.

The 2004 analysis has been updated in 2011 [WCAP-17315]; the 2011 analysis defines the current state of embrittlement until such time as additional data becomes available. Section 3.1 of the Part 2 report confirmed the correctness of these calculations by PG&E.

Page 7, Item R

Comment

"At the same time that PG&E is claiming that their pre-2004 data is not credible (as per RG1.99 definitions), Palisades is assuming that the data is credible. However, the 2011 DCPP PTS Evaluation by Westinghouse appears to be an effort to replace the 2006 PTS Evaluation, and the data is judged "not-credible" at the beginning of their sum of squares procedure."

Reply

Evaluations performed on the Palisades plant have no bearing on Diablo Canyon Unit 1. Also, datum that was once determined to be part of a non-credible set can later change to be part of a credible set when more data is collected because the NRC's credibility evaluation, evaluates the data set as a whole, not each datum individually.

When the three Diablo Canyon Unit 1 surveillance data points for weld wire heat 27204 are combined with the two surveillance data points from Palisades for that same weld wire heat, the data set is found to be credible as assessed in the [WCAP-17315] analysis of Diablo Canyon Unit 1 performed in 2011. Section 3.1.1 of the Part 2 report validates that this determination is correct.

The [WCAP-17315] evaluation does indeed replace (or supersede) the earlier 2003 analysis on based only the three Diablo Canyon Unit 1 surveillance data for weld wire heat 27204 [WCAP-15958]. That analysis, which

determined the data set to be not creditable, was validated by Section 3.1.1 of the Part 2 report.

Page 7, Item S

Comment "This appears to be a violation of the rules as set out in RG1.99 Position 2.1 which allow the use of the sum of squares procedure only if your data is deemed credible. The precise language in RG1.99 suggests that if two or more sets of surveillance data are deemed credible, then Position 2.1 can be used to determine chemistry factors based on a best fit of the data. In the 1998 update to GL92-01, Case 5 as presented by Wichman clearly states that 5 out of 6 data sets (87%) must be deemed "credible" to use the sum of squares procedure. If only 2 of 5 data sets are deemed credible (2 Palisades capsules were judged credible), the sum of squares procedure cannot be used to lower the margin and CF values as performed in the 2011 Westinghouse PTS Evaluation. (See RG1.99, Position 2.1). This appears to be inconsistent with NRC procedures."

Reply As stated in several previous replies, credibility is assessed with respect to a data set as a whole, not with respect to individual datum. A datum that was once determined to be part of a not-credible set can later change to be part of a credible set when more data is collected. Section 3.1.1 of the Part 2 repot validates that PG&Es assessment of credibility has been correctly performed, consistent with NRC procedures.

Page 7, Item T

Comment "One must ask, how can PG&E waffle about the credibility of the same 3 sets of data over time?"

Reply The assertion that PG&E is waffling appears to arise due to the commenter's misunderstanding of the NRC's credibility procedure, which is explained in Section 2.4.2.2 of the Part 1 report. That section describes how credibility is assessed with respect to a data set as a whole, not with respect to individual datum. A datum that was once determined to be part of a not-credible set can later change to be part of a credible set when more data is collected. Section 3.1.1 of the Part 2 report validates that PG&Es assessment of credibility has been correctly performed, consistent with NRC procedures. Table 6 of the Part 2 report, which is copied for convenance on page 11 above of this document, shows how credibility of the weld wire heat 27204 data sets has changed over time.

Page 8, Item U

Comment "What is different about DCPP-1 is that it is only one of two plants in the world still in operation that contain the flawed weld material (heat#27204) which was recognized by Westinghouse to be substandard immediately after delivery of the Unit 1 RPV. The metallurgical specifications were revised before Unit 2 was delivered. Because of the early recognition that the 27204 weld material was ***flawed***, very few reactors in the world contain this material. There have only been five "capsule tests" in the entire world that we know of using this material as evidenced by NRC's extensive review."

Reply Having only one sister plant should not be seen as indicative of a plant having too little data. Roughly one-third of all operating PWRs have no sister plants data at all, yet these plants remain compliant with NRC requirements for surveillance monitoring [10CFR50-App G]. Please see the reply to Page 9, Item 2 below for additional details.

The use of the word "***flawed***" by the commenter to describe weld wire heat 27204 is misleading. Weld wire heat 27204 has a higher copper content that was typical of RPV-grade steels and weld wires used at the time of Diablo Canyon Unit 1's fabrication. While the use higher copper steels has been discontinued, many plants with even higher copper content than Diablo Canyon Unit 1 remain in safe service today.

Page 8, Item V

Comment "By 1992, raw samples of the 27204 weld material proved impossible to obtain and that is why Capsule B (still in the Unit 1 RPV) only contains broken fragments of previously tested samples of the 27204 weld material. This is important historical context, because there is insufficient test data industry-wide to analyze with accuracy how embrittled the DCPP-1 welds actually are."

Reply As mentioned in the reply to Page 8, Item U above and to Page 9, Item 2 below Diablo Canyon Unit 1 is not, by industry or regulatory standards, deficient in the amount of data it has available. The "fragments" that were inserted in Capsule B are broken halves of Charpy specimens. There are well developed and accepted ASTM standards by which such samples can be re-constituted to make them acceptable for testing. See for example [ASTM-E1253].

Page 8, Item W

Comment "A linear extrapolation of the reported 2006 PTS results appear to suggest that the jump in the embrittlement data contained in the 2011 Westinghouse Evaluation represents a 64% shift in the embrittlement projections. How is that plausible?"

Reply The 2011 change in data occurred because the sister plant data were incorporated into the analysis as required by the NRC regulations. The change between the PTS predictions circa-2006 and those of 2011 are illustrated by Figure 4 of the Part 2 report, which is copied on page 4 of this document above for convenience. On this figure the red curve provides RT_{PTS} estimates circa-2006 while the blue curve provides the 2011 RT_{PTS} estimate. The change from the red curve to the blue curve occurred because the sister plant data were incorporated into the analysis in 2011. The incorporation of this data was appropriate as discussed in the reply to Page 2, Item B above.

I am not sure to what the commenter's 64% value refers, especially since temperature differences are not typically expressed as a percentage due to the arbitrariness of zero on temperature scales.

Page 9, Item 1

Comment "According to PG&E's own 2006 projections and corroborated by the NRC, Unit 1 will be within 3% of maximum embrittlement 'screening limits' as defined by the Federal Code of Regulations by November 2024. This projection of embrittlement was based on "hard data", (Charpy stress tests) performed on material samples and indicated some samples demonstrated "fast fracture", characteristic of embrittlement. The "reference temperature" or RT_{PTS} value was projected to be 258.7°F by Nov. 2024. Note that the 10CFR50.61 screening limit is <270F. By independent calculation, the NRC calculated this value to be 258.8°F, a remarkable confirmation of both their mathematical accuracy and their faith in the pre-2004 data."

Reply The 2006 calculations of RT_{PTS} based on surveillance data have since been superseded by more recent calculations that are based on additional data provided by the sister plant Palisades [WCAP-17315, DCL-23-038]. These newer calculations form the current licensing basis for Diablo Canyon Unit 1. As such this comment is not relevant to the current and future estimates of RPV embrittlement and safety. Nevertheless, the following comments are provided for information:

(A) Sections 3.1.1 and 3.1.2 of the Part 2 report to DCISC confirm the appropriateness and accuracy of the RT_{PTS} calculations performed by both PG&E and the NRC, including the calculations referenced here.

(B) As noted in these sections, when in the past the set of surveillance data used to estimate RT_{PTS} has been determined to be "not credible" (which was the situation in 2006) the Diablo Canyon Unit 1 RPV was forecasted to exceed the NRC's 10CFR50.61 RT_{PTS} screening limit (270 °F or 132 °C) after 40 but before 60 years of operation.

(C) More recent calculations (which represent the current licensing basis) demonstrate that the Diablo Canyon Unit 1 RPV is not forecast to exceed the NRC's RT_{PTS} screening limit until well after 60 years of operation (see Figures 2 and 3 in the Part 2 report).

(D) Due to the diminished rate of embrittlement at higher fluences for the Diablo Canyon Unit 1 weld (see, for example Figures 2 and 3 in the Part 2 report) the proximity of the Diablo Canyon RT_{PTS} value to the screening criteria (that is, within 11 °F or 6 °C) does not correspond to a similar proximity in time.

(E) This proximity to the screening criteria should not be a cause for concern because the effects of material uncertainty and data scatter have been incorporated into the screening criteria by the NRC.

(F) The similarity of the RT_{PTS} values cited in this comment is expected. Different engineers performing an algebraic calculation using the same input data should produce very similar results.

Page 9, Item 2

Comment "There is considerable evidence that both the PNP and DCPP Unit 1 reactor pressure vessels are severely embrittled, and yet these are the only data sets available as inputs into the DCPP PTS Evaluation. For this reason, further investment in Unit 1 should be postponed awaiting further data. PG&E has failed to report on their 2006 PTS Evaluation confirmed by the NRC as it is not even mentioned in either the Kirk or Westinghouse Reports."

Reply The 2006 calculations of RT_{PTS} based on surveillance data have since been superseded by more recent calculations that are based on additional data provided by the sister plant Palisades [WCAP-17315, DCL-23-038]. These newer calculations are available to inform predictions of embrittlement at Diablo Canyon Unit 1. As such this comment is not relevant to the current and future estimates of RPV embrittlement and safety. Nevertheless, the following comments are provided for information:

(A) Future estimates of embrittlement change only when new input data becomes available. New input data become available with each capsule tested and when sister plant data becomes available. In Section 3.1.1 of the Part 2 report, I therefore performed calculations associated with the expanded data set made available after each surveillance capsule report [WCAP-8465, WCAP-11567, WCAP-13750,

WCAP-15958] was published and with the availability of the sister plant data from Palisades [WCAP-17315]. My estimates of future embrittlement in Section 3.1.1 of the Part 2 report for each evolution in available data ties to these reports. In licensee communication with the NRC these estimates are frequently repeated with no change in data or in predicted outcomes. For example, the 2006 PTS calculations referred to in this comment simply repeat the evaluation of data from three capsules (S, Y, and V) that could be calculated following publication of the Capsule V report in 2003. Thus, the 2006 PTS calculations are effectively addressed in the Part 2 report by the evaluation of data from three capsules (see Figure 2 in the Part 2 report).

(B) In the USA, PWRs have between zero and three sister plants that provide data for PTS evaluation. Roughly two-thirds of PWRs have sister plant data while roughly one-quarter have one sister plant, which is the situation for Diablo Canyon Unit 1. While consideration of available sister plant data is required by the NRC when doing a PTS (10CFR50.61) evaluation, a plant should not be considered deficient of data if it has only one sister, like Diablo Canyon Unit 1. As few as three plant-specific measurements fully satisfy the NRC's requirements [10CFR50-AppH], and by considering sister plant data Diablo Canyon Unit 1 has five relevant measurements.

(C) Whatever the state of embrittlement of the Palisades Nuclear Power plant may be, it is irrelevant to assessing the condition of Diablo Canyon Unit 1. The only nexus to Palisades for Diablo Canyon is the use of appropriate sister plant data, which PG&E has done. Both my reports and the NRC's evaluations confirm the appropriateness of PG&E's use of the sister plant data from Palisades.

Page 9, Item 3

Comment "Immediately after delivery of the Unit 1 RPV in the late 1960's, Westinghouse admitted to PG&E that Unit 1 contained weld material with metallurgical deficiencies in the form of impurities of copper and nickel that would predispose the RPV to premature failure. Dr. Kirk rather absurdly argues that these "flaws" were not "flaws" or "errors" because the metallurgical issues were not understood at the time. However, window dressing aside, the historical significance of the known substandard metallurgy is the point. The mathematical predictions in the 1986-2003 capsule reports also took into account the known impurities in the RPV weld material, and the physical stress test indicated there was a predisposition for brittleness."

Reply

The semantics of word choice notwithstanding, the simple fact is that when the Unit 1 vessel was fabricated, the weld metal used was higher in copper and nickel than would be recommended today based on the state of knowledge that exists today. Today's state of knowledge differs greatly from state of knowledge when the Unit 1 vessel was specified and fabricated.

It is correct to state that the Diablo Canyon Unit 1 RPV has greater susceptibility to the effects of neutron irradiation due to relatively high copper content in the limiting weld than do modern RPV alloys. This copper content is higher than many, but certainly not all, operating RPVs. Nevertheless, this increased susceptibility to embrittlement is quantified by the surveillance data that has been collected for the Diablo Canyon Unit 1 RPV and is accounted for by the NRC's prediction formula [RG1.99R2]. Additionally, the criteria that ensure the safe operation of the RPV (for example, the NRC's PTS screening criteria) have been satisfied by the Diablo Canyon Unit 1 RPV for an operational period beyond 60 years. Finally, as noted in the Part 1 report (see Section 3.6.2) *"At least 25 units having a copper content equal to or exceeding that of the Diablo Canyon Unit 1 weld remain in operation today."*

Page 9, Item 4

Comment

"This historical context has been omitted from the Kirk Report. Given that the Kirk report was reviewed unilaterally by PG&E for historical accuracy, and no opposing parties were engaged in such discussion, and because there are significant historical inaccuracies in the Kirk Report which are contradicted by the NRC record, it is difficult to express confidence in the 'independence' of this reporting."

Reply

PG&E was not asked to review the Part 1 and Part 2 reports for "historical accuracy," but rather to confirm that the data used was correct. This was done to ensure that my calculations on the embrittlement projections that appear in the Part 1 and Part 2 reports were based on accurate input data. See also the reply to Page 3, Item C above.

Page 9, Item 5

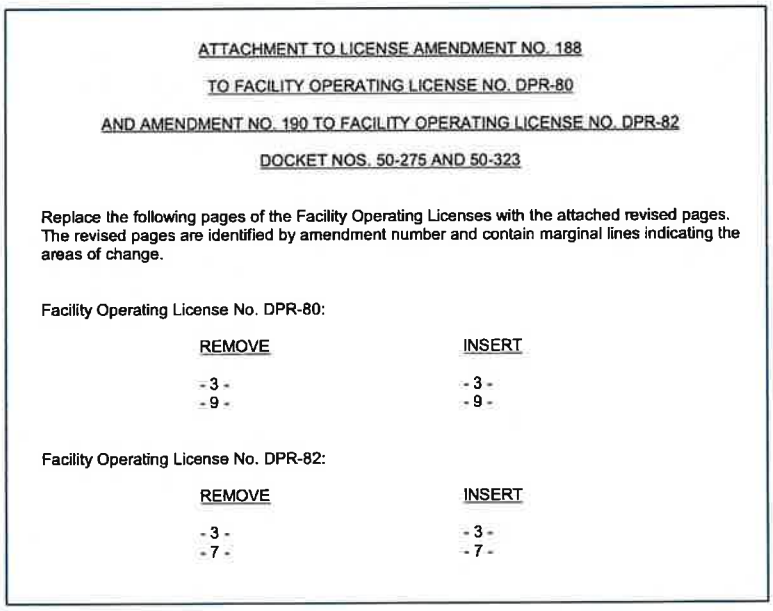
Comment

"Kirk's citation of a 2008 letter from the NRC indicates that NRC had by then forgotten the 2006 conditions of license extension approval that the embrittlement stress test program ("surveillance program") was amended by the July 17, 2006 letter of approval which required an additional capsule test (Capsule B) be conducted by 2009. Because PG&E has waffled on the issue of credibility of their data, there are a great deal of questions about the

actual state of the Unit 1 reactor. PG&E continues to oppose immediate retesting of previously tested samples under test methods that are known to be credible. Since Capsule B may not be tested until 2028, why is the DCISC not moving to retest samples that are already in hand?"

Reply

Despite the assertation of the commenter, the referenced letter [NRC 2006] does not amend the Diablo Canyon Unit 1 license to require an additional capsule test (Capsule B) be conducted by 2009. The letter from the NRC to PG&E notes (see pdf page 5, item 2) that "*the license is amended by changes to the Facility Operating License No. DPR-82 as indicated in the attachment to this license amendment.*" An image of the referenced attachment appears below. A review of modifications to pages 3, 7, and 9 of the facility operating license reveal that these change only expiration date of the license and make no mention of any other license modification, particularly concerning Capsule B.



ATTACHMENT TO LICENSE AMENDMENT NO. 188

TO FACILITY OPERATING LICENSE NO. DPR-80

AND AMENDMENT NO. 190 TO FACILITY OPERATING LICENSE NO. DPR-82

DOCKET NOS. 50-275 AND 50-323

Replace the following pages of the Facility Operating Licenses with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Facility Operating License No. DPR-80:

REMOVE	INSERT
- 3 -	- 3 -
- 9 -	- 9 -

Facility Operating License No. DPR-82:

REMOVE	INSERT
- 3 -	- 3 -
- 7 -	- 7 -

The NRC staff's safety evaluation, which appears on pdf pages 8-16 of [NRC 2006], does address the capsule withdrawal schedule. On pdf page 12 the NRC states (in part) the following (***emphasis added***):

> ***"Under this supplemental program, four capsules, Capsule S, Y, V, and B, were designated for removal from the DCPP-1 RV. Capsules S, Y, and V have been removed and tested in accordance with the licensee's program. The request to recover the testing time for DCPP-1 amends the projected withdrawal for Capsule B to approximately 20.7 EFPY, when the capsule is projected to achieve a neutron fluence of 2.9 x 10^{19} n/cm^2 (E > 1.0 MeV).*** *Therefore, the*

capsule will achieve a neutron fluence approximately equal to twice the projected limiting inside RV fluence for DCPP-1 at the EOL (i.e., approximately 2×1.43 x 10^{19} n/cm^2 [E > 1.0 MeV]). This complies with the criterion in ASTM E185-82 for withdrawal of the final capsule of a four capsule withdrawal program. This is acceptable because 10 CFR Part 50, Appendix H, permits the licensee's to meet the RVMSP withdrawal criteria of more recent versions of ASTM E185, inclusive of E185-82. Therefore, the NRC staff concludes that the adjustments to the withdrawal time and projected neutron fluence for Capsule B will still be in compliance with 10 CFR Part 50, Appendix H."

These statements, and indeed all statements in the NRC Staff's safety evaluation, do not constitute conditions on the Diablo Canyon Unit 1 license. Were a condition placed on the license it would be extremely clear and appear in the amended operating license rather than being relegated the safety evaluation.

Additionally, as noted in the Section 2.3 of the Part 2 report, this capsule withdrawal schedule was subsequently superseded various PG&E requests and NRC approvals. Section 2.3.1 of the Part 2 report noted that in every instance, both before and after [NRC 2006] was written in 2006, the NRC referred to the Diablo Canyon Unit 1 surveillance capsule program for the first 40 years of operation as being a *three-capsule program*; only [NRC 2006] makes a different statement. If the commenter feels that this topic poses a safety risk, the appropriate form of redress would be a 2.206 petition filed with the NRC. However it should be noted that the NRC recently denied a 2.206 petition filed by the Mothers for Peace in 2023 with respect to Diablo Canyon Unit 1 (see https://www.nrc.gov/docs/ML2405/ML24058A103.pdf dated 8 March 2024). The topic of Capsule B testing was addressed extensively in the NRC's response to the petition. In their response the NRC makes the following statements:

1. *"The final capsule required for the current operating license period (i.e., Capsule V) received an estimated neutron exposure greater than the RPV is expected to receive at the end of the current 40-year operating license period. Thus, the licensee obtained surveillance data representative of the RPV beyond the end of the current operating license period."*
2. *"As indicated in the approval of the supplemental surveillance program on September 4, 1992 (ML16341G687), Capsule B was intended to be removed and tested when the accumulated fluence is equivalent to the vessel inside surface at 48 Effective Full Power Years (i.e., operation of the plant well beyond the original 40-year design). Thus, as part of the licensee's current licensing basis for Diablo Canyon, Unit 1, the*

withdrawal, and testing of Capsule B is not required to demonstrate compliance with Appendix H during its current operating 40-year license period."

3 *"The licensee is not required under Appendix H to withdraw their "license renewal capsule" to support their current operating license, as all required capsules for Diablo Canyon, Unit 1 have already been withdrawn and tested, as discussed in NRC's letter dated July 20, 2023. However, if a renewed license is issued for Diablo Canyon, this "license renewal capsule" would become required under Appendix H to support the renewed operating license."*

These statements are all consistent with the findings of the Part 2 report to the DCISC. In particular, the NRC's comment 3 (above) indicates that Capsule B testing was not needed during the initial license period and that the NRC has no concerns regarding a need to expedite testing of Capsule B, as suggested by this comment. As described in Section 2.3.2 of the Part 2 report, Capsule B should be tested before 2028 to be consistent with NRC guidance [NUREG-1801].

Page 9, Item 6

Comment "By 2011, PG&E reassessed all of their pre-2004 to be "not-credible" and in a manner that appear to be inconsistent with NRC procedures as defined in Reg. Guide 1.99. First, PG&E claimed one data point in the capsule Y set was out of standard deviation range and then eliminated the entire set. This directly violated GL92-01 which states: "A priori exclusion of some data based on 'inconsistency' with expected norms should not be used before analysis for statistical outliers is conducted." Then PG&E claimed that the two remaining "credible" sets did not meet the minimum number of sets required to regard them as "credible". This seems to violate Reg. Guide1.99, criterion 3 which clearly states that you need only two sets of credible data for each "limiting material" (most embrittled) to regard them as "credible". PG&E had the minimum two sets for each material, but the NRC did not question this incorrect interpretation of data set credibility criterion."

Reply I assume that this comment refers to the PTS and upper shelf energy evaluations performed by Westinghouse in 2011 for PG&E [WCAP-17315]. The credibility criteria as expressed by the NRC have been correctly considered by PG&E and Westinghouse in the 2011 report [WCAP-17315] and in subsequent documents that repeat this analysis result. These evaluations considered the two sister plant data from Palisades along with data from the three Diablo Canyon Capsules (S, Y, and V) tested in 1987, 1993, and 2003, respectively. This analysis is still the analysis of record

[DCL-23-038]. Here I will address only the evaluation of weld wire heat 27204, which is the limiting weld for Diablo Canyon Unit 1.

(A) Appendix A of [WCAP-17315] provides the Westinghouse credibility evaluation.

(B) On pages A-1 to A-6 Westinghouse assesses the credibility of only the Diablo Canyon surveillance data from Capsules S, Y, and V. On page A-6 they conclude that "*Criterion 3 is also **not** met for the surveillance weld material when **only** Diablo Canyon Unit 1 data is considered.*" The presence of this analysis, which is not required, may have given rise to this comment.

(C) As described in Section 2.4.2.2 of the Part 1 report, credibility is assessed on the available data set as a whole, not on individual datum or on data subsets. If, as has been the case for Diablo Canyon Unit 1 since 2011, there are five measurements of ΔT_{41J} all five measurements will either be deemed credible or not credible following the NRC's procedures. This comment seems to be based on the faulty premise that in a set of five data points some data points may be credible while others are not. This outcome is not possible when correctly using the NRC procedures. Additionally, for PTS assessments consideration of sister plant data is required (again see the Part 1 report Section 2.4.2.2).

(D) As required and as just described in item (C), On pages A-7 to A-10 Westinghouse assesses the credibility of the Diablo Canyon surveillance data from Capsules S, Y, and V as supplemented by the two sister plant data from Palisades. On page A-10 they conclude that "*Table A.1-8 indicates that all five surveillance data points fall within the +/- 1σ of 28°F scatter band for surveillance weld materials; therefore, the weld material (Heat # 27204) is deemed "credible" per the third criterion when all available data is considered. In conclusion, the combined surveillance data from Diablo Canyon Unit 1 and Palisades for weld Heat # 27204 may be applied to the Diablo Canyon Unit 1 reactor vessel weld.*"

(E) As required by 10CFR50.61, Table 6.1-1 of [WCAP-17315] uses the evaluation of the Diablo Canyon Unit 1 surveillance data along with the sister plant data to form the basis for their PTS evaluation.

In summary, the credibility criteria as expressed by the NRC have been correctly considered by PG&E and Westinghouse in the 2011 report [WCAP-17315] and in subsequent documents that repeat this analysis result.

Page 10, Item 7

Comment "The DCISC has not weighed in on the fact that PG&E set aside the 2006 PTS Evaluation (maximum embrittlement by 2025) by means that do not appear to comply with NRC regulations. There should at least be a motion to

include reference to the earlier PTS projections in the Westinghouse PTS Evaluation as is customary. The DCISC hired Dr. Kirk to make recommendations to them and he now claims that the 2011 Westinghouse PTS Evaluation is consistent with NRC procedure when it appears that there were many critical omissions. It is fairly clear that several NRC procedures were not followed, and that Dr. Kirk has overlooked details required by NRC procedures."

Reply

The 2006 calculations of RT_{PTS} based on surveillance data have since been superseded by more recent calculations that are based on additional data provided by the sister plant Palisades [WCAP-17315, DCL-23-038]. These newer calculations form the current licensing basis for Diablo Canyon Unit 1. As such this comment about the 2006 PTS evaluation is not relevant to the current and future estimates of RPV embrittlement and safety. Nevertheless, the following comments are provided for information:

(A) Section 3.1.1 of the Part 2 report provided my independent evaluation of each data set that has existed since Diablo Canyon Unit 1 was placed into service. This analysis validated results provided by PG&E (see Section 3.1.2 of the Part 2 report) since 2003. This latter section provides confirmation that PG&E's 2006 PTS evaluation is correct.

(B) As stated in my response to Page 9, Item 6 above, PG&E has correctly followed the NRC's procedures for credibility evaluation and has reached conclusions that agree with my own.

Page 10, Item 8

Comment

"While the Kirk Report assures "conservatisms" in at least a dozen places, a review of Tables 5.1-1, 5.1-2 and 6.1-1 and 6.1-2 in the Westinghouse report quickly reveals that the Westinghouse PTS Evaluation uses the least conservative surveillance-based chemistry factors. The Westinghouse PTS Evaluation appears to employ a sum of squares procedure that is only allowed under RG1.99, Position 2 when all data sets are credible. Wichman 1998 modifies this requirement to allow sum of squares procedure when 5 of 6 data sets are credible (83%). The numerous references to "conservatisms" by which Dr. Kirk assures a margin of safety to the public when non-credible sets are used are false assurances. In the final analysis, the Westinghouse PTS Evaluation employs the LEAST CONSERVATIVE chemistry factors based upon a sum of squares procedure with questionable results. All conservatisms have been eliminated by reducing both the chemistry factors and the margin (M) resulting in a significant reduction of the projected level of embrittlement for both DCPP and Palisades. Both RPVs previously appeared to be among the most embrittled RPVs in the US."

Reply

I assume that the "Westinghouse Report" referred to by this comment is the 2011 report on PTS and USE evaluations [WCAP-17315]. Use of a chemistry factor for weld wire heat 27204 of 214.1 °F is appropriate and allowed by the NRC because this chemistry factors was estimated from a credible set of surveillance data, which has been the case since 2011.

Statements I made in the reports concerning the conservatism of the RPV assessment process go beyond analysis procedures for surveillance data. For example:

- Analysis of pressure temperature limits for normal operation
  - Assumes the presence of a very large flaw (¼ wall thickness) that has never been found in a reactor vessel.
  - Assumes loading magnitude that exceeds that which occurs under normal operation.
  - Assumes a lower-bound representation of the fracture toughness of the material in addition to the margin terms imposed by the NRC.
- Analysis of severe events like PTS
  - Assume the presence of a very large flaws in greater density than detected in a reactor vessel inspection.
  - Assumes a binned representation of severe loadings that are intended to bound (exceed) the transients that may occur during postulated accident scenarios.

Page 10, Item 9

Comment

"In 2013, in response to questions at a public meeting regarding the Palisades RPV embrittlement, the NRC responded in writing admitting that Palisades and DCPP-1 were among the five most embrittled reactors in the US at that time. Due to retirements of older plants that used the 27204 weld material, these two plants are the only remaining in the US to use the #27204 weld material are now among the four most embrittled plants in the US. (See NRC proceeding written response to public concern about Palisades embrittlement, Appendix A)."

Reply

The fact that certain plants are among the five most embrittled reactors in the USA is irrelevant to the plant's continued operating safety. PG&E's analysis, as affirmed by the NRC and by the Part 2 report, remains in compliance with the NRC's embrittlement screening criteria and, thereby, remains safe to operate.

Additionally, the following information is provided for clarification:

(A) The referenced list of five plants comes from an answer to Question 4 that occurred during a NRC Webinar on PTS [NRC 2013]. In that document, the NRC's response to a question from the meeting includes the list of the five plants and begins with the statement, "*The NRC currently estimates that the following plants will exceed the PTS screening criteria of 10 CFR 50.61 during their 20-year period of operation beyond their original 40-year licenses.*"

(B) Additional statements in the NRC's response clearly stated that there were methods available to those plants to update calculations and change that estimate to support future extended operations.

(C) None of the NRC's responses infer that any of the listed plants, including Diablo Canyon Unit 1, are currently unsafe for operation or are expected to become unsafe in the future provided that the NRC's regulations continue to be satisfied.

Page 10, Item 10

Comment "Dr. Kirk performed his own calculation of "upper shelf energy" (USE), a second embrittlement metric, and found Unit 1 would reach maximum embrittlement screening limits by 2029 and only if it is operated with a reduced capacity factor of 85% to 95%. This is in direct contradiction to Dr. Kirk's support of the 2011 Westinghouse PTS Evaluation conclusions. However, to his credit, Dr. Kirk does suggest additional embrittlement testing to confirm the status of the Unit 1 RPV and suggests that the mini-CT test methodology is perhaps more accurate than the 100-year old Charpy methodology. Dr. Macdonald agrees with this suggestion. However, Dr. Kirk affirms the 2011 Westinghouse conclusion that embrittlement is within regulatory limits until 2044, and he dismisses his own USE calculations without a clear explanation of the contradiction."

Reply The analysis referred to was reported in Chapter 4 of the Part 2 report. As stated at the beginning of that chapter "*It should be emphasized that while the techniques used in this chapter evolved from currently accepted practices and in some cases are currently in codification review by ASME, none are currently endorsed or required by the NRC. Thus, the information presented in this chapter has no impact on the licensing basis of the Diablo Canyon Unit 1 nuclear power plant.*"

It is also stated in Section 4.2 of the Part 2 report, which concerns the supplemental USE analysis, that an equivalent margins analysis following Regulatory Guide 1.161 could be performed to address any USE concerns. The report further stated that "*Equivalent margins analyses performed on other reactors have, without exception, demonstrated that continued*

operation at USE values considerably below 68J is acceptable." The uniformity of this result across all plants and embrittlement conditions speaks to the conservatism of the 68J screening criteria.

Additional material property data could be collected to support an equivalent margins analysis by performing J-R curve tests following ASTM Standard E1820. Such tests, if performed, would need to use a larger specimen than the mini-CT to appropriately measure the J-R curve of the Diablo Canyon material. It is possible that collection of additional material property data may not be necessary because the needed information can often be estimated by correlative methods allowed by the NRC in Regulatory Guide 1.161. In any event, all previous experience indicates that an equivalent margins analysis performed on Diablo Canyon Unit 1 would most likely demonstrate its continued operating safety even for USE values below 68J.

The supplemental analysis of upper shelf energy appearing in Section 4.2 of the Part 2 report did assume an 85-95% capacity factor to arrive at the estimate that the USE of the Diablo Canyon Unit 1 limiting weld could fall below the NRC's 68J screening criteria by 2029-2030. It should be mentioned that an 85-95% capacity factor is not "reduced" but rather is typical of current operating experience. It is impossible, and therefore unrealistic to assume, that a nuclear plant can run at 100% capacity.

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Appendix

Comments Made by Mr. Bruce Severance on 15 April 2024 follow

Comment to the Diablo Canyon Independent Safety Committee

Is DCPP Unit 1 Reactor a 'Good Bet' for the People of California?

By Bruce Severance, Regulatory Compliance Engineer

April 15, 2024

The DCISC's Determination on the Kirk Report Will Signal a Green or Red Light to the State

When it comes to the safety and reliability of a nuclear reactor, why would anyone ever gamble if there is a clear path to obtaining the data necessary to minimize both financial and safety risks?

As a climate mitigation policy analyst, co-founder of the Central Coast Economic Recovery Initiative and the Green Infrastructure Research Collaborative, I have always supported the most cost-effective infrastructure development alternatives for building a bridge to a carbon-free economy. For a number of reasons I support continued operation of Unit 2 at the Diablo Canyon Power Plant (DCPP), but I cannot support continued operation or further investment in Unit 1 based on calculated risks of lost investment. It is clear to me from the NRC docket record, having thoroughly reviewed roughly 4000 pages of it, that Unit 1 is not a "good bet" for the citizens of our state. It is the citizens of SLO County that would pay most dearly should any "pressurized thermal shock" event result directly from misunderstood or miscalculated radiation embrittlement assessments. On this note, there are many points of the Kirk and Westinghouse reports that raise serious questions regarding the credibility of the analysis and whether NRC procedures were in fact closely followed. This paper is an effort to point to the specific instances in which the DCISC's expert may not have clearly stated the facts, and why the DCISC should reconsider is proposed endorsement of the analysis.

However, the larger picture of how the DCISC's endorsement of the Kirk Report will need to be evaluated by state agencies in the broader context of whether further investment in continued operation of Unit 1 is in fact a sound financial decision. It is clear from PG&E's own 2017 submission to the CPUC, that DCPP has represented 22% of its in-house generation capacity while consuming over 40% of its in-house generation budget (2017 CPUC report), so it is already the least cost-effective generation in its fleet. This translates into a cost roughly 2.3 times higher than the average of the rest of their in-house generation. Although the DCISC is focused on safety, safety issues have a direct bearing on projected operation and repair costs, and there are a number of cost-risk considerations that are likely to cause the relative operational costs (over generation alternatives) to increase significantly in the coming years. These include: 1) the known metallurgical flaws in the Unit 1 reactor pressure vessel (RPV) which predispose it to more rapid embrittlement, 2) the pre-2004 test data and PG&E's own 2006 calculations indicate this embrittlement will be reaching the Federal Code of Regulation "screening limits" by 2025(also confirmed by NRC in 2006); 3) the probability or risk of escalating repair costs as high-dollar components begin to fail; 4) the postponed maintenance over the past six years that were reasonably deferred to minimize further investment loss in a plant that had been slated for closure in 2018, but which have also kept average repair costs and operational costs artificially low.

A

Considering all of these variables, the relative cost of continued operation of Unit 1 is likely to swell from 2.3 to 4 times that of more cost-effective generation alternatives. Does this make sense? Is Unit 1 in fact needed to meet the projected grid supply shortfall expected to peak between 2025 and 2030? The CEC will need to make those determinations based on the DCISC's assessment of Unit 1 embrittlement. So the question is not simply one of safe operation for 5 years of 20 years, but also a matter of the impacts of safety assessments on the state's financial risk assessment. The CPUC will also need to approve of the additional cost burdens on ratepayers.

Although it has been clearly stated that cost of operation is not the purview of the DCISC, it is the mandate of SB846 to closely evaluate and consider such relative costs to determine that continued operation of DCPP is both safe, and that safe operation is cost-effective. For these reasons, accurate reporting about the current and projected safety related repairs that may be required should be carefully evaluated by the DCISC, particularly Unit 1 embrittlement as premature failure of the Unit 1 RPV would result in a loss of all other investments in its continued operation. This is because RPV replacement would add in the range of $500M to $700 million, and all other repairs would become "sunk costs" should it be deemed necessary. Considering the SB846 requirement to evaluate cost trade-offs, the DCISC should broaden its consideration to include whether continued operation of the Unit 1 RPV is in fact a "good bet" for the citizens of California. If for example, there is less uncertainty about the degree of RPV embrittlement suffered by Unit 1 versus the greater certainty regarding the condition of Unit 2, such uncertainty and relative risks should be discussed in the DCISC's reporting to state agencies.

It is my perception that the state's decision to move forward with funding the continued operation at DCPP Unit 1 relies heavily on the decision of the Diablo Canyon Independent Safety Committee (DCISC) to endorse their expert's report "An Evaluation of the Status of Diablo Canyon Unit 1...".*[1] This report by Dr. Mark Kirk reviews the 2011 Westinghouse PTS Evaluation*[2] which investigates the embrittlement of the Unit 1 reactor. The critical question is whether NRC procedures were in fact followed in the process of reanalyzing the DCPP-1 pre-2004 stress test data, and whether the Kirk Report accurately represents the current state of Unit 1 embrittlement and confirms the Westinghouse assessment based on accurate interpretation of NRC procedure. I cannot claim to have all the answers, but there are serious questions about how data from two severely embrittled plants can be combined and integrated mathematically to yield far more favorable projections than either subset of data would suggest. It is clear that this is accomplished by nudging chemistry factors (CF variable) downward; the same variable intended to account for the confirmed metallurgical issues with critical welds in both the Palisades and Diablo Canyon Unit 1 reactors. Relatively small changes in CF result in fairly radical changes in the projected embrittlement of both of these power plants.

B

A Contradictory Request

In mid-March, the General Counsel for the DCISC requested that I submit comments to the DCISC regarding Dr. Kirk's analysis of the 2011 Westinghouse Pressurized Thermal Shock (PTS) Evaluation.*[1&2] However, I was given the constraint that my comments must be submitted without further reference to "historical NRC or PG&E documents". The 2011 Westinghouse PTS Evaluation is itself a "historical document" and it makes many references to other "historical NRC documents". The Kirk Report makes reference to numerous "historical documents" some of which appear to me to be out of context. All of

the regulations can also be considered "historical NRC documents". The contradiction implicit in this request was immediately apparent to me. Most public policy debate pivots on interpretation of regulations and other references. As a citizen of San Luis Obispo who has read extensively on the topic of Diablo Canyon Unit 1 embrittlement motivated only by civic duty, I do feel that I should have a right to cite regulations and "historical documents" where the historical record may have been presented out of context. Misinformation may not be intentional misleading, but it should nevertheless be corrected. While PG&E was allowed to review and edit Dr. Kirk's analysis, public advocates such as myself, were not afforded this privilege. It is therefore unreasonable to constrain discussion only to the Kirk and Westinghouse reports when these clearly rely on interpretation of prior references. Had I complied with the DCISC constraint, I would not be able to comment on the veracity of the reports in question at all.

C

The Relevant Historical Context

During the February 21st meeting, I pointed to a 2013 document from the NRC which stated that Palisades Nuclear Plant (PNP) and DCPP-1 were among the four most-embrittled reactors in the nation.*[3] (See also Appendix A.) Dr. Kirk was listed as an NRC official overseeing that response to public inquiry. I was a bit surprised that when I raised this as cause for concern, I received an almost heated response with Dr. Budnitz calling this an unfair comparison, and tantamount to calling shortest guy on the Warriors basketball team "short" when he is still much taller than the rest of the population. Such analogies reflect the DCISC's predisposition to approve continued operation based on the Kirk Report. And I must ask if the misstatements of fact contained in the report are of significance at all. Dr. Kirk's own independent analysis suggests Unit 1 will be approaching the maximum screening limits for embrittlement by 2029 (USE projection). Why is no one on the DCISC raising concern with the implicit contradiction between this 2029 projection and Dr. Kirk's validation of the Westinghouse PTS Evaluation which states Unit 1 will not reach screening limits until 2044?

D

In my comment to the DCISC in February 2024, I pointed to a 2006 NRC document (Letter granting 37-month extension approval to Nov. 2024*[4] in which PG&E has asserted and NRC confirmed that Unit 1 would be within 3% of maximum screening limits for embrittlement by Nov. 2024. When I mentioned this document to Dr. Kirk, he indicated that it was of no significance and that it had no bearing on the subsequent Westinghouse conclusions. (See excerpt in Appendix B below.)

E

Neither the Kirk nor Westinghouse Reports makes mention of the 2006 PG&E PTS Evaluation that accompanied the application for a 37-month license extension. The 2006 NRC document granting the extension clearly states that the 37-month extension granted by this document amends the surveillance program requiring a forth capsule be tested by roughly 2009: "The request [for the 37-month extension] ...amends the projected withdrawal for Capsule B to approximately 20.7 EFPY". (approx. the time of 2009 refueling outage) "This complies with the criteria in ASTM E185-82 for withdrawal of the final capsule of a four capsule program." On page 21 of Part 2 of the Kirk Report, Dr, Kirk cites a 2008 NRC letter which incorrectly stated that PG&E had met the requirement for all three capsule tests required by the DCPP-1 test program. The author of the 2008 NRC letter clearly made an error and was unaware that the surveillance program had been previously amended: "The withdrawal and testing of Capsule V fulfilled the third and final recommendation of ASTM E185-70 for the current Diablo Canyon Unit 1

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operating license". The Kirk Report reaffirms this error. The error should be noted. To date, Capsule B has never been tested and the 2006 condition of extension approval which allowed them to operate beyond 2021 has still not been fulfilled, although the NRC has granted numerous postponements.

Why is such historical inaccuracy not important to the DCISC? I have brought up this 2006 NRC document before, and no member of the DCISC committee has directly commented on it. The official response I have received is instruction from your general counsel that I am to make no further reference to other "historical documents". The relevant point is that the NRC clearly thought additional capsule testing was needed on Unit 1 because they had confirmed for themselves the degree of severe embrittlement. This would suggest that additional surveillance testing should be done sooner than later, and not wait until 2028 as Dr. Kirk seems to suggest.

PG&E and the NRC based their 2006 PTS analysis and embrittlement projections based upon the premise that the pre-2004 test data met the credibility requirements as stated in RG1.99 and the NRC's independent assessment produced calculated results that were within less than 1% deviation from PG&E's assessment. The extreme correlation between PG&E's and the NRC's independent results should be noted. Yet the 2006 NRC-PG&E projection that Unit 1 will reach embrittlement screening limits is not even mentioned in either the 2011 PTS Evaluation or by Dr. Kirk. This PTS analysis that only pre-dates the 2011 Westinghouse PTS Evaluation by five years, and it is not even mentioned as a reference as is customary in such reports to the NRC. The omission is notable and perhaps contrary to NRC procedures. Wichman's 1998 clarification of GL92-01 (NRC PTS calculation procedures) clearly states:

G

> *"..., licensees shall consider plant-specific information that could affect the level of embrittlement. This information includes but is not limited to the reactor vessel operating temperature and any related surveillance program[5] results."*
>
> Footnote 5 noted above states:
>
> *"Surveillance program results means any data that demonstrates the embrittlement trends for the limiting beltline material, including but not limited to data from test reactors or from surveillance programs at other plants with or without surveillance program integrated per 10 CFR Part 50, Appendix H."*[5]

The fact that both the 2011 PTS Evaluation and the Kirk Report fail to mention the 2006 PG&E - NRC-corroborated PTS findings is contrary to NRC procedure and the GL92-01 regulatory guide as clearly defined above. Endorsing the Kirk Report in its current form and without correction or attention to such detail validates these misstatements of historical fact and the omission of prior analysis of embrittlement trends.

Misleading Reassurances Regarding Capsule B Test Delays

There are aspects of the Kirk Report which appear to me to be misleading. Kirk states: "Currently available surveillance data pertinent to Diablo Canyon Unit 1 RPV have already quantified embrittlement at exposure levels that the [DCPP-1] RPV will not reach until after 60 years...indicating that the deferral of the withdrawal and testing of Capsule B has not compromised safety".*[6] The Palisades data to which

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Dr. Kirk refers to here did not give Entergy license to operate for 60 years and only gave them an extension to operate under the standard 50.61 regulations until 2017, or for about 5-6 years beyond their original 40-year license. In 2014, it was clear that Palisades could not comply under 50.61 rules beyond 2017 and that they applied for an extension to 2031 on the basis of 50.61a rules (which Dr. Kirk wrote for the NRC). Their embrittlement data failed to meet the test to comply in any other manner. Under the alternative rules (10CFR50.61a), a severely embrittled RPV is allowed to operate with a much more stringent safety regimen even if the projected RT_{PTS} of the most limiting materials doesn't comply with regulatory screening limits. Additional safety measures under this rule include ultrasonic testing (UT), mapping and monitoring of the flaws and cracks that naturally developed in the RPV steels, and many other safety measures. The fact that Dr. Kirk makes representations that the Palisades "sister plant" data has assured their safe operation for the 60-year operation period is inaccurate. That plant can only qualify under the alternative rules and Dr. Kirk was the primary reviewer of the Palisades 50.61a license application in 2014. He is well aware that Palisades is severely embrittled and that the Palisades operating conditions are entirely different from DCPP-1, and that it was operating under the alternative rules from 2017 until it closed in 2022. If the reference is to the 2011 Westinghouse PTS Evaluation for DCPP-1, that report was never submitted to the NRC until December of 2023 and the analysis is still under review by the NRC. Neither interpretation is a justification for delaying withdrawal and testing of Capsule B.

H

I

The Summary of Key Omissions and Misstatements in the Kirk and Westinghouse Reports

While Dr. Kirk's report seems to repeatedly reassure that "conservatisms" are incorporated into the Westinghouse PTS Evaluation, it appears the opposite is the case. Taken separately, the Palisades data (Two capsule sets) and the DCPP-1 data (three capsule sets) both indicate severe embrittlement of the critical weld material (Heat#27204). In the case of DCPP-1, lower axial weld #3-442C appears to be the "most limiting" (most embrittled) with the 2006 PTS Evaluation (cited above), suggesting a reference temperature of pressurized thermal shock (RT_{PTS}) equal to 258.8°F by Nov. 2024 (within 3% of 50.61 screening limits). The Palisades data indicates even more severe embrittlement with the Palisades 2010 PTS Evaluation*[7] suggesting their circumferential weld #9-112 (using #27204) approaching 280°F by March of 2011. It is simply remarkable and somewhat implausible that by combining the test data from these two severely embrittled "sister plants", a new mathematical projection is achieved that shows both plants having substantially lower embrittlement (as much as a 64% shift in the data as compared with prior reports). Palisades used the "sum of squares" method outlined in Reg. Guide 1.99 in 2010 and represented that the DCPP-1 data was "credible", a term of art which references consistency between predictions and measured results as well as standard deviations in the graphed plots if the data. PG&E used the same method months later with a similar effect of radically lowering the embrittlement forecast for the DCPP-1 reactor.

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K

Where the prior hard test data and the 2006 PTS analysis revealed that the DCPP-1 reactor materials demonstrate a propensity toward brittle fracture characteristics in lab tests, the new math lowers the value of 'chemistry factors' (CF) that account for the embrittled material properties. The precise composition of the welds had previously been tested (around 1992 at DCPP) and the percentage by weight of nickel and copper impurities that are the direct cause of the reactors' predisposition to

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premature embrittlement were reported to be .21% copper and .98% nickel.*[8] Those values should not change over time and the regulations incorporate tables to determine "chemistry factors" (CF) based on material property analysis (RG1.99, pg1.99-4). In some references the "table CF" which are extrapolated from the RG1.99-4 table are shown to be 222F, and in other references shown to be 226.8F. Kirk has suggested that "table CF" based on RG1.99 and chemical testing values should not change. So why is it appearing as a different value within the same Westinghouse document? In effect, changing the chemistry factors (CF) allow the data to appear to fall into a tighter standard deviation which in turn can also allow the margin (M, like a margin of error) to also be reduced. Minor changes in the variables can add decades to the projected life of a plant.

M

As noted in Wichman (1998), very small changes in CF result in comparatively large changes in the resulting RT_{PTS} calculations and operational life of the plant.

The Use of "Sister Plant" Data Must Meet 10 CFR50.61 Criteria

Additionally, the 1995 Update to 10 CFR50.61 spells out clear criteria for qualifying "sister plants".*[9] Dr. Kirk has stated repeatedly in his report that "NRC requires" that sister plant data be integrated. That is a misstatement. NRC encourages reference to sister plant data, but to use that data to reduce chemistry factors and margin in a sum of squares procedure, the licensee must first demonstrate that the two "sister plants" have similar designs and operating conditions as defined by the 1995 Update to 10CFR50.61. (See footnote 8 and Appendix C) No such sister plant analysis has been performed to date, and the 2011 Westinghouse PTS Evaluation makes no reference to this NRC requirement. Dr. Kirk dismisses the importance of this NRC requirement, and asserts that one can safely assume operational similarities between sister plants. He makes the argument that operational differences are accounted for through application of temperature adjustments. However, it remains an NRC procedure that is clearly required and has not been followed by the 2011 Westinghouse PTS Report. Dr. Kirk's suggestion that the sum of squares procedure for integrating data from other plants is "required", fails to address this important qualification criteria.

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The operational conditions between the two plants (PNP and DCPP) are significantly different, and not at all similar as Dr. Kirk's report suggests would be safe to assume. Earlier capsule testing at Palisades indicated rapid embrittlement of the RPV welds and there was concern that the plant would have to close as early as 1999. For this reason, and from 1999 onwards, Palisades implemented an "Ultra Low Leakage Core Strategy" to reduce the flux (radiation exposure) at the critical welds. This involved a change in the fuel configuration, reduction of generation capacity to 90% (to reduce radiation damage), and the addition of stainless steel shielding to protect the most vulnerable welds. Although DCPP operated at 97.9% of its current capacity (3338MWt) until the 10th fuel cycle (about 1992), it has operated at its current 100% capacity (3411MWt) since then. Most significantly, DCPP1 has not employed stainless steel shielding at its limiting welds as PNP has, and there is no accounting of this in the Westinghouse PTS Evaluation.

O

Even if the NRC doesn't flag such an oversight, it is still a violation of their regulatory requirement. Therefore, the sum of squares integration of DCPP1 and PNP data sets would not be allowed under the requirements of 10 CFR50.61. The Kirk Report suggests that all of these variables are captured by the operating temperature adjustments that made when sister plant is integrated, and while that may be true of the capacity reduction, it would not likely be true of shielding or fuel configuration changes that move fuel away from critical welds. Some of these operational changes may be accounted in the dosimetry (radiation sensors), but that is not safe to assume. The fact that a detailed discussion of such variables and regulatory requirements is completely overlooked by the Westinghouse PTS Evaluation and the Kirk Report is a significant analytical omission. P

Inconsistent Application of NRC Procedures Based on Changing 'Credibility' of Data

It is important to note that Dr. Kirk dismisses the concerns expressed by Dr. Macdonald and myself about the manner in which PG&E has tried to judge its pre-2004 data "not credible" and in several sections of Part 1 of his report, attributes this to an "apparent misunderstanding of NRC's definition of credibility in the context of embrittlement analysis". The problem is that PG&E waffles on its characterization of the pre-2004 data, using it to apply for a 37-month extension in 2006 as if it is credible and projecting Unit 1 to reach maximum embrittlement screening limits by about 2025 on the basis of this data. This analysis was closely corroborated by the NRC (less than .5% difference in the results). PG&E then refer to the same data in the 2009 License Renewal Application (2009 LRA) to suggest Unit 1 will far exceed the 270F screening limits by 2044. Q

By the end of 2010, PG&E appears to be in communication with Palisades about their use of the sum of squares method to demonstrate compliance through April of 2017. At the same time that PG&E is claiming that their pre-2004 data is not credible (as per RG1.99 definitions), Palisades is assuming that the data is credible. However, the 2011 DCPP PTS Evaluation by Westinghouse appears to be an effort to replace the 2006 PTS Evaluation, and the data is judged "not-credible" at the beginning of their sum of squares procedure. R

This appears to be a violation of the rules as set out in RG1.99 Position 2.1 which allow the use of the sum of squares procedure only if your data is deemed credible. The precise language in RG1.99 suggests that if two or more sets of surveillance data are deemed credible, then Position 2.1 can be used to determine chemistry factors based on a best fit of the data. In the 1998 update to GL92-01, Case 5 as presented by Wichman clearly states that 5 out of 6 data sets (87%) must be deemed "credible" to use the sum of squares procedure. If only 2 of 5 data sets are deemed credible (2 Palisades capsules were judged credible), the sum of squares procedure cannot be used to lower the margin and CF values as performed in the 2011 Westinghouse PTS Evaluation. (See RG1.99, Position 2.1). This appears to be inconsistent with NRC procedures. S

One must ask, how can PG&E waffle about the credibility of the same 3 sets of data over time? The inconsistencies clearly raise questions regarding whether PG&E has actually followed NRC procedure as Kirk has asserted. PG&E has waffled in their position on credibility since 2001 depending upon what T

their goals were at the time. Such inconsistencies, though buried in historical documents, have direct bearing as to whether the 2011 Westinghouse PTS Evaluation follows correct procedures.

The Applicability of Embrittlement Trend Curves is Overstated

A great deal of merit is given in the Kirk Report to the NRC's multi-decade effort to gather data from all nuclear plants and correlate the results of their materials testing programs (surveillance programs) to improve the accuracy of the results and this in fact has been done with great success in most cases. Kirk is correct to note the value of correlating data regarding the embrittlement of the same weld and plate materials used across a range of plants, and one can see that would lead to greater certainty in the calculations, because as the amount of data available increases, the uncertainty and range of standard deviations generally decreases. The more data, the more clear patterns emerge from it.

What is different about DCPP-1 is that it is only one of two plants in the world still in operation that contain the flawed weld material (heat#27204) which was recognized by Westinghouse to be substandard immediately after delivery of the Unit 1 RPV. The metallurgical specifications were revised before Unit 2 was delivered. Because of the early recognition that the 27204 weld material was flawed, very few reactors in the world contain this material. There have only been five "capsule tests" in the entire world that we know of using this material as evidenced by NRC's extensive review. U

Because of that fact, there is little opportunity to review a broader base of data gathered industry wide and review the embrittlement trend curves (ETCs) as Dr. Kirk suggests. This is a false assurance. Test data beyond the five capsules included in the Westinghouse PTS Evaluation do not exist. What we have are three capsule tests at DCPP (multiple samples in each test capsule), and two capsule tests from the Palisades Nuclear Plant in Michigan. By 1992, raw samples of the 27204 weld material proved impossible to obtain and that is why Capsule B (still in the Unit 1 RPV) only contains broken fragments of previously tested samples of the 27204 weld material. This is important historical context, because there is insufficient test data industry-wide to analyze with accuracy how embrittled the DCPP-1 welds actually are, and the data that we do have from Palisades (circumferential weld #9-112) indicate that the reference temperature of pressurized thermal shock (RT_{PTS}) was reaching regulatory limits by 2011 or at effectively 40 years of operation. Through minor changes to chemistry factors, this was extended to 2017. The 2006 DCPP-1 PTS Report to the NRC suggested it was also highly embrittled by 40 years of operation, reaching to within 3% of the maximum regulatory screening limits by Nov. 2024 (258.7F). NRC's calculations and assessment of PG&E's pre-2004 test data confirmed their conclusions to within less than .05% variation in the calculated results. Given this context of prior embrittlement analyses, it appears to be highly implausible, that the sum of squares procedure used in the Westinghouse can be correct. A linear extrapolation of the reported 2006 PTS results appear to suggest that the jump in the embrittlement data contained in the 2011 Westinghouse Evaluation represents a 64% shift in the embrittlement projections. How is that plausible? Since no other nuclear plants employ this rare, substandard material, there is no broader base of industry experience that would suggest embrittlement trend curves based on "generic" data from other plants exists or reduces these uncertainties.

V

W

A Short List of Inaccuracies and Concerns Regarding the Kirk and Westinghouse Reports

In the following several pages, I will summarize in bullet form the most relevant facts pertaining to the Kirk Report and the accuracy of its conclusions. I believe that all of these considerations taken together weigh heavily against "endorsement" of the Kirk Report:

Page 9, Item 1 1) **According to PG&E's own 2006 projections and corroborated by the NRC, Unit 1 will be within 3% of maximum embrittlement 'screening limits' as defined by the Federal Code of Regulations by November 2024.** This projection of embrittlement was based on "hard data", (Charpy stress tests) performed on material samples and indicated some samples demonstrated "fast fracture", characteristic of embrittlement. The "reference temperature" or RT_{PTS} value was projected to be 258.7°F by Nov. 2024. Note that the 10CFR50.61 screening limit is <270F. By independent calculation, the NRC calculated this value to be 258.8°F, a remarkable confirmation of both their mathematical accuracy and their faith in the pre-2004 data.

Page 9, Item 2 2) **There is considerable evidence that both the PNP and DCPP Unit 1 reactor pressure vessels are severely embrittled, and yet these are the only data sets available as inputs into the DCPP PTS Evaluation. For this reason, further investment in Unit 1 should be postponed awaiting further data.** PG&E has failed to report on their 2006 PTS Evaluation confirmed by the NRC as it is not even mentioned in either the Kirk or Westinghouse Reports.

Page 9, Item 3 **3) Immediately after delivery of the Unit 1 RPV in the late 1960's, Westinghouse admitted to PG&E that Unit 1 contained weld material with metallurgical deficiencies in the form of impurities of copper and nickel that would predispose the RPV to premature failure.** Dr. Kirk rather absurdly argues that these "flaws" were not "flaws" or "errors" because the metallurgical issues were not understood at the time. However, window dressing aside, the historical significance of the known substandard metallurgy is the point. The mathematical predictions in the 1986-2003 capsule reports also took into account the known impurities in the RPV weld material, and the physical stress test indicated there was a predisposition for brittleness.

Page 9, Item 4 4) **This historical context has been omitted from the Kirk Report.** Given that the Kirk report was reviewed unilaterally by PG&E for historical accuracy, and no opposing parties were engaged in such discussion, and because there are significant historical inaccuracies in the Kirk Report which are contradicted by the NRC record, it is difficult to express confidence in the 'independence' of this reporting.

Page 9, Item 5 5) **Kirk's citation of a 2008 letter from the NRC indicates that NRC had by then forgotten the 2006 conditions of license extension approval that the embrittlement stress test program ("surveillance program") was amended by the July 17, 2006 letter of approval which required an additional capsule test (Capsule B) be conducted by 2009.** Because PG&E has waffled on the issue of credibility of their data, there are a great deal of questions about the actual state of the Unit 1 reactor. PG&E continues to oppose immediate retesting of previously tested samples under test methods that are known to be credible. Since Capsule B may not be tested until 2028, why is the DCISC not moving to retest samples that are already in hand?

Page 9, Item 6 6) **By 2011, PG&E reassessed all of their pre-2004 to be "not-credible" and in a manner that appear to be inconsistent with NRC procedures as defined in Reg. Guide 1.99.** First, PG&E claimed one data point in the capsule Y set was out of standard deviation range and then

eliminated the entire set. This directly violated GL92-01 which states: "A priori exclusion of some data based on 'inconsistency' with expected norms should not be used before analysis for statistical outliers is conducted." Then PG&E claimed that the two remaining "credible" sets did not meet the minimum number of sets required to regard them as "credible". This seems to violate Reg. Guide1.99, criterion 3 which clearly states that you need only two sets of credible data for each "limiting material" (most embrittled) to regard them as "credible". PG&E had the minimum two sets for each material, but the NRC did not question this incorrect interpretation of data set credibility criterion.

Page 10, Item 7 7) **The DCISC has not weighed in on the fact that PG&E set aside the 2006 PTS Evaluation** (maximum embrittlement by 2025) **by means that do not appear to comply with NRC regulations.** There should at least be a motion to include reference to the earlier PTS projections in the Westinghouse PTS Evaluation as is customary. The DCISC hired Dr. Kirk to make recommendations to them and he now claims that the 2011 Westinghouse PTS Evaluation is consistent with NRC procedure when it appears that there were many critical omissions. It is fairly clear that several NRC procedures were not followed and that Dr. Kirk has overlooked details required by NRC procedures.

Page 10, Item 8 8) **While the Kirk Report assures "conservatisms" in at least a dozen places, a review of Tables 5.1-1, 5.1-2 and 6.1-1 and 6.1-2 in the Westinghouse report quickly reveals that the Westinghouse PTS Evaluation uses the least conservative surveillance-based chemistry factors. The Westinghouse PTS Evaluation appears to employ a sum of squares procedure that is only allowed under RG1.99, Position 2 when all data sets are credible.** Wichman 1998 modifies this requirement to allow sum of squares procedure when 5 of 6 data sets are credible (83%). The numerous references to "conservatisms" by which Dr. Kirk assures a margin of safety to the public when non-credible sets are used are false assurances. In the final analysis, the Westinghouse PTS Evaluation employs the LEAST CONSERVATIVE chemistry factors based upon a sum of squares procedure with questionable results. All conservatisms have been eliminated by reducing both the chemistry factors and the margin (M) resulting in the a significant reduction of the projected level of embrittlement for both DCPP and Palisades. Both RPVs previously appeared to be among the most embrittled RPVs in the US.

Page 10, Item 9 9) **In 2013, in response to questions at a public meeting regarding the Palisades RPV embrittlement, the NRC responded in writing admitting that Palisades and DCPP-1 were among the five most embrittled reactors in the US at that time.** Due to retirements of older plants that used the 27204 weld material, these two plants are the only remaining in the US to use the #27204 weld material are now among the four most embrittled plants in the US. (See NRC proceeding written response to public concern about Palisades embrittlement, Appendix A)

Page 10, Item 10 10) **Dr. Kirk performed his own calculation of "upper shelf energy" (USE), a second embrittlement metric, and found Unit 1 would reach maximum embrittlement screening limits by 2029 and only if it is operated with a reduced capacity factor of 85% to 95%.***[10] This is in direct contradiction to Dr. Kirk's support of the 2011 Westinghouse PTS Evaluation conclusions. However, to his credit, Dr. Kirk does suggest additional embrittlement testing to confirm the status of the Unit 1 RPV and suggests that the mini-CT test methodology is perhaps more accurate than the 100-year old Charpy methodology. Dr. Macdonald agrees with this suggestion.

However, Dr. Kirk affirms the 2011 Westinghouse conclusion that embrittlement is within regulatory limits until 2044, and he dismisses his own USE calculations without a clear explanation of the contradiction.

Despite these many concerns, the DCISC has already moved to "endorse" the Kirk Report and only narrowly elected to defer the vote on endorsement until the June meeting. Strong arguments were made both for and against waiting for Dr. Macdonald to submit his analysis despite his fight with Covid at the time. It is my earnest hope that this distinguished committee will not disregard the opposing view and consider that there may have been merit to the 2006 PG&E and NRC PTS Evaluation which clearly indicated severe embrittlement by 2025.

When there is so little data, and PG&E has called the credibility of their own data into question, why not at least discuss the possibility of more immediate micro-CT testing to verify the status of Unit 1 embrittlement? Why rush to endorse a report with so many apparent contradictions and inaccuracies?

The only reason this is being rushed to an approval is that many state agencies and the legislature are looking to the DCISC to make a clear determination as to whether Unit 1 is worthy of additional investment. The problem is that the Westinghouse PTS Report written in 2011 doesn't actually answer this question, because it cannot. It is written in esoteric engineering language that translates into a "green light" without the needed assessment of real potential risks, both in regards to safety and financial. If even two of the above ten summarized concerns proves to be true, the DCISC should not vote to endorse the Kirk Report. Doing so will send a false signal to the state regarding the worthiness of the DCPP Unit 1 reactor. Where the Westinghouse PTS Evaluation fails to provide the much promised "conservatisms", it will be up to the DCISC to provide a more conservative and calculated assessment of the Kirk Report. It is my hope that you will closely examine these details as a great deal rests on your determinations.

PG&E's methods of revising embrittlement projections should be more deeply analyzed by anyone interested in whether the State's $300M gamble on DCPP is in fact a "safe bet". Alternative test methodologies exist that would produce new data sets based on retesting of archived material samples and they should be employed immediately to minimize risk to the state. If the State is gambling $1.4B on repairs and continued operation of DCPP, why are we not testing these immediately accessible test samples in order to make a more informed financial decision for the State and its citizens? How much would it cost, $500k, $1M? I have raised this in prior comments, letters and during public meetings over the last year, and the DCISC has yet to discuss the possibility.

In closing, it is important to qualify my statements, that as a member of the DCDEP, I do not speak on behalf of that body and my conclusions are my own. I have worked for director and VP level staff as a Regulatory Compliance Engineer for a large company for many years, but my efforts to research DCPP embrittlement are completely voluntary, and have never been paid by anti-nuclear organizations or affiliated with them. I am supportive of running Unit 2 for ten years rather than both reactors for five, as this would be a far better investment than gambling state funds on Unit 1.

Bruce Severance, Regulatory Compliance Engineer, Energy Policy Analyst, submitted April 15, 2024, 5pm

Footnotes:

*1 An Evaluation of the Status of Diablo Canyon Unit 1 with Respect to Reactor Pressure Vessel Condition , Monitoring and Prediction, Part 1 and 2, Dr. Mark Kirk, Consultant for the DCISC, Phoenix Engineering Associates, Inc., Unity, New Hampshire, January 26, 2024

*2 Diablo Canyon Units 1 and 2 Pressurized Thermal Shock and Upper Shelf Energy Evaluations, Westinghouse Electric Company LLC, WCAP-17315-NP, July 2011

*3 NRC written response to public concerns about severe embrittlement at Palisades, published by NRC, 2013 (See Appendix A)

*4 Letter from NRC to PG&E approving 37-month license extension for DCPP-1, July 17, 2006, NRC Docket #ML061660220, pg, 4 (see Appendix B for excerpt below)

*5 Generic Letter (GL)92-01 and RPV Integrity Assessment, Kieth R. Wichman, NRC Workshop on RPV Integrity Issues, elaborates on GL92-01 (1992), Feb. 12, 1998, pdf p.19

*6 An Evaluation of the Status of Diablo Canyon Unit 1 with Respect to Reactor Pressure Vessel Condition , Monitoring and Prediction, Part 1, p.4, Dr. Mark Kirk, Consultant for the DCISC, Phoenix Engineering Associates, Inc., Unity, New Hampshire, January 26, 2024

*7 Revised Pressurized Thermal Shock Evaluation for the Palisades Reactor Pressure Vessel, Attachment to cover letter from Entergy Nuclear Operations, NRC# ML110060692, Structural Integrity Associates, Inc. Report #1000915.401, Nov. 2010

*8 Analysis of Capsule V from the Pacific Gas and Electric Diablo Canyon Unit 1 Reactor Vessel Radiation Surveillance Program, Westinghouse Corp., WCAP-15958, Jan. 2003, Table 4-3, pg. 4-4

*9 the 1995 Update to 10 CFR 50 (Code of Federal Regulations, Federal Register, Vol. 60, #243, December 19, 1995, p. 65476 (See Appendix C, below, for excerpts)

*10 An Evaluation of the Status of Diablo Canyon Unit 1 with Respect to Reactor Pressure Vessel Condition , Monitoring and Prediction, Part 2, p.40, Dr. Mark Kirk, Consultant for the DCISC, Phoenix Engineering Associates, Inc., Unity, New Hampshire, January 26, 2024 (See also Appendix D, below)

Appendices A-D document history of Unit 1 embrittlement issues on following pages

Appendix A: *A 2013 NRC written response to public question regarding the reactor integrity of Palisades which mentions DCPP-1 and Palisades as among the four most embrittled reactors in the US. Note that Dr. Kirk was presiding as an official of the NRC at these public listening sessions and the responses:*

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

April 18, 2013

LICENSEE: Entergy Nuclear Operations, Inc.
FACILITY: Palisades Nuclear Plant
SUBJECT: SUMMARY OF THE MARCH 19, 2013, PUBLIC MEETING WEBINAR REGARDING PALISADES NUCLEAR PLANT

PUBLIC MEETING PRINCIPAL ATTENDEES
March 19, 2013

NRC Attendees

C. Pederson, Deputy Regional Administrator, RIII
J. Giessner, Chief, Division of Reactor Projects, Branch 4
M. Kirk, Senior Materials Engineer, Office of Nuclear Regulatory Research
M. Holmberg, Senior Reactor Inspector, RIII

4. **Which are the other most embrittled plants in the U.S.? How many PWRs will reach their screening criteria in the next 10 years?**

   The NRC currently estimates that the following plants will exceed the PTS screening criteria of 10 CFR 50.61 during their 20-year period of operation beyond their original 40 year licenses. Updated fluence calculations, capacity factors changes, power uprate, new surveillance data, and improved material property information (i.e., the use of direct rather than correlative measurements of the vessel material's resistance to fracture) can change these estimates. For example, Point Beach has made a recent licensing submittal that seeks to use improved material property information to re-evaluate the level of embrittlement in the vessel. If approved, it is estimated that Point Beach would not exceed the screening criteria of 10 CFR 50.61 during their 20-year license extension period.

   1. Point Beach 2 (2017)
   2. Palisades (2017)
   3. Diablo Canyon 1 (2033)
   4. Indian Point 3 (2025)
   5. Beaver Valley 1 (2033)

Appendix B: *Excerpt from NRC July 17, 2006 Letter approving 37-month extension and showing Unit 1 will reach maximum embrittlement (RT_{PTS} screening limits) by PG&E's own calculation and validating the credibility of the pre-2004 embrittlement stress test data (1986, 1992, 2003 capsule tests):*

The NRC staff performed independent calculations of the RT_{PTS} values for the RV beltline materials at DCPP-1/2 through the revised expiration dates for the DCPP-1/2 operating licenses. The NRC staff used the methods of analysis in 10 CFR 50.61 as the basis for its independent RT_{PTS} calculations. The NRC staff applied the updated clad-to-base metal neutron fluences that were provided in PG&E Serial Letter No. DCL-06-045.

The NRC staff determined that for DCPP-1, Lower Shell Axial Weld No. 3-442C (Heat No. 27204) is the limiting beltline material for PTS. The NRC staff calculated a RT_{PTS} value of 258.8 EF for this weld at 35.2 EFPY. This value is in agreement with the RT_{PTS} value calculated by the licensee for this weld (i.e., 258.7 EF) at 35.2 EFPY. Both of these values meet (i.e., are lower than) the PTS screening criterion of 270 EF in 10 CFR 50.61 for RV axial weld materials at the end of the operating license (EOL) and are acceptable.

The NRC staff determined that for DCPP-2, Intermediate Shell Plate No. B5454-2 (Heat No. C5168-2) is the limiting beltline material for PTS. The NRC staff calculated a RT_{PTS} value of 214.8 EF for this weld at 35.8 EFPY. This value is in agreement with the RT_{PTS} value

Un-irradiated RT-NDT value of limiting weld is -56F, so total range of embrittlement is 326F (-56 added to 270F. RT-PTS screening limit) at 258.8F Unit 1 has used up 315F of their 326F 'runway', or 97% of their allowed embrittlement without triggering repairs or other significant measures. This projected RT-PTS value was confirmed precisely by NRC based on pre-2004 stress test data. An extrapolation based on rate of embrittlement suggests they have until mid-2026 at the latest.

From page 4 of NRC's July 17, 2006 letter of approval of PG&E's request for a 37-month operational extension for DCPP Unit 1 (NRC docket number ML061660220)

EXHIBIT C ON FOLLOWING PAGE

Appendix C: *The following is an excerpt of some of the criteria required by the NRC in order to qualify a "sister plant" as operationally similar enough to compare and integrate surveillance data.*

Criteria required in order to be permitted to share data between RPVs (1995 Update to 10CFR 50.61 p.65476 (Ammends Append. H)

III. Surveillance Program Criteria

C. Requirements for an Integrated Surveillance Program.

1. In an integrated surveillance program, the representative materials chosen for surveillance for a reactor are irradiated in one or more other reactors that have similar design and operating features. Integrated surveillance programs must be approved by the Director, Office of Nuclear Reactor Regulation, on a case-by-case basis. Criteria for approval include the following:

a. The reactor in which the materials will be irradiated and the reactor for which the materials are being irradiated must have sufficiently similar design and operating features to permit accurate comparisons of the predicted amount of radiation damage.

b. Each reactor must have an adequate dosimetry program.

c. There must be adequate arrangement for data sharing between plants.

d. There must be a contingency plan to assure that the surveillance program for each reactor will not be jeopardized by operation at reduced power level or by an extended outage of another reactor from which data are expected.

e. There must be substantial advantages to be gained, such as reduced power outages or reduced personnel exposure to radiation, as a direct result of not requiring surveillance capsules in all reactors in the set.

2. No reduction in the requirements for number of materials to be irradiated, specimen types, or number of specimens per reactor is permitted.

3. After (the effective date of this section), no reduction in the amount of testing is permitted unless previously authorized by the Director, Office of Nuclear Reactor Regulation.

Note: "Integrated surveillance programs must be approved by the Director, office of Nuclear Reactor Regulation on a case by case basis...."

"Must have sufficiently similar design..."

"There must be a contingency plan to assure that the surveillance program for each reactor will not be jeopardized by operation at reduced power level or by an extended outage of another reactor from which data are expected."

Palisades was operated at reduced power (95% capacity) since 1999.

APPENDIX D ON FOLLOWING PAGE

Appendix D: *Dr. Kirk states on Page 40 of Part 2 of his Report that further embrittlement testing should be performed and that his own evaluation of "upper shelf energy" another embrittlement metric indicates Unit 1 approaching 50.61 screening limits as early as 2029. Despite this independent conclusion, Dr. Kirk asserts the Westinghouse Report follows NRC procedures and validates Unit 1's safe operation until 2044:*

Kirk: USE reaching max by 2029-30. Need for more testing. Kirk Report, Part 2p.40

Limiting weld at DCPP to fall below 1//4T USE of 50flb by 38.5EFPY of 2029 at 85-95% power. Proof of bad, risky investment

Since the [RG1.99R2] procedure requires that its trend curve be adjusted to bound all available data, the [RG1.99R2] representation of this similar data set becomes the red curve shown in Figure 10. Figure 11 shows the resultant prediction, based on the red curve, of irradiated USE and how it decreases with increasing fluence. The blue and green vertical lines show the ¼T fluence values for the Unit 1 RPV at the end of 40 and 60 years of operation (32 and 54 EFPY, respectively). This analysis suggests that the Unit 1 RPV could fall below the [10CFR50-AppG] 68 J screening criteria sometime during its license renewal period. More specifically, the limiting weld in the Unit 1 RPV is forecast to fall below the 68J screening criteria at a fluence of 0.87×10^{19} n/cm^2, which should occur at the ¼T after 38.5 EFPY of operation. Assuming a future capacity factor between 85-95%, 38.5 EFPY will be reached in the year 2029 or 2030.

Were it determined to be appropriate to consider all similar data as part of a USE analysis then an equivalent margins analysis performed following the guidance of Regulatory Guide 1.161 would be needed to demonstrate adequate safety margins for Diablo Canyon Unit 1 [RG1.161] after 2029-2030. The NRC would require such an analysis to be submitted three years before the plant is forecast to fall below the 68 J screening criteria [10CFR50-AppG]. Equivalent margins analyses performed on other reactors have, without exception, demonstrated that continued operation at USE values considerably below 68J is acceptable, see [WCAP-17651] and [ANP-3646] as examples.

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE	
AGENDA TRANSMITTAL FORM	
MEETING DATE:	June 21, 2024
AGENDA ITEM:	XXI-A
AGENDA TITLE:	Minutes of February 21-22, 2024 Public Meeting
CONSENT [X] ACTION [ ] INFORMATION [ ]	

Staff Summary: Attached are the Minutes which have been prepared from the Committee's one hundred and seventh public meeting held on February 21-22, 2024, in Avila Beach, CA and as a Zoom webinar.

(Each session was also webcast live in real time and is available for subsequent viewing, archived to the meeting agenda, by visiting the links on the Committee's website at www.disc.org or at www.slospan.org. Meetings are videotaped for later broadcast on Channel 21 in the San Luis Obispo, CA area, the governmental access television channel.)

RECOMMENDED COMMITTEE ACTION: Accept the Minutes by motion

MINUTES
of the
DIABLO CANYON INDEPENDENT SAFETY COMMITTEE'S
FEBRUARY 21-22, 2024, PUBLIC MEETING
[For Approval at the June 20-21, 2024, Public Meeting.]

Wednesday & Thursday
February 21-22, 2024
Avila Beach, California
Also conducted as a Zoom Webinar

Notice of Meeting.

A legal notice of the public meeting was published in the San Luis Obispo Tribune and a display advertisement was published in the New Times, both local newspapers, and mailed and emailed to the media and those persons on the Committee's mailing list. A mailing list verification form was provided to those persons on the Committee's mailing list in accordance with California Government Code 14911. The meeting agenda and the complete agenda packet for the meeting and the informational presentations made during the meeting together with the fact finding reports to be approved were posted on the Committee's website at prior to the meeting. The meeting agenda contained information on how to access the webinar using a computer, cellphone or a telephone. This in-person meeting was also produced as a Zoom webinar by AGP Video, Inc. and was webcast live on SLO-SPAN at http://www.slo-span.org and through http://www.dcisc.org and was subsequently broadcast on San Luis Obispo, California, local government access television Channel 21. A supply of hand sanitizers and face coverings was made available in the meeting room.

I CALL TO ORDER - ROLL CALL

The February 21, 2024, public meeting of the Diablo Canyon Independent Safety Committee (DCISC), the one hundred and seventh public meeting of the Committee, was called to order by Committee Chair Dr. Peter Lam at 9:00 a.m. Dr. Lam briefly reviewed the professional backgrounds and appointment to the DCISC for each of his fellow Members, Dr. Per F. Peterson, the appointee of the Governor of California and Dr. Robert J. Budnitz, the appointee of the California Attorney General. Dr. Budnitz then briefly reviewed Dr. Lam's professional background and reported Dr. Lam serves on the DCISC as the appointee of the Chair of the California Energy Commission.

Present:	Committee Member Robert J. Budnitz [attending remotely]
	Committee Member Peter Lam
	Committee Member Per F. Peterson
Absent:	None

A Notice of Remote Participation in Public Meeting was posted to www.dcisc.org prior to the meeting regarding Dr. Budnitz remote participation.

II INTRODUCTIONS

Dr. Lam introduced and briefly reviewed the professional backgrounds of the Committee's Technical Consultants and Assistant Legal Counsel: Technical Consultants Mr. Richard D. McWhorter Jr., Mr. R. Ferman Wardell, P.E., and Dr. Andrew C. Kadak who was present and in attendance remotely, and DCISC Assistant Legal Counsel Mr. Robert W. Rathie.

Dr. Lam then introduced Mr. Hector M. Garcia, Diablo Canyon Power Plant (DCPP or the plant) Chief Nuclear Officer Support Manager and Ms. Brandy Lopez, Strategic Initiatives Licensing Principal. Dr. Lam remarked Mr. Garcia and Ms. Lopez play key roles on behalf of PG&E and DCPP as liaisons with the DCISC in coordinating the Committee's activities, providing information, and facilitating the Committee's public meetings and the frequent fact-finding visits conducted by a single member and one of the technical consultants.

Mr. Rathie reported this meeting is being livestreamed and broadcast on the internet and he welcomed the technicians for AGP Video who provide this component of the Committee's public meetings.

III PUBLIC COMMENTS AND COMMUNICATIONS

The Chair invited any members of the public in attendance who wished to address remarks to the Committee on items not appearing on the agenda for the public meeting to do so at this time.

Dr. Gene Nelson, President and Senior Legal Researcher for Californians for Green Nuclear Power was recognized. Dr. Nelson stated his comments were based upon a message he sent to the Committee earlier in the day with an attachment with an excerpt from Section 4.2 of PG&E's 2023 License Renewal Application. In his message Dr Nelson stated the Committee and the public would benefit from Dr. Mark Kirk, who has been engaged by the Committee to review the integrity of the Unit 1 reactor pressure vessel, analyzing and summarizing Section 4.2 of the Application which Dr. Nelson described as a difficult section to understand, as Dr. Kirk is capable of clearly communicating and focusing on the similarities and differences in the embrittlement determination for Unit 1 as compared to that for Unit 2 and the significance thereof. Dr. Lam thanked Dr. Nelson for his comments.

Dr. Lam requested Mr. Rathie to present the next item.

IV ACTION ITEMS

A. Receive PG&E's Response to DCISC's 33rd Annual Report on Safety of Diablo Canyon Operations: July 1, 2022 - June 30, 2023.

Mr. Rathie reported the Committee approved its 33rd Annual Report at its public meeting in September 2023 and the report has now been distributed in accordance with the direction of

California Senate Bill 846 (SB846)[1] and California Public Resources Code 712.1 which require the Committee to submit its annual reports to the California Public Utilities Commission (CPUC), the California Legislature (Senate and Assembly) and to the NRC as well as to the entities who now receive its annual reports, including PG&E for its response to each annual report which response is once again to be included in each report. Mr. Rathie reported the Committee did not make any recommendations in its 33rd Annual Report. The Committee publishes its annual reports as two bound volumes, on the internet at www.dcisc.org, in compact disk format and on a USB drive. Annual Reports are also distributed to the Special Collections and Archives Department at the R.E. Kennedy Library at the California Polytechnic University at San Luis Obispo (Cal Poly) and to local public libraries.

On a motion by Dr. Peterson, seconded by Dr. Budnitz, the Committee Members unanimously accepted PG&E's response to the Committee's Thirty-Third Annual Report on the Safety of Diablo Canyon Nuclear Power Plant Operations for the period July 1, 2022 through June 30, 2023. [A prior version of PRC §712.1 did not provide for PG&E's response to be incorporated into the DCISC's annual reports. That provision has been changed and the 33rd Annual Report now contains PG&E's response to the 33rd as well as to the 32nd Annual Report for 2021-2022.

V ACCEPTANCE OF MINUTES

This item concerned review and acceptance of the Minutes of the Committee's September 13-14, 2023, public meeting conducted in Avila Beach and as a Zoom Webinar. A draft of the September 2023 Minutes was included in the public agenda packet for this meeting. Dr. Peterson remarked that the use of **bold** text in the Minutes is important as it captures and describes some action or commitment on the part of the Committee which is then included on the Committee's Open Items List. The Members and Consultants reviewed the Minutes and provided corrections and substantive changes to certain sections of the Minutes which will be included in the final version of the September 2023 Minutes. The Members and Technical Consultants then conducted a page-by-page review of the September 2023 Minutes and discussed some of the follow-up actions to be taken, provided clarification concerning typographical errors and the accuracy of certain statements in the Minutes and made editorial comments and changes concerning the draft of the September 2023 Minutes.

Mr. John Geesman, representing the Alliance for Nuclear Responsibility was recognized. Mr. Geesman referred to an exchange described on Page 60 of the Minutes wherein Mr. Jearl Strickland, a PG&E Consultant, stated that in a .75G seismic event restoration of operations would occur within the amount of down time expected after a design basis earthquake but Mr.

[1] On September 2, 2022, Governor Newsom signed California Senate Bill 846, codified as Public Resources Code Sections 25233, 25233.2 and 25302.7, Public Utilities Code Sections 712.1 and 712.8, and Water Code Section 13193.5 which, together with the approval by the CPUC on December 14, 2023 of Decision 23-12-036, provides for the conditional extension of operations at Diablo Canyon beyond the current retirement date, up to five additional years, that is no later than October 31, 2029 for Unit 1 and October 31, 2030 for Unit 2, under specific conditions as provided by the legislation including approval by the NRC of extending the operating licenses for Diablo Canyon.

Geesman stated Mr. Strickland did not specify how much time would be allowed for restoration of operation after a design basis earthquake event and Mr. Geesman remarked that if there is such a designated time that it be included in the September Minutes. Consultant McWhorter responded the Committee conducted a fact finding to review the comments made in the report by the Enercon firm concerning movement of the turbines in a design basis earthquake and whether there was the potential for turbine blade damage which Mr. McWhorter remarked could result in a very extended outage. Mr. McWhorter reported that during this fact finding PG&E provided information from the turbine thrust bearing manufacturer that concluded, while the turbine thrust bearing would likely be damaged there were stops that would prevent movement of the turbine shaft such that blade clash would not occur and accordingly the repair time would not be as long as postulated in the Enercon Report. Mr. McWhorter reported he did not recall Mr. Strickland reporting on the anticipated outage duration from a design basis earthquake and this was not covered during the fact finding. Consultant Wardell reported the turbine manufacturer reported it would take several weeks to repair the turbine thrust bearing.

Mr. Geesman remarked he was less focused on the turbine scenario than just generically on the time expected for recovery after a design basis earthquake. Dr. Budnitz stated that after an earthquake that exceeded the operating basis earthquake the plant would be required by its license from the Nuclear Regulatory Commission (NRC) to shut down and perform inspections before it could resume operation. Mr. McWhorter reported this protocol is set forth in NRC Regulatory Guide (RG) 1.166.[2] Dr, Budnitz confirmed it would probably take a period of weeks to accomplish the requirements of RG 1.166.

Consultant McWhorter [who previously served at Old Dominion Electric Cooperative as Vice President of Operations and Asset Management] remarked that when Old Dominion's North Anna Power Station in Virginia experienced an earthquake in 2011 which slightly exceeded the design basis earthquake for that plant, the North Anna plant was offline for approximately 90 days to complete inspections. He reported this was due to the review of the design basis as well as the actual inspections which found very little damage. He confirmed the NRC regulations codify a plant's response to an earthquake above the operating basis. Dr. Budnitz observed plants on the East Coast do not experience seismic activity to the degree the West Coast experiences seismic events and as a result DCPP is probably more ready for such a response than a plant located in Virginia as PG&E has an in-house staff and a cadre of engineering personnel who work regularly in the area of seismic risk. Dr. Peterson stated the seismic instrumentation at North Anna was limited due to its data storage capacity and this created a certain level of uncertainty and DCPP has modern instrumentation. Dr. Budnitz reported the NRC has now introduced guidance requiring all nuclear power plants to have better instrumentation than was required prior to the 2011 event at North Anna. Dr. Peterson observed that a lack of adequate instrumentation represents a missed opportunity to confirm the correctness of structural response model predictions. Dr, Budnitz observed that no plant can respond safely to an earthquake unless the operators perform correctly and this was the case in the 2011 event at North Anna during which there were no errors made by the operating crew after the earthquake.

[2] The NRC's Regulatory Guide series provides guidance to licensees and applicants on implementing specific parts of the NRC's regulations, techniques used by the NRC staff in evaluating specific problems or postulated accidents, and data needed by the staff in its review of applications for permits or licenses.

The Minutes of the Committee's public meetings in their final accepted form become part of its Annual Reports. Upon a motion made by Dr. Budnitz, seconded by Dr. Peterson, the Minutes of the Committee's September 13-14, 2023, public meeting were accepted subject to inclusion of the changes provided to the Committee's Assistant Legal Counsel. As revised the September 2023 Minutes will be a part of the Committee's 34th Annual Report.

VI ACTION ITEMS (Cont'd.)

B. Discussion of Issues on Open Items List.

Dr. Lam requested Consultant Wardell lead a review of items on the Open Items List, which he described as an important tool used by the Committee to set priorities, track and to follow issues, concerns, information requests and activities identified for subsequent action or receipt during fact-finding or public meetings. Mr. Wardell stated he appreciated Consultant McWhorter's assistance with the Open Items List and reported newly added or changed items were shown in *red italics* while items for which follow up is scheduled prior to the June 2024 public meeting were shown in *yellow,* and items which were deleted or changed were shown in ~~strike-out~~ on the version of the Open Items List included with the agenda packet and certain items on the list were identified for closure.

Items discussed or concerning which action was taken included the following[3]:

Item	Re:	Action Taken/Next Action
CM-13	Rev. Maintenance Dept. Performance	Next Action 3/24 FF (RJB/RDM) Strike 4/24FF Next Action
EN-21	Rev. Projects Long-Term Planning	Next Action after 2R24
NS-5	Monitor NSOC Meetings	Next Action Remote Attendance 10/21/24 & write-up 11/24FF (RJB/RDM)
SC-3	Long-Term Seismic Program	Change ref. to EO-8 to EO-9
SC-14	Monitor IPRP	Next Action 3/24FF (RJB/RDM)
O-3	Nuclear Insurance & Safety Inspections Including Claims Payment History	Next Action 5/24FF (PFP/RDM)
PM 9/23 #5	Circulating Water System/Condensers/ Intake Cove Dredging Project	Close to EN-21 Review after 2R24
PM 9/23 #8	Artificial Intelligence, , Operating Experience & Other Safety-Related Contexts	Next Action 12/24FF (PFP/RFW) and Revise text-delete ref to legal constraints
All Items	Highlight Items Directly Related to SB846 Mandate	
February PM	Use of IPAWS	Inquire at next review of EPO

[3] Key to some abbreviations used: Emergency Preparedness Organization (EPO); Fact-finding (FF), Diablo Canyon Independent Peer Review Panel (IPRP), Integrated Public Alert Warning System (IPAWS), Public Meeting (PM), Robert J. Budnitz (RJB), Richard D. McWhorter Jr. (RDM), Per F. Peterson (PFP), R. Ferman Wardell (RFW).

Ms. Linda Seeley representing San Luis Obispo Mothers for Peace (Mothers for Peace) was recognized. Ms. Seeley inquired whether reports on the results of the annual radioactivity release reports could be structured to provide information to the public concerning DCPP releases, including batch releases and their timing as well as liquid and gaseous releases. Mr. Wardell reported the DCISC summarizes these reports every year in its reports of fact-finding on the Committee's review those reports. Ms. Seeley stated her request was for specific information not summaries and she desired explicit information, preferably in advance of any release, as she commented tritium, strontium and cesium accumulate in the human body. Dr. Budnitz reported the DCISC reviewed the reports for 2022 during its August 9-10, 2023 fact finding visit, in Section 3.10 of that report and a report was made to the public at the September 2023 public meeting when the Committee concluded the annual offsite radiological dose received by the general public of less than one millirem was insignificant as compared to the 620 millirem average annual radiation exposure for persons in the United States. Ms. Seeley reported that at the San Onofre Nuclear Generating Station (SONGS) in Southern California the public is now notified before the release of irradiated water. **At Doctor Peterson's suggestion a copy of the 2022 reports reviewed by the Committee together with the August 2023 Fact Finding Report will be sent to Ms. Seeley to seek her recommendations for what additional information should be provided.**

Dr. Gene Nelson of Californians for Green Nuclear Power was recognized. Dr. Nelson reported he holds a Ph.D. in Radiation Biophysics and he commented Ms. Seeley had made some factual errors in her remarks as there is no mechanism to release strontium or cesium as they are essentially encapsulated in spent nuclear fuel and cesium does not accumulate.

VII COMMITTEE MEMBER REPORTS AND DISCUSSION

A. Public Outreach, Site Visits and Other Committee Activities, Scheduling and Confirmation of Future Fact-Finding Visits and Public Meetings.

Mr. Rathie reported this agenda topic is for Members or Consultants to make a brief report on their activities or site visits since the last public meeting and to then turn to future scheduling of public meetings and fact finding visits.

Dr. Lam reported he held conversations with Ms. Linda Seeley, a member of Mothers for Peace and the PG&E Diablo Canyon Decommissioning Engagement Panel (Engagement Panel), and with Mothers for Peace's attorney Ms. Diane Curran concerning the agenda for this meeting and Dr. Kirk's presentation to the Committee later at this public meeting on his contracted study. Dr. Lam also reported that with Mr. Rathie he participated in a remote interactive meeting with Mr. David Hochschild, the Chair of the California Energy Commission (CEC), the CEC Chief of Staff and Dr. Justin Cochran, CEC Senior Nuclear Policy Advisor and Emergency Coordinator and other CEC personnel to review the Committee's activities in FY 2023/2024 and to discuss the phenomenon of Pressurized Thermal Shock and its related technical and safety implications which he stated was a subject of interest for the CEC representatives.

Dr. Budnitz reported that on several occasions with Mr. Rathie he participated in remote interactive, meetings with representatives of the California Department of Water Resources (DWR) which included Ms. Delphine Hou, Deputy Director Statewide Water and Energy, Messrs. Christian Arechavaleta, Manager Electricity and Strategic Reserve, and Eric Wulff,| Manager, Power Markets Contracts Branch together with DWR Consultants Dr. Deb Luchsinger and Mr. Jerry Bishoff. Dr. Budnitz reported some of these meetings also included Mr. David Zizmor, CPUC Regulatory Analyst, Energy Division. The subject of these meetings included the DCISC's progress in its review of the Updated Seismic Assessment for DCPP which PG&E is required to conduct as a covenant of the loan provided under the provisions of SB846 and which will be subject of a report later during this public meeting.

The Members then discussed and confirmed future public meetings of the DCISC for June 26-27, 2024 [subsequently changed to June 20-21, 2024] and October 9-10, 2024, and February 19-20, 2025 and the Members and Consultants then scheduled a public meeting for June 11-12, 2025.

Fact-finding visits were then confirmed, subject to confirmation by DCPP that the plant can support the visit on the selected dates, and scheduled as follows:[4]

[2024] March 19-20 RJB/RDM; April 17-18 PL/RFW; May 8-9 PFP/RDM; July 31-August 1 PFP/RFW (in conjunction with the next evaluated emergency exercise), August 21-22 PL* or TBD/RDM; September 24-25 RJB/RFW; November 20-21 RJB/RDM; December 11-12 PFP/RFW; and

[2025] January 21-22 TBD/RDM; March 18-19 RJB/RFW; April 8-9 TBD*/RDM; May 7-8 (PFP/RFW).

During the discussion on scheduling Dr Lam announced that he will be leaving his position on the DCISC when his current term concludes on June 30, 3024,* and therefore the August 21-22, 2024 fact-finding visit will likely be conducted by the member appointed by the CEC Chair to serve in his stead. In response to Consultant McWhorter's inquiry Dr. Lam confirmed that should his successor not be timely appointed he would consider continuing to attend fact finding and public meetings if his travel schedule permits until a successor is appointed.

B. Documents Provided to the Committee:

The Chair observed the Committee operates in a transparent fashion. Assistant Legal Counsel Rathie reported outgoing and incoming correspondence to and from the Committee is kept on file at the office of its Legal Counsel and that a list of documents received by the DCISC from PG&E since its last public meeting in September 2023 was included in the public agenda packet for this meeting.

Mr. John Geesman speaking on behalf of the Alliance for Nuclear Responsibility was recognized. Mr. Geesman stated he reported to Mr. Rathie that the log of incoming documents

[4] Robert J. Budnitz (RJB), Andrew C. Kadak (ACK), Mark Kirk (MK), Peter Lam (PL), Richard D. McWhorter Jr. (RDM), Per F. Peterson (PFP), R. Ferman Wardell (RFW), To be Determined (TBD).

from PG&E does not include the DCISC's receipt of the study by independent consultants required by SB846 to catalog and evaluate maintenance that may have been deferred due to the expectation of the plant closing earlier. Consultant McWhorter reported that this document was put into a separate folder in the Certrec document portal and was not included in the transmittal log. Dr. Budnitz requested Mr. Garcia to check whether the document Mr. Geesman referred to was provided to the DCISC on a confidential basis.[5]

A short break followed.

VIII CONSULTANT REPORT & RECEIVE, APPROVE, AND AUTHORIZE TRANSMITTAL OF A FACT FINDING REPORT TO PG&E

A. The Chair requested Consultant Wardell to provide a summary report on the November 14-15, 2023, fact-finding visit with Dr. Budnitz. Mr. Wardell reviewed the topics discussed with PG&E during the July 2023 visit as follows:

➢ Operations Staffing and Retention - Consultant Wardell reported the purpose of this review was related to the potential for extended operation of DCPP through 2030 or perhaps longer and to assess whether a sufficient number of reactor operators were available to safely operate the plant. He reported that because of the success of the two-tiered Employee Retention Program, undertaken following approval of the Joint Proposal,[6] there are a sufficient number of operators presently on staff. DCPP has conducted two new classes for non-licensed operators who perform activities in the plant outside of the control room and Mr. Wardell commented in many cases non-licensed operators go on to obtain licenses as reactor operators.[7] Another non-licensed class is being planned together with license upgrade classes. The Fact Finding Team (FFT) concluded operator staffing is satisfactory to safely continue operations.

➢ Unit 1 Vessel Embrittlement – Mr. Wardell stated Dr. Mark Kirk who has been engaged by the DCISC as a technical consultant to review this topic will make a presentation later during this meeting and the purpose of the fact finding was to address nine technical questions. Dr. Kirk attended the fact finding as did representatives of DWR and the FFT received satisfactory answers to Dr. Kirk's questions.

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[5] It was subsequently confirmed that a confidential version of the evaluation and catalog was provided to the DCISC of the draft evaluation and catalog of maintenance activities by the independent consultant team together with the March 2024 transmittal.

[6] The Joint Proposal was entered into by PG&E, together with Friends of the Earth, the Natural Resources Defense Council, Environment California, the International Brotherhood of Electrical Works Local 1245, Coalition of California Utility Employees and the Alliance for Nuclear Responsibility in June 2016 to retire DCPP at the expiration of the current operating licenses for each unit, November 2024 for Unit-1 and August 2025 for Unit-2 and was subsequently approved by the CPUC in 2018 in Decision (D) 18-01-022. D.23-12-036 abrogated those provisions of D.18-01-022 that would have required the plant to cease operations at the end of its current operating licenses in November 2, 2024 (Unit 1) and August 26, 2025 (Unit 2).

[7] There are two categories of reactor operator licenses: a reactor operator and a senior reactor operator. A senior reactor operator supervises the reactor operators. The licenses are issued after the individual passes both a written exam and an operating test. The senior reactor operator exam measures the individual's ability to direct licensed operators.

➢ NRC Maintenance Rule[8] Update – The purpose of this FFT inquiry was to assess the health and effectiveness of the Maintenance Rule Program at DCPP which monitors the maintenance of systems, structures and components (SSC) based on their risk significance. Problems are assessed to be determine if they represent maintenance preventable functional failures and affected SSCs are placed into (a)(1) status in the Maintenance Rule Program for correction and subsequent monitoring. Mr. Wardell reported the number of SSCs in (a)(1) status at DCPP has been declining as has the number of maintenance preventable functional failures and the FFT concluded the DCPP Maintenance Rule Program is healthy and effective.

➢ Probabilistic Risk Assessment (PRA) Analysis Update – Dr. Budnitz explained the purpose of a PRA is to calculate the core damage frequency and the frequency of a very large early release of radioactivity by identifying every important accident sequence and for each of those sequences working out the likelihood of occurrence and its consequences. Over a period of years the community of PRA experts have developed a confidence that all the accident sequences for a plant such as DCPP have been identified. He reported the PRA for DCPP is considered among the best and careful work continues for improving the analyses and to reduce uncertainties. Dr. Budnitz commented the DCPP Seismic PRA is judged to be the finest in existence and it serves as a model for other plants. Every plant is required to periodically update its PRA and DCPP performed a full update with outside expert peer review which was completed in April 2023. He reported this update included accounting for changes to plant procedures and design changes. Dr. Budnitz reported the plant PRA is now up to date and is used for assessing safety in decision making, including determining the extent of the safety compromise when a piece of equipment is taken out or service or begins to age and whether work should be performed on equipment while the plant is online or during an outage. The PRA is also used in the license renewal process. Dr. Budnitz reported the FFT concluded not only is the DCPP PRA excellent, but it is also proving its effectiveness as a decision making tool.

➢ Meeting with Nuclear Regulatory Commission (NRC) Resident Inspector – Mr. Wardell reported the FFT met with NRC Resident Inspector, Ms. Ayesha Athar, to discuss the Preventative Maintenance Optimization ++ Program (PMO++),[9] the twenty-third refueling outage for Unit 1 (1R23), recent NRC inspection activities and the DCPP License Renewal Application. Mr. Wardell stated the FFT concluded the meetings with the NRC on site resident inspectors are beneficial. Mr. Wardell reported the Resident Inspector, one inspector of a two-inspector team, will soon be reassigned by the NRC.

➢ Institute of Nuclear Power Operations (INPO) Update – Consultant Wardell reported discussions concerning INPO, which sets high standards for the industry to improve performance

[8] The regulatory objective of the Maintenance Rule, 10 CFR 50.65, is to require licensee monitoring of the overall continuing effectiveness of maintenance programs to ensure safety-related structures, systems, and components (SSCs) and certain SSCs that are not safety related are capable of performing their intended functions, for equipment that is not safety related, failures will not occur that prevent the fulfillment of safety-related functions, and failures resulting in unnecessary actuations of safety-related systems are minimized.

[9] The ++ designation stands for projects and life cycle review.

and conducts evaluations every other year for every plant in the United States are restricted by confidentiality agreement. INPO also provides operating experience to plants and assists with plant programs. Concerns raised by INPO evaluations are addressed through the plant's Corrective Action Program. Mr. Wardell stated he was able to report DCPP regularly receives positive evaluation results from INPO, but due to the confidentiality restrictions he could not discuss any details.

➢ Meet with DCPP Officer – the FFT met with Vice President of Technical and Business Services Ms. Maureen Zawalick to discuss items on the fact finding agenda and other items of mutual interest. Mr. Wardell report these meetings with DCPP leadership continue to be beneficial.

➢ Independent Seismic Update – Dr. Budnitz reported the FFT reviewed three different activities related to seismic assessments. The first activity was in connection with the updated seismic assessment required by SB846 which Dr. Budnitz commented the DCISC is still reviewing and on which there will be a report later in this meeting. The second activity concerned the reviews of DCPP seismic safety conducted by the CPUC's Independent Peer Review Panel, made up of certain state governmental entities, and the IPRP's upcoming meeting expected to be held in April or May 2024 and the IPRP's review of the PG&E Updated Seismic Assessment mandated by SB846. Finally, Dr. Budnitz observed PG&E has submitted a License Renewal Application for DCPP which includes sections concerning seismic safety which the DCISC will also review. He observed the plan is now to revisit the Committee's May 5, 2023 evaluation and to make a further report at the June 2024 public meeting.

➢ Refueling Outage 1R24 Update and Outage Control Center – Mr. Wardell reported at the time of the FFT visit Unit 1 was connected to the grid and was in the process of increasing power and was at the point where testing was required to include chemistry sampling and checking for condenser and other salt water leakage and operators were awaiting instruction from the Reactor Engineering Department. Consultant Wardell reported 1R24 was judged successful and to have met its goals with the exception of the collective radiation dose goal having been exceeded due to the impact of emergent work. [Subsequently, during the presentation on the December 2023 fact-finding visit it was reported that this emergent work was caused by a small leak on a pressurizer safety valve.] Dr. Budnitz remarked that while the outage goal was exceeded the collective radiation dose for 1R24 remained well within regulatory guidance and no single individual received anything approaching the individual radiation dose limit.

➢ Independent Assessment of Maintenance – Consultant Wardell reported this assessment was required by SB846 and was performed by the W.M. Dean Consulting Company during April through October 2023. The FFT together with DWR representatives reviewed the consultants' report which concluded DCPP has not experienced any deferred maintenance that would create a vulnerability to future plant operations or warrant remedial action. The DCISC FFT reached a similar conclusion and found the assessment to have been extensive and quite intrusive.

➢ Accompany Operator on Unit 2 Rounds – Mr. Wardell reported the FFT accompanied an operator on rounds in the plant and visited areas in the Turbine and Auxiliary Buildings including observation of the condensers and the feedwater pumps located above the condensers.

He reported the operator was knowledgeable concerning the components visited and in use of the checklist, and the FFT found the plant to be clean and orderly with the equipment operating normally.

➢ Observe Nuclear Safety Oversight Committee (NSOC) Meeting (11/20/23) – Consultant Wardell reported the NSOC is comprised of five high level executive external industry peers who visit the site over four-day periods to provide a thorough, comprehensive and candid independent perspective on plant safety and performance. For reasons of confidentiality Mr. Wardell stated he could not describe the particulars of the NSOC's visit which concluded with the exit meeting held on November 20, 2023, which the FFT was allowed to attend remotely.

Mr. John Geesman representing the Alliance for Nuclear Responsibility inquired concerning the PRA whether his understanding was correct that the term "risk significance" as used in context of a PRA is quantitatively determined by two criteria, those being contribution to core damage frequency and contribution to large early release frequency. Dr. Budnitz replied those are the criteria upon which the NRC concentrates but there are others including whether a large release will be early or later in a PRA scenario and the NRC's concentration is on scenarios leading to an early release.

In response to Mr. Geesman's inquiry, Dr. Budnitz stated that while plant reliability is not one of the NRC's PRA criteria, the plant does pay attention to scenarios affecting reliability which are revealed by PRA analyses, whereby a combination of failures or human error would lead to a compromise of reliability and the plant uses the PRA to prioritize maintenance, replacement, and repair as well as operator training. Dr. Budnitz stated he believes that where the fact finding report addresses online maintenance review, plant reliability is not one of the considerations for measuring risk significance. Dr. Peterson observed the plant has identified all of the single point vulnerabilities that can cause a reactor trip[10] and the identification of single point vulnerabilities is more directly related to plant reliability and there are programs to ensure those items which represent single point vulnerabilities have high reliability. Dr. Budnitz replied the PRA identifies those sequences and when concern is expressed with a particular function or item the PRA group is consulted to determine a components role in the PRA.

In response to Mr. Geesman's inquiry about the SB846 Independent Review of Deferred Maintenance not being included in the document list for this meeting Mr. Wardell confirmed the report was included with the electronic work package received from PG&E, but as it was not part of the regular document transmittal it was omitted from the list. In response to Mr. Geesman's observation that some years ago DCPP did receive a downgrade in its rating from INPO, Mr. Wardell stated he believes Mr. Geesman's observation is correct, after which efforts were made to restore the plant's INPO rating.

Mr. David Weisman representing the Alliance for Nuclear Responsibility was recognized. He stated concerning the failure during 1R24 to meet the goal for collective

[10] A reactor trip is a protective function performed by the protection and safety monitoring system when it anticipates an approach of a parameter to its safety limit. Reactor shutdown occurs when electrical power is removed from the rod drive mechanism coils, allowing the rods to fall by gravity into the reactor core.

radiation exposure there was reference to emergent issues and he inquired as to a more detailed enumeration of what those emergent issues may have been. Mr. Wardell stated he would review the written report and provide more information to Mr. Weisman later during the meeting, as there is a presentation scheduled during this meeting on the 1R24[11] refueling outage and that may be an opportune time to address Mr. Weisman's inquiry. Dr. Budnitz and Mr. Garcia replied it was not uncommon for things to be discovered during a refueling outage that were not expected during the outage planning process. Mr. Garcia observed that when outage goals are set, they are often revised and made more aggressive based upon performance during the outage.

Mr. Rathie suggested the Committee follow its recent practice of approving its fact finding reports by resolution. On a motion by Dr. Peterson seconded by Dr. Budnitz the November 14-15 & 20, 2023 Fact Finding Report, together with Resolution 2024-01, was unanimously approved. Mr. Rathie reported all the fact finding reports to be considered at this public meeting were made available on the Committee's website at www.dcisc.org prior to the meeting.

IX ADJOURN MORNING MEETING

The Chair adjourned the morning meeting of the DCISC at Noon.

X RECONVENE FOR AFTERNOON MEETING

The afternoon meeting of the DCISC was convened by the Chair at 1:20 p.m.

XI COMMITTEE MEMBER COMMENTS

There were no comments by any member at this time.

XII PUBLIC COMMENTS AND COMMUNICATIONS

Dr. Lam invited members of the public to address the Committee on matters not on the agenda for this meeting.

Mr. Elliot Korb was recognized and stated he was with the Radiant Nuclear firm. [Radiant Nuclear has designed a fission microreactor that's fueled by ceramic-coated particles of high-assay, low-enriched uranium and cooled by helium gas.] Mr. Korb inquired concerning the availability of any upcoming tours of DCPP. Dr. Peterson remarked that in the past the Committee regularly conducted tours with members of the public as part of its mandate to conduct public outreach and the Members and Consultants briefly discussed again offering tours in connection with upcoming DCISC public meetings. Mr. Garcia reported PG&E presently conducts tours and Mr. Rathie stated that when requests are received through the Committee's office a DCPP representative [Ms. Rachel Dion] has been extremely helpful and responsive in facilitating those requests. At Dr. Budnitz' request Mr. Korb provided his contact information

[11] See November and December 2023 Fact Finding Reports review of emergent work identifying to address a small leak on the Unit 1 pressurizer.

through the Committee's website. [Mr. Korb was subsequently provided information to the Committee's office and was contacted by Ms. Dion concerning a tour.]

Dr. Gene Nelson of Californians for Green Nuclear Power reported the link to plant operation information on www.dcisc.org was not working nor was the direct line to access a recording on plant operating status. Mr. Rathie reported he would consult with the Committee's webmaster to see if something can be done or have the link removed.

XIII CONSULTANT REPORT & RECEIVE, APPROVE, AND AUTHORIZE TRANSMITTAL OF A FACT FINDING REPORT TO PG&E

B. The Chair requested Consultant McWhorter to provide a summary report on the December 12-13, 2023, fact-finding visit with Dr. Peterson. Mr. McWhorter reviewed the topics discussed with PG&E during the December 2023 visit as follows:

➢ Refueling Outage 1R24 Results – Consultant McWhorter reported DWR representatives joined remotely with the DCISC Fact Finding Team (FFT) for this topic. He reported 1R24 began on October 1 and ended November 13, 2023 and in general all major work activities were completed as planned including all license renewal inspections which represented a very large scope of work. With the exception of collective dose, reviewed previously, and reliability all outage goals were met. The goal for reliability was not met due to failure to operate Unit 1 for 90 consecutive days following startup due to a shutdown at day 26 [outage 1X25] to repair a small leak on a pressurizer safety valve. **The FFT concluded 1R24 was successful and the DCISC should follow up on the causes and corrective actions for the pressurizer safety valve leak and on maintenance outage 1X25.**

➢ Outage Management Team Meeting – Mr. McWhorter reported this is a meeting of senior leadership at the station to review different aspects of outage preparation and management including review of 2R24, focusing on deferring laser mapping of the Unit 2 high pressure turbine in preparation for its replacement in 2R25, and the removal from 2R24's scope of a modification to the temporary reactor vessel cavity seal in order to free up resources for other work. The FFT concluded the Outage Management Team meeting was conducted efficiently and effectively.

➢ Response to DCISC Recommendation on the Use of Earthquake Response Procedures – This recommendation was made in the DCISC July 2023 Fact Finding Report regarding the use of FLEX[12] procedures. Mr. McWhorter reported FLEX procedures are typically entered into upon extended loss of all alternating current (AC) power at the station. During the July 2023 fact finding the DCISC FFT recommended that DCPP assess what might trigger consideration of the use of FLEX in situations involving an earthquake. Mr. McWhorter reported the DCPP Operations Department has made changes to earthquake response procedure OCPM4 in response

[12] FLEX is not an acronym but describes a strategy developed by the nuclear industry to provide diverse and flexible coping strategies to address the loss of safety-related systems due to certain beyond design basis events. It is a group of supplemental components, many of them portable, which are seismically stored, and can be made available for timely attachment to permanent plant systems for accident mitigation.

to the DCISC's recommendation and he reported other departments were currently reviewing procedures specifically in the areas of emergency preparedness and stranded plant procedures and in security for post-earthquake inspections. **The DCISC FFT concluded that this was appropriate follow up and the status of the implementation of FLEX procedures should be reviewed in the future with reference to other procedural changes.**

In response to Consultant Kadak's request Mr. McWhorter summarized the changes related to FLEX to Operations procedure OCMP4-FLEX as including checking the status of the spent fuel pools and referring to FLEX procedures to mitigate damage to spent fuel if needed, checking site conditions to ascertain if FLEX implementation strategies need to be implemented such as ensuring routes to access FLEX equipment are clear, using FLEX procedures to assess plant damage during walkdowns and using FLEX communication equipment if plant communication is lost post-earthquake.

➢ Training Program for New Engineers – Mr. McWhorter reported 48 new engineers were hired last year bringing the total for the Engineering Department to 127 engineers. He commented many of the new engineers had prior experience and the FFT found training for the new engineers is conducted in three stages: engineering support personnel initial training; a ten-week INPO-accredited training program and an individual position specific qualifications plan to be completed in one year; and individual development plans focused on development of additional skills for current and future assignments. Mr. McWhorter reported DCPP has engaged a consultant to facilitate coordination of knowledge transfer to oversee the transfer of position-specific knowledge between engineers. The FFT concluded the training for new engineers was well organized and appropriately focused to maintain the technical knowledge in the Engineering Department.

➢ Intake Cove Maintenance and Dredging Project Update – Consultant McWhorter stated this review was brought to the Committee's attention by an anonymous message which was mailed to the Alliance for Nuclear Responsibility and provided to the DCISC by the Alliance. The author of the message alleged improper deferral of the dredging project and improper cleaning of the intake area by divers. The FFT first inquired of PG&E concerning these topics without revealing the existence of the message and learned the dredging project was deferred from refueling outage 1R24 to 2R24 primarily due to the complexity of contracting and permitting requirements and not by financial concerns. He reported the DCISC representatives learned that divers routinely use fire hoses to clean areas around the Intake Structure for safety reasons and in this activity some amount of sand is pushed through the system to clear the area so the divers can inspect the bar racks and traveling screens at the Intake Structure for corrosion and other problems. The FFT learned sand is swept through the system on a regular basis and this is not precluded by the environmental permit.

Consultant McWhorter reported the FFT subsequently revealed the existence of the anonymous message to PG&E and it was entered into the Employee Concerns Program for further review. He reported the DCISC then followed up on the investigation by the Employee Concerns Program at the January 2024 fact finding to see if other concerns had been expressed and to review the independent evaluation by the Employee Concerns Program. The FFT concluded the

dredging project was being appropriately managed and the maintenance activities in the Intake Cove by the divers were appropriate.

➢ Unit 1 Reactor Vessel Embrittlement Update Including Efforts to Remove Capsule B - During the fact finding Committee Consultant Dr. Mark Kirk was provided an opportunity to ask questions of PG&E relative to the report Dr. Kirk has prepared on this topic. Representatives of DWR participated remotely in this session as did Consultants Kadak and Kirk. Two specific areas were reviewed including the history and results of the Unit 1 reactor pressure vessel 10-Year In-Service Inspection Program to conduct a non-destructive inspection of welds. Mr. McWhorter reported a partial inspection was conducted in 2024 and the next inspection is currently scheduled for 2025 during 1R25 at the time of removal of the Unit 1 reactor core barrel. The FFT also received a briefing on the prior unsuccessful attempts to remove surveillance Capsule B from Unit 1 and the inability to engage the tool with the capsule plug. Mr. McWhorter reported the DCISC and the public will receive information on this matter during the evening presentation and the FFT concluded DCPP had provided adequate information on past Unit 1 pressure vessel weld inspection results, together with answers to questions raised related to vessel embrittlement.

➢ Refueling Outage 1R24 License Renewal Inspection Results – Consultant McWhorter reported there were approximately 184 license renewal inspections completed for Unit 1 during refueling outage 1R24 including inspections of welds, of small bore piping, internals of various tanks including Refueling Water, Diesel Fuel and Condensate Storage Tanks, concrete inspections, and electrical and cable inspections. He reported during 1R24 approximately 35 components were removed from service and replaced with new components. Mr. McWhorter reported the FFT found overall that the results from 1R24 were very positive with no age-related challenges identified to any system's ability to perform its function. The DCISC FFT also discussed the results of the 1R24 inspections conducted by the NRC inspectors which identified no concerns with any of the license renewal inspection activities for Unit 1. There was one non-cited violation (NCV) for an issue on Unit 2 related to sealing of a joint in Containment but this was unrelated to inspection for license renewal.

➢ License Renewal Application Overview – Mr. McWhorter reported representatives of the DWR attended this session remotely. He reported the purpose of license renewal is not to re-validate the safety design of the station, but to validate that aging will not impact safety functions during an additional twenty years of operation. The scope includes identifying which systems are subject to Aging Management Programs and to identify specific types of aging mechanisms. Consultant McWhorter observed there are 44 Aging Management Plans applicable to DCPP for this initial and for the ongoing rounds of inspections. He observed that out of the approximately 3,000 pages that make up the DCPP License Renewal Application approximately 1,000 pages consist of the Environmental Impact Report. He reported that the day after the FFT met with DCPP representatives the License Renewal Application was deemed sufficient and was accepted by the NRC which action allows the station to continue to operate beyond the end of its current operating licenses while the License Renewal Application continues to be reviewed by the NRC.

➢ Update on the Use of Electronic Procedures – Mr. McWhorter reported this topic was a follow up to discussions at a prior public meeting and included a dialogue with DCPP concerning incorporating new technologies such as electronic procedures. He reported DCPP expressed that it is now focused on getting through the current license renewal application process and the outage work required, but DCPP does have a desire to be more proactive in this area in the future. **Mr. McWhorter stated the FFT concluded that the DCISC should review this topic following conclusion of the 2R24 refueling outage.**

➢ Management Observation Programs – Mr. McWhorter reported this program has expanded and is the subject of regular DCISC review. He reported the program provides for supervisors to regularly observe employees while the employees work in the plant and these observations are discussed in a collaborative fashion with the data entered into an electronic system to track and categorize and to assess any developing trends across the station. Between September to mid-December 2023 there were 1,246 observations made including during 1R24 and a number of strengths as well as some opportunities for improvement were identified. Consultant McWhorter reported in response to the FFT's inquiry as to the employees' perception of this observation program the DCPP representatives responded employees generally feel it is a normal part of the business of operating a nuclear power plant. In response to Consultant Kadak's query Mr. McWhorter replied these observations include looking for the use of human performance tools, compliance with plant procedures, and the use of personal protective equipment by Operations and Maintenance Department personnel. He reported of the 1,246 observations perhaps 100 were written up as strengths and approximately 150 represented opportunities for coaching on procedures. The FFT concluded the observations appear to provide valuable insight into human performance strengths, weaknesses and opportunities at the station.

➢ Emergency Preparedness Department – Consultant McWhorter reported this was a routine review but the timing was important due to an issue within the last two years with drill performance and a drill and graded emergency exercise are both schedule for the middle of 2024. The Emergency Preparedness Department manages training for the groups and employees that staff the emergency response facilities. Staffing consists of four Emergency Response Teams with approximately 70 individuals on each team who serve on-call for two weeks on a rotating basis. The teams have drills scheduled consisting of exercises for the entire station and for individual teams and work groups. In past years deficiencies were noted with attendance and performance during drills and Mr. McWhorter reported the FFT found the numbers of such deficiencies have been reduced significantly and this issue seems to be resolved with appropriate corrective actions having been taken with the use of dynamic learning activities in the training exercises. Consultant McWhorter reported the Emergency Preparedness Department has increased staffing and now consists of seven persons and one supervisor. The FFT also discussed the implementation of a new emergency siren test protocol using electronic equipment to sense activation. **The FFT concluded the Emergency Preparedness Department was performing well overall and the DCISC should plan to observe the emergency preparedness exercise scheduled for July 31, 2024 and Mr. McWhorter reported a fact finding visit has been planned around that date**.

➢ Meet with DCPP Officer –The FFT met with Vice President of Business and Technical Services Ms. Maureen Zawalick to discuss items of mutual interest.

➢ Auxiliary Saltwater Pump 2-2 Degradation and Exigent Technical Specification[13] Change – Mr. McWhorter reported DCPP applied for an exigent Technical Specification (TS) change for an extension of the outage time to perform a motor replacement for auxiliary saltwater pump 2-2 from 72 to 144 hours. The problem with the pump involved increasing degradation of the oil for the pump motor due to the presence of iron which was indicative of possible bearing wear. Consultant McWhorter reported the decision to replace the pump motor prior to the next scheduled refueling outage was conservative and a prompt operability assessment (POA) was performed to document that the pump could still perform its safety function until the motor could be replaced. He reported it took 84 hours out of the 144 hours allowed by the TS change to compete the work. **A cause evaluation will be performed for the bearing degradation and Consultant McWhorter reported the FFT recommended the DCISC review the cause evaluation in the future.** The FFT concluded there were no safety concerns. Consultant McWhorter reported there is presently an effort to transition to risk-informed outage times under a future license amendment request that would allow the use of PRA insight, the employment of compensatory actions to reduce the risk, and the protection of alternative components to allow a plant to determine on its own whether additional outage time might be allowed. Dr. Budnitz remarked the NRC Reg. Guide 1.174 addresses use of PRA.

➢ Low Temperature Overpressurization Protection (LTOP) System – Consultant McWhorter reported the DCISC chose to examine the LTOP System in context of the concerns expressed concerning the phenomenon of Pressurized Thermal Shock (PTS). He reported there are basically two broad situations where PTS is an issue: over pressurization of the Reactor Coolant System (RCS) when it is at low temperature during shutdown conditions; and in the specific situation where cold water is injected at high pressure into the reactor by the Emergency Core Cooling System (ECCS). He remarked it is the low temperature shutdown situation where a plant is most vulnerable to PTS. The LTOP System is designed to prevent that situation by measuring and monitoring the RCS pressure when the temperature of the plant is low and then opening two power-operated relief valves if necessary to vent pressure. The LTOP System is enabled at low RCS temperatures and the set points and temperature limits and the allowed equipment configuration are all established by a pressure and temperature limits report. He reported part of the analysis that goes into determination of the set points for DCPP includes evaluating a hypothetical pre-existing crack in the reactor vessel of 2" deep by 12" long. The FFT concluded the station appropriately uses the LTOP System to prevent inadvertent over pressurization of the reactor vessel at low temperatures.

In response to Consultant Wardell's inquiry Mr. McWhorter replied the LTOP System can act rapidly and has sufficient capacity to prevent PTS when the plant is shut down there are certain pieces of equipment that must be taken out of service in accordance with Technical Specifications including some of the high pressure safety injection pumps and if that is done then if the remaining pumps and systems were to start and inject water then the power-operated relief valves would relieve that amount of flow and prevent pressure from reaching the point where the

[13] As part of an NRC license authorizing operation of a nuclear facility, Technical Specifications establish requirements for items such as safety limits, limiting safety system settings, limiting control settings, limiting conditions for operation, surveillance requirements, design features, and administrative controls.

vessel could crack, given the assumed hypothetical 2" by 12" pre-existing crack and the LTOP System would have the capacity to prevent PTS. Mr. Wardell commented on the importance of the LTOP System to prevent or mitigate an over-pressure event.

➢ Meet with Nuclear Regulatory Commission (NRC) Senior Resident Inspector – Mr. McWhorter reported the FFT met with Senior Resident Inspector Mr. Mahdi Hayes to discuss the topics from the fact-finding visit and other topics of mutual interest.

After Mr. McWhorter's presentation Mr. John Geesman representing the Alliance for Nuclear Responsibility was recognized. Mr. Geesman inquired as to the inspections of the Unit 2 high pressure turbine being deferred from the 2R24 outage pending a risk review by DCPP's insurer. report [all fact finding reports were made available in draft form on the Committee's internet website prior to the meeting]. Mr. Geesman inquired as to what firm acts as the insurer and how often does an insurance review occur in outage planning. Consultant McWhorter responded he believes the insurer was involved because the insurer is aware the Unit 2 turbine is old and has been monitoring the situation. He observed this does not significantly change the timetable for replacement of the turbine it just moves pre-inspection work from one outage to another.

Mr. Geesman then inquired regarding use of an integrated public alert warning system (IPAWS) which uses cellular phone notifications. He stated IPAWS has been used within the nuclear industry and inquired whether the Committee or the FFT had a view as to whether DCPP should implement such a system rather than relying on sirens. Consultant McWhorter confirmed that many plants have transitioned to the use of IPAWS warning systems but it is his understanding that PG&E is not considering implementing IPAWS at this time but has not ruled it out as a backup means of notification to alerting the public regarding safety routes but any such implementation would need to be done in conjunction with state and local officials. **Dr. Budnitz suggested the DCISC's next review of the Emergency Preparedness Program should include asking DCPP about plans to use IPAWS and the rationale for continued use of the present system of notification. [Added to Open Items List.]**

Ms. Sherry Lewis, a member of Mothers for Peace, was recognized. In response to Ms. Lewis' inquiry regarding aging evaluations performed as part of the license renewal process Mr. McWhorter replied that because the plant's basic safety design has not changed there is no need to validate the design, but components are reviewed and the purpose of the license renewal inspection scoping efforts is to review all installed equipment and identify all possible aging mechanism that need to be addressed by Aging Management Plans. Dr. Budnitz remarked only the items kept in the scope are those components for which aging is thought to be important and the DCISC reviewed the list of items retained within the scope and also confirmed items screened out of the scope were not age-related. Dr. Lam remarked that previously it was required during a licensing hearing to examine anything safety-related but the NRC has now changed that approach to focus litigation only on equipment related to aging.

Mr. Bruce Severance was recognized. In response to Mr. Severance's questions related the automatic controls of pressure temperature limits Mr. McWhorter replied procedures and technical specification exist to control the configuration of equipment as the plant shuts down

and an annunciator alerts the operators once the temperature drops below a certain level to place the LTOP System in service. Mr. McWhorter, in response to Mr. Severance's inquiry concerning a loss of coolant accident (LOCA), replied a LOCA is not the scenario the LTOP System is designed to protect against. He commented that to have a LOCA and have the temperature in the reactor vessel fall and then to have high pressure water injected into the vessel is a very difficult accident sequence to generate. In response to Mr. Severance's comment about controlling a curve which describes the increase in pressure following activation of the Emergency Core Cooling System (ECCS) which Mr. Severance stated could lead to PTS, Dr. Peterson observed a reactor cannot be operating at power and be at a low temperature and in the situation described by Consultant McWhorter's report, as the reactor is not operating at power it does not have a substantial inventory of fission products present releasing heat and the Residual Heat Removal (RHR) System is capable of low pressure injection. Consultant McWhorter observed in a LOCA situation pressure is dropping in a reactor which is shut down but where the vessel remains at a high temperature and as the vessel is refilled procedures call for shutdown of some pumps, but the reactor does not get into a cold over-pressurization situation and the goal is to get on the RHR System in a low pressure recirculation mode with that system's available relief valves. In response to Mr. Severance question Mr. McWhorter replied that the water used in the ECCS is not pre-heated. Dr. Lam remarked there are good sources of information on the emergency core cooling features about which Mr. Severance has inquired in 10 Code of Federal Regulations (CFR) Appendix Case [??] of the NRC regulations, together with the DCPP Final Safety Analysis Report (FSAR). Dr. Budnitz commented there is also some training material for reactor operators which is in the public domain and Dr. Lam remarked the NRC has a generic training manual available to the public.

Dr. Gene Nelson of Californians for Green Nuclear Power was recognized and he referred Mr. Severance to the reports that were issued after the accident in 1979 to Unit 2 at the Three Mile Island Nuclear Generating Station in Pennsylvania.

On a motion by Dr. Budnitz seconded by Dr. Lam the December 12-13, 2023 Fact Finding Report, together with Resolution 2024-02, was unanimously approved.

C. The Chair requested Consultant Wardell to provide a summary report on the January 24-25, 2024, fact-finding visit with Dr. Lam. Mr. Wardell reviewed the topics discussed with PG&E during the January 2024 visit as follows:

➢ Observe Plant Health Committee Meeting – Consultant Wardell reported that due to a conflicting emergency exercise the Plant Health Committee observation was cancelled.

➢ 2R24 Refueling Outage Plans - Mr. Wardell reported the outage scope for 2R24 is similar to that for 1R24 and the 2R24 outage is planned to take approximately 50 days including the license renewal inspections. He reported the outage goals include no recordable injuries, no nuclear safety events and a radiation dose goal that has yet to be established. The FFT concluded the outage plans for 2R24 appeared appropriate.

➢ Meet with NRC Senior Resident Inspector – the FFT met with Senior NRC Resident Mr. Mahdi Hayes to discuss the NRC's inspection activities and the refueling outages for Unit 1 and

Unit 2. Mr. Wardell reported the Resident Inspector, Ms. Ayesha Athar, is to be reassigned soon. He reported there are three NCVs to be documented in the next inspection report including an allegation raised concerning a leak on an emergency diesel generator fuel tank which the NRC investigated and found not to be of concern. The FFT concluded the meetings with the NRC resident staff are beneficial.

➢ 2023 Operating Plan Results and 2024 Operating Plan –Mr. Wardell reported there will be a presentation by PG&E later during this public meeting and he commented all goals from the 2023 Operating Plan were met with the exception of the Occupational Safety and Health Administration (OSHA) related goal to have no recordable injuries, as there was one such injury during 2023. Consultant Wardell briefly reported the Operating Plan goals for 2024 are similar to those for 2023.

➢ Unit 1 Reactor Vessel Embrittlement - Mr. Wardell reported this session of the fact finding visit was attended remotely by DWR representatives. The purpose was to provide PG&E with an opportunity to review Dr. Mark Kirk's reports on the integrity of the Unit-1 reactor pressure vessel for factual error or omission. He reported PG&E representatives identified minor corrections which Dr. Kirk has made and which did not affect the results of the reports.

➢ 2024 Spent Fuel Loading Campaigns – Mr. Wardell reported a campaign constitutes moving spent fuel assemblies from the spent fuel pool to the Independent Spent Fuel Storage Installation (ISFSI) located on the hillside behind and above the plant. There have been no loading campaigns conducted since 2018 and for 2024 six loading campaigns are planned for each unit, for a total of 384 fuel assemblies with 32 assemblies placed in each multipurpose cannister which is then placed into an overpack. Mr. Wardell reported training has been conducted by the Holtec firm which manufactures the casks to be used and procedures and processes have been improved for the upcoming loading campaigns. Consultant Wardell reported the spent fuel dry storge system manufactured by the Orano firm is expected to be available for use in 2030 after completion of its site-specific seismic qualification for DCPP. The FFT concluded the spent fuel loading campaigns are being appropriately planned. Dr. Lam mentioned that with the expedited process employed by DCPP to obtain casks from the Holtec firm there is no delay in the process.

➢ 2023 Regulatory Year in Review - Mr. Wardell reported that in 2023 the NRC spent 5,600 hours in inspection activities and issued 11 NCVs. The 16 NRC Performance Indicators remained in all "Green" status[14] and License Amendment Requests (LARs) have been submitted for risk informed completion times as described by Mr. McWhorter during his presentation and for license renewal. Mr. Wardell reported the NRC has now accepted the License Renewal Application.

[14] A probabilistic risk assessment of Green means there is no equipment out of service or some other compromise to safety that would make the relative risk higher than the probabilistic risk assessment baseline for normal operation and maintenance activity and accordingly trigger a classification, in descending order, of White, Yellow or Red.

➢ Post-Outage 1R24 Reactor Physics Test – Consultant Wardell reported that following 1R24, nuclear core physics testing was performed as power was increased to assess the fuel's design, as one third of the fuel assemblies are normally replaced in each refueling outage, and to test the accuracy of predictions and analyses integral to power operation. Included is the measurement of control rod worth to ensure the control rods can shut down the power plant. Subcritical negative reactivity and moderator temperature coefficient to keep the core safe were also tested. Mr. Wardell reported a new physics test, called the alternate rod worth test, was used after 1R24 and he reported this test has a lower risk than previous test protocols due to fewer movement of the control rods and also has the benefit of saving six to eight hours of outage startup time. He reported the FFT was impressed with the improved reactor physics testing.

➢ Intake Dredging Update – Mr. Wardell reported the FFT conducted a follow up from the December 2023 fact-finding visit concerning this item and learned the Employee Concerns Program did not find an allegation having been independently raised regarding dredging at the Intake Structure or concerning retaliation for raising that matter. Dr. Lam commented DCPP took this matter very seriously and used its normal process to investigate with no effort or attempt at retaliation discovered. Mr. Wardell and Dr. Peterson observed that as the allegation was raised anonymously with the Alliance for Nuclear Responsibility it was impossible to trace the source. Dr. Lam observed if dredging were not done this would not be a major safety concern. Consultant McWhorter remarked the accumulation of sand in front of the Intake Structure occurs more in the area of the circulating water pumps than in proximity to the safety-related auxiliary saltwater pumps. Dr. Peterson observed there are benefits to dredging to reduce the velocity of water flows and reduce entrainment of kelp.

➢ Observe Reactor Operator Continuing Training on the Simulator – Mr. Wardell reported the FFT observed reactor operator training in the Simulator Facility.[15] Mr. Wardell reported the drill postulated a faulty steam generator with a steam and hot water leak inside Containment with a resulting LOCA and loss of cooling. The DCISC team observed the training and Mr. Wardell reported the Simulator performed perfectly and the Operations crew performed very well over the several hours of training. He reported the Operations crew used proper human performance tools and the training was successfully completed.

➢ Air- and Motor-Operated Valve Programs – Consultant Wardell reported this was a periodic review for the DCISC of formal programs on procedures which test safety-related valves periodically, generally during an outage. The valves are tested to ensure they are capable of opening or closing on time and for any friction in the valve stem to assure they will operate properly under normal or accident conditions. The FFT concluded the Air and Motor Operated Valve Program is in good health with any valve found to be out of specification placed immediately into the Corrective Action Program.

➢ Emergency Diesel Generator (EDG) Update – The FFT reviewed EDGs and visited the Turbine Building and toured EDG 1-2 with the system engineer. Health status for the EDGs for both Units is Green and Mr. Wardell reported the system engineer is very knowledgeable and the

[15] The Simulator Facility is a full-size mockup of the Unit 1 Control Room.

plant was found to be good and clean condition. The EDGs are at present all within specifications.

Mr. John Geesman representing the Alliance for Nuclear Responsibility was recognized. Mr. Geesman inquired as to the reference in Mr. Wardell's written fact finding report [all fact finding reports were made available in draft form on the Committee's internet website prior to the meeting] to GQD panel alarm relay modules being obsolete with no spares in stock and that . DCPP will need to procure 15 replacement modules through end of plant life. Mr. Geesman inquired whether the reference to plant life referred to five years or to twenty years. **Dr. Budnitz reported the DCISC would follow up on Mr. Geesman's inquiry with the EDG system engineer.**

On a motion by Dr. Peterson, seconded by Dr. Budnitz, the January 24-25, 2024 Fact Finding Report, together with Resolution 2024-03, was unanimously approved.

A short break followed.

XIV DISCUSSION, DIRECTION AND ACTION, AS APPROPRIATE, BY THE COMMITTEE, CONSULTANTS & COUNSEL

The Chair requested Assistant Legal Counsel Rathie to make the next report.

C. Status of Governmental Agency Interactions, Responses to SB846 Directives, Administrative, Regulatory, Contractual (Ratify Amendment No. 1 and Consider Approval of Amendment No. 2 to Agreement for Consultant Services with Dr. Mark T. Kirk), Financial and Future Funding Matters, and Other Committee Discussions.

Regarding interaction with government agencies Mr. Rathie began by paying tribute to Ms. Rochelle Becker, Executive Director of the Alliance for Nuclear Responsibility, who made a remark some time ago about the number of committees that are involved with Diablo Canyon issues and that these committees ought to be talking to one another. Mr. Rathie remarked he found this to be an important insight. He reported he recently participated in Dr. Lam's meeting with California Energy Commission Chair Mr. David Hochschild, Vice-Chair Mr. Siva Gunda, Executive Director Drew Bohan, Senior Nuclear Policy Advisor and Emergency Response Coordinator Dr. Justin Cochran and Senior Policy Advisor Mr. Ken Rider. Mr. Rathie reported Committee representatives have met remotely on several occasions with representatives of the DWR to coordinate reviews required by SB846 including the updated seismic assessment required as a condition of the loan agreement for the continued operation of DCPP. Mr. Rathie recognized the presence in the audience of Mr. Jerry Bischoff who is servicing as a consultant to the DWR. He reported Committee representatives have met and discussed various matters including the open rulemaking matter [R.23-01-007] pending before the CPUC with the Commission's Energy Division staff and concerning the CPUC Decision on Phase 1 Track 2 of that proceeding in which the Commission conditional approved the extended operation of DCPP for up to five additional years [after termination of the current operating licenses].

Mr. Rathie reported the members of the Committee remotely attended a meeting of the

CPUC Independent Peer Review Panel (IPRP) for the review of seismic issues related to DCPP held on November 9, 2023 and another meeting of the IPRP is now scheduled in April or May 2024. In concluding this portion of his report Mr. Rathie reported that with Consultant McWhorter he listened by telephone to the NRC's public meeting on the scope of the environmental review for the License Renewal Application.

Mr. Rathie reported in its response to SB846 the Committee has completed its review of any seismic upgrades required in connection with continued operation and continues to plan for its review of the PG&E Updated Seismic Assessment required by SB846 on which Dr. Budnitz will provide more details and the Committee has completed its comprehensive review of "deferred maintenance" and has continued to review maintenance issues in context of SB846. He reported the Committee's 33rd Annual Report has been distributed in accordance with the direction in SB846 and it is available on the Committee's website at www.dcisc.org. In September 2023 he reported the DCISC engaged the services of Dr. Mark Kirk to conduct a study of the integrity of the Unit 1 reactor pressure vessel and Dr. Kirk's two reports have been available on the Committee website since February 1 and Dr. Kirk will be making a report this public meeting.

Concerning administrative matters Mr. Rathie remarked that now that Dr. Lam has announced he would be stepping down from his position on the DCISC at the conclusion of his term on June 30, 2024, the CEC will have a difficult task to identify a qualified candidate who can replace Dr. Lam and Mr. Rathie observed Dr. Lam has given wonderful service to the Committee and will be greatly missed. Mr. Rathie reported that Governor Newsom recently reappointed Dr. Peterson to another three-year term on the DCISC beginning July 1, 2023 and continuing through June 30, 2026 to continue to his service to the citizens of California. Mr. Rathie reported he has had conversations with Consultants Wardell and McWhorter concerning revising the Committee Policies and it is hoped that certain revisions may be brought forward at the June 2024 public meeting. Mr. Rathie reported that on October 25, 2023, approval was received from the CPUC for a Third Restatement of the Charter for the Committee which revisions from the second Restatement addressed only those changes made by CPUC Decision 23-08-004 in Phase 1 Track 1 of R.23-01-007 approving changes in funding for the Committee during the period of transition and relicensing, that is to the end of 2025 when Mr. Rathie speculated that funding for the Committee's operations will again change during the period of extended operation.

Mr. Rathie then introduced and asked special counsel for regulatory matters Mr. Willis Hon to make the next presentation concerning regulatory matters. Mr. Hon reported rulemaking proceeding R.23-01-007 is split into two tracks, each with two phases. Phase 1 Track 1 dealt with funding for the DCISC and with Mr. Rathie Mr. Hon met remotely concerning amendment of the Committee's Charter with CPUC Energy Division representatives and to discuss the development of cost estimates for DCISC operations during the transition and relicensing period. Since that time, the CPUC proceeded to adopt Decision 23-12-036 conditionally approving extended operation of DCPP for Unit 1 until 2029 and for Unit to until 2030. The conditions include that the NRC continues to authorize operations, the loan agreement by DWR is not terminated, and the Commission does not make a future determination that extended operations are imprudent and unreasonable. Phase 1 Track 2 also addresses some of the cost allocation and

ratemaking mechanisms for PG&E during the period of extended operation.

Mr. Hon reported that PG&E and Californians for Renewable Energy (CARE) have each filed an application for a hearing of D.23-12-036 which will be addressed by the CPUC in the coming months and the CPUC has moved on to Phase 2 of R.23-01-007 and has issued a ruling asking for comments on the issues to be considered in Phase 2. One of those issues is likely to be funding for the Committee during extended operation. It is anticipated the CPUC will hold a pre-hearing conference to hear from the parties. The DCISC is not a party to any of these proceedings. A scoping memo will then issue together with a schedule for Phase 2 of the proceeding.

The Committee took up approval of two contract amendments to the Agreement with Dr. Mark Kirk entered into in September 2023, to increase his compensation for the study of Unit 1 reactor pressure vessel integrity. Mr. Rathie reported Amendment No. 1 was executed by the Chair in the interim and was now before the Committee for ratification and Amendment No. 2 was now the Committee for approval. The effect of these amendments is to increase Dr. Kirk's compensation to an amount not to exceed $61,000. Dr. Lam remarked the agreement with Dr. Kirk is entered into by the full Committee and until the Committee makes its decision on the disposition of Dr. Kirk's report, the report stands on its own concerning the PTS phenomenon.

Ms. Sherry Lewis of Mothers for Peace was recognized. In response to Ms. Lewis' query Dr. Lam responded that Dr. Kirk's report was provided to PG&E for its review of only factual information in the report and PG&E was specifically requested by the Committee not to comment on Dr. Kirk's conclusions.

Dr. Gene Nelson on Californians for Green Nuclear Power was recognized and he commented he briefly reviewed Dr. Kirk's reports and was impressed with its thoroughness and applicability of the reports in addressing questions being raised by the public regarding the safety of Unit 1.

Mr. David Weisman representing the Alliance for Nuclear Responsibility was recognized. Mr. Weisman thanked Mr. Rathie for his comments concerning Ms. Becker and he commented she was instrumental in the founding of this Committee through a CPUC decision in 1988 and she was also instrumental in the creation of what is now the IPRP, having been involved in the creation of a similar committee for the San Onofre Nuclear Generating Station (SONGS) in southern California. Mr. Weisman remarked Ms. Becker has for 35 years advocated and remained involved in issues concerning nuclear power and he thanked the Committee for recognizing her commendable actions over nearly four decades.

Upon a motion made by Dr. Budnitz, seconded by Dr. Peterson, the Committee Members unanimously ratified Amendment No. 1 and approved Amendment No. 2 to the Agreement with Dr. Mark Kirk.

Mr. Rathie reported that the Committee has not had to cancel or curtail any of its planned activities due to funding constraints during the time it has been performing additional review activities in response to SB846. He reported, however, the Committee did exceed in 2023 the

amount of funds provided by PG&E's ratepayers under the terms of a CPUC decision. He reported the Committee under decision D.23-08-004 now receives additional funding for its activities from the Diablo Canyon Transition and Relicensing Memorandum Account (DCTRMA) and for 2023 the amount of $213,500 was provided under the DCTRMA. However, this amount was not sufficient to cover all the Committee's expenses in 2023, but going forward into 2024 the shortfall will be made up through an invoice submitted for 2024 under the DCTRMA funding formula. Upon a motion by Dr. Budnitz, seconded by Dr. Peterson, the Committee unanimously provided authority to Mr. Rathie to submit an invoice to PG&E for funding for calendar year 2024 under the DCTRMA. Mr. Rathie reported the Committee will continue in the future to return any funds received from the PG&E ratepayers and remaining unspent at the end of a calendar year to PG&E for credit to its ratepayers and will return any unspent DCTRMA funds during the fourth quarter of 2025 in accordance with D.23-08-004.

D. Discussion of New DCISC Initiatives Related to Extended Operations Under SB846, License Renewal, and Changes of Emphasis in Upcoming Fact-Finding Meetings.

Mr. Rathie reported this item was placed on the agenda to allow the Committee members to discuss how the Committee's review activities may change due to the role played by the License Amendment Application in determining the areas and issues to be reviewed during fact-finding and public meetings.

Dr. Budnitz remarked the License Renewal Application includes dozens of different technical areas which the NRC staff will be reviewing and submitting requests for additional information to PG&E which the DCISC should also separately review and he observed the DCISC may identify other issues to be reviewed and it is possible a third party may introduce comments with yet more issues for the Committee to review. Consultant McWhorter observed some of the issues which may arise as a result of the License Renewal Application include the requests for information, processing and implementing the Aging Management Plans, resumption of spent fuel movement from the spent fuel pools to the ISFSI, the implementation of projects to support license renewal and staffing and employee retention in support of license renewal. Dr. Budnitz remarked the license for the Orano firm's new spent fuel storage system has yet to be received and the DCISC has committed to complete a technical review of the modified design required for DCPP's high seismic environment.

Dr. Budnitz reported SB846 requires PG&E to support an independent updated seismic assessment and PG&E has assembled a team of experts to conduct that assessment and a different group to conduct a participatory peer review which Dr. Budnitz described as an ongoing peer review which continues throughout the process. Dr. Budnitz remarked he believes the experts engaged by PG&E for both the assessment and the participatory peer review were all first rate, competent and very well-credentialed individuals. The assessment follows what Dr. Budnitz described as the spirit of the Senior Seismic Hazard Committee (SSHAC)[16] Level 1

[16] In order to review the state-of-the-art and improve on the overall stability of the Probabilistic Seismic Hazard Assessment (PHSA) process, the NRC, the U.S. Department of Energy (DOE), and the Electric Power Research Institute (EPRI) co-sponsored a project to provide methodological guidance on how to perform a probabilistic

analysis. Dr. Budnitz reported four technical meetings were conducted and the DCISC was invited to attend each meeting. Dr. Budnitz reported the DCISC representatives did not provide any technical feedback to the team and acted only as observers. He reported draft reports were provided to the Participatory Peer Review Panel and the DCISC for review under confidentiality restrictions. Dr. Budnitz reported he has reviewed the Assessment and will be providing an evaluation concerning the Assessment that is based upon the technical merits and the process used by the reviewers and the CPUC Independent Peer Review Panel (IPRP) is scheduled to meeting in April or May 2024. Dr. Budnitz reported that under SB846 the DCISC will also review and incorporate the report of the IPRP. Dr. Budnitz reported he does not expect to be able to present a full report to the Committee at its June 20-21, 2024 public meeting. He remarked the NRC review of the License Renewal Application may also generate questions concerning seismic adequacy which the DCISC would review.

Mr. John Geesman on behalf of the Alliance for Nuclear Responsibility was recognized. Mr. Geesman remarked he believed that in the briefing Dr. Budnitz gave to the Diablo Canyon Decommissioning Engagement Panel shortly after the adoption of SB846 Dr. Budnitz undermined his credibility concerning his substantive analysis as well as the credibility of the Updated Seismic Assessment. Mr. Geesman requested that in his procedural analysis Dr. Budnitz address the justification for PG&E choosing to vary from the requirements of the SSHAC Level 1 process. Mr. Geesman further observed that the PG&E Geosciences Department was previously faulted and found not to be in compliance with its own quality assurance procedures concerning which Dr. Budnitz has assured the public that there was no safety impact. Mr. Geesman commented he assumes Dr. Budnitz will likewise assure the public that what Mr. Geesman described as the violations of the SSHAC Level 1 standards will have no impact on safety. He requested that any such analysis should address why or how variation from the specified SSHAC rules bolsters the credibility of the Updated Seismic Assessment.

Mr. Geesman reported that in 2008 the California Energy Commission made policy recommendations which the DCISC followed, with what Mr. Geesman described as some degree of diligence, to try to lower the density of the spent fuel stored in the spent fuel pools. He commented this was an important safety priority embraced by the Energy Commission, the CPUC and by the DCISC but he commented he has heard no mention of this issue in context of consideration of PG&E's revised plans for spent fuel movement during extended operations. Mr. Geesman commented he believes the objective of reducing spent fuel pool density was a principal factor in the selection of the Orano firm to supply a new spent fuel storage system for DCPP. He stated if the DCISC has abandoned this objective this needs to be clearly addressed, as it continues to be of considerable importance to the Alliance for Nuclear Responsibility and to local residents.

Dr. Lam replied that as the appointee of the California Energy Commission to the DCISC he made numerous inquiries of PG&E concerning the delay in implementing the Energy Commission's priority and he determined that PG&E has done a reasonably adequate job in

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seismic hazard assessment (PHSA). The project was carried out by a seven-member Senior Seismic Hazard Analysis Committee (SSHAC) Chaired by Dr. Robert J. Budnitz and supported by a large number of other experts.

exploring options for reducing the rack density in the spent fuel pools but he stated DCPP is running out of space to store spent fuel and there are numerous procedural and technical barriers to implementing the objective of decreasing rack density including the need to configure the spent fuel pools to provide adequate shieling and DCPP's use of high burnup fuel. The capacity of the Independent Spent Fuel Storage Installation (ISFSI) is also a factor and Dr. Lam remarked the issue is not being focused upon at the present time due to policy and technical barriers. Mr. Geesman remarked that PG&E has assured the Committee that DCPP has sixty years of capacity with the ISFSI and both spent fuel pools filled, but as Dr. Budnitz has observed, this is not a long-term solution. Mr. Geesman stated the issue of spent fuel density remains important and he observed the Legislature in adopting SB846 would expect the cost of additional dry cask storage, even if it required an expansion of the ISFSI, to be included with the cost effectiveness determinations the CPUC is charged to make.

Dr. Gene Nelson of Californians for Green Nuclear Power was recognized. Dr. Nelson observed that in 2015 the NRC recognized that the plant had adequate margin for any plausible seismic event and the statistics and physics in support of that determination have not changed. Dr. Budnitz replied that since the 2015 seismic review was undertaken there has been a lot of new information received and that information is the central focus of the Updated Seismic Assessment which the DCISC is charged with reviewing.

XV ADJOURN AFTERNOON MEETING

The Chair adjourned the morning session of the DCISC at 4:40 p.m.

XVI RECONVENE FOR EVENING MEETING

Dr. Lam reconvened the evening meeting of the DCISC at 5:15 p.m.

XVII COMMITTEE MEMBER COMMENTS

There were no comments by Committee Members at this time.

XVIII INFORMATION ITEMS BEFORE THE COMMITTEE

Dr. Lam requested Mr. Garcia to introduce the first of the informational presentations requested by the Committee of PG&E for this public meeting. Mr. Garcia introduced DCPP Director of Strategic Initiatives Mr. Phillipe Soenen who has made presentations to the Committee in the past in his previous capacity as Licensing Manager for Decommissioning Environmental Activities. Mr. Garcia reported Mr. Soenen holds a Bachelor of Science Degree in Mechanical Engineering from the University of California at San Diego. Mr. Soenen has more than twenty years of experience in the nuclear industry including holding a number of positions at DCPP including Licensing Supervisor, Project Manager for License Renewal and as Licensing Engineer for the original DCPP and Humboldt Bay Nuclear Power Plant ISFSI applications for dry cask storage facilities.

A. Briefing on Section 4.2 of New License Renewal Application Reactor Vessel Neutron Embrittlement Analyses, Including a Briefing on the Recent Attempt to Retrieve Capsule B from Unit 1.

Mr. Soenen reported he would provide information on the contents of the License Renewal Application (LRA) and on the recent attempt to withdraw Surveillance Capsule B[17] from Unit 1. Mr. Soenen reported DCPP's reactor vessel integrity program is in full compliance with the federal oversight regulations. PG&E's LRA includes the basis for PG&E's conclusion that the reactor vessels will remain safe for sixty years of operation using currently available information and current methodologies endorsed by the NRC. The NRC will perform an independent review of this information as part of the LRA and PG&E is planning to withdraw Capsule B during refueling outage 1R25 in the spring of 2025. Capsule B will then be tested and results reported to the NRC.

As background information Mr. Soenen stated that during plant operation over time neutron embrittlement, known as fluence, can reduce the fracture toughness of the ferritic steel of the reactor vessel beltline material and can also expand the beltline material. To support forty years of operation (i.e., the duration of DCPP's current operating licenses), as part of the Technical Specifications (TS) and the operating licenses PG&E is required to reduce the potential for negative effects from neutron embrittlement within the control bands of a pressure thermal limit. Pressurized Temperature (PT) limit curves are developed and updated based on changes in the reactor design and on updated fluence information to ensure DCPP continues to operate within the safety zone and also to set safety positions for the Low Temperature Overpressurization Protection (LTOP) System.

Mr. Soenen stated federal regulations require all operating U.S. reactors to have a Reactor Vessel Material Surveillance Program. This includes the periodic withdrawal and testing of surveillance capsules installed in the reactor vessels in locations where they are exposed to greater fluence than the vessel itself in order to provide a forecast and projection of how fluence will be interacting over time with the reactor material. The Reactor Vessel Material Surveillance Program is a requirement for the current plant's forty-year operating license period and has been satisfied for both Units. Mr. Soenen provided a reference to the citation for the safety evaluation by the NRC that the Reactor Vessel Material Surveillance Program requirements have been met.

Mr. Soenen reported to support license renewal reactor vessel neutron embrittlement calculations for sixty years of operation are updated and presented in DCPP's LRA in Section 4.2:

- LRA Section 4.2.1, Neutron Fluence Projections;
- LRA Section 4.2.2, Pressurized Thermal Shock;
- LRA Section 4.2.3, Upper Shelf Energy; and
- LRA Section 4.2.4, P-T Limits and Low Temperature Overpressure Protection (LTOP).

He stated the NRC will be independently reviewing the LRA to verify DCPP Unit 1 and Unit 2 can safety operate for sixty years.

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[17] Surveillance specimen capsules must be located near the inside vessel wall in the beltline region so that the specimen irradiation history duplicates, to the extent practicable within the physical constraints of the system, the neutron spectrum, temperature history, and maximum neutron fluence experienced by the reactor vessel inner surface.

Mr. Soenen stated that surveillance coupons previously withdrawn from the DCPP reactor vessels as part of the Reactor Vessel Material Surveillance Program have determined that fluence experienced through reactor operation, as confirmed by a calculation performed by the Westinghouse[18] firm [WCAP-17299-NP, publicly available as part of DCPP's LRA submittal], demonstrate the fluence values supporting a projection of sixty years of operation. The calculation also determined additional reactor vessel materials should be monitored based upon regulations.

Mr. Soenen reported concerning Unit 2 that all the reactor vessel surveillance coupons have been withdrawn and data provided in the LRA demonstrates acceptability through sixty years of operation. For Unit 1 data is provided in the LRA to demonstrate acceptability through sixty years of operation. Mr. Soenen reported the LRA credits withdrawing one final capsule from Unit 1, known as Capsule B, for testing to support up to sixty years of operations. **Dr. Peterson observed this will be an issue of high importance that the DCISC will be discussing and he remarked it is important that Capsule B be successfully withdrawn in the 2025 refueling outage. Dr. Peterson remarked the Committee may want to consider making a recommendation that Capsule B be withdrawn even in the event the refueling outage needs to be extended to do so.** Mr. Soenen replied PG&E agrees and has high confidence in being able to withdraw Capsule B during the next Unit 1 refueling outage as the reactor vessel will be in a different configuration due to removal of the reactor core barrel which is required to conduct other inspections. In response to Dr. Lam's inquiry Mr. Soenen replied if DCPP is unable to take credit for Capsule B there are other options for demonstrating fluence projections including by external vessel fluence monitoring and through correlations that the current forecast or projections are conservative and he remarked there are also potential options for modifying how the reactor is operated to stay within limits.

Mr. Soenen confirmed that even without credit for Capsule B the plant could still move forward with the LRA as withdrawal of Capsule B is not a requirement for license renewal, rather under NUREG 1801[19] it is a viable option in context of the Aging Management Program. In response to Dr. Lam's request for an analysis if credit is not taken for Capsule B, Mr. Soenen replied that such an analysis is now contained in the LRA, as the withdrawal of Capsule A and use of other applicable industry information demonstrates DCPP can operate for sixty years. He remarked Capsule B's data would be confirmatory as part of the Aging Management Program. **In response to Dr. Lam's query concerning the complexity of the effort to undertake such an analysis Mr. Soenen replied he would need to look into what alternative evaluations would be necessary if DCPP were not able to use the validation of Capsule B data in the**

[18] DCPP's two pressurized water reactors were manufactured by the Westinghouse firm.

[19] The NRC provides guidance to licensees and applicants by issuing NUREG-series publications regarding regulatory decisions, research results, results of incident investigations, and other technical and administrative information. NUREG-series publications disseminate scientific, technical, and administrative information dealing with licensing and regulation of civilian nuclear facilities and materials. Publications in the NUREG series may neither state nor imply any regulatory requirements, since such requirements are stated only in laws, regulations, licenses (including technical specifications), or orders. In other words, the NRC staff may suggest a course of action in a NUREG-series publication, but the regulated community may use other approaches to satisfy the agency's regulatory requirements.

LRA and he stated he would follow up with a response to the Committee on this matter. In response to Consultant McWhorter's question Mr. Soenen stated the results of the testing and analysis of Capsule B must by regulations be submitted within eighteen months of the capsule being withdrawn from the vessel, but he stated PG&E is hopeful of completing that process within one year of withdrawal. In response to Dr. Peterson's inquiry Mr. Soenen stated he believes Capsule B would need to be stored due to its decay heat for approximately sixty days before it could be opened but the shielding in the transportation package is quite advanced and it is not a challenge to transport a capsule off-site. Dr. Peterson observed the capsule is likely stainless steel but the material inside [the surveillance coupon] is ferritic and not subject to activation to the same degree as the capsule.

Mr. Soenen stated the LRA relies on NRC-approved methodologies to project PTS and upper shelf energy (USE) values for sixty years of operation [termed PTS reference temperature and Charpy USE]. NRC regulations provide PTS reference temperature and Charpy USE screening criteria and the LRA provides the results of calculations which are derived or summarized in the LRA from the Westinghouse's calculation provided as part of the LRA [the analysis, WCAP-17315-NP, is publicly available as part of DCPP's LRA submittal - see LRA Tables 4.2.2-1 & 2]. Mr. Soenen reported the results of this analysis demonstrate the beltline materials and extended beltline materials remain below the NRC PTS reference temperature and Charpy USE screening criteria and that it is safe to operate Unit 1 for sixty years.

Mr. Soenen stated pressure thermal limits are updated as required by the Technical Specifications and the operating licenses for DCPP and are maintained in the Pressure Temperature Limits Report which is submitted to the NRC. The Report is periodically updated as the pressure thermal limits are inputs to supporting safety systems, including the LTOP System, to ensure that if pressure were released prior to a catastrophic condition based on low temperature set points, the safety systems would respond as designed. He reported the LRA commits to the existing Technical Specification requirements for managing the pressure thermal limits throughout the period of extended operation. In response to Consultant McWhorter's inquiry concerning at what point the assumed fluence values in the Pressure Temperature Limit Report (PTLR) for a forty year end-of-life get reanalyzed and resubmitted for sixty years of operation Mr. Soenen responded there is a license amendment request (LAR) being developed now for submission to the NRC during the first half of 2024 to update the PTLR. Mr. Soenen stated the LAR will be implemented sometime before the first half of 2025. Dr. Budnitz inquired concerning the percentage of uncertainty in the estimates of fluence in the PTLR for a forty-year lifecycle and Mr. Soenen responded that the uncertainties were calculated within the limits of the methodology, but he did not know the specific percentage.

Mr. Soenen next described the attempts to withdraw Capsule B from Unit 1 during refueling outage 1R24. He reported PG&E was aware entering into 1R24 there were going to be challenges in removing Capsule B due to application of sufficient force necessary to effect its removal. He reported PG&E submitted a request to the NRC which was approved for revision of the withdrawal schedule to either fall of 2023 or spring of 2025 which he stated was consistent with license renewal guidance documents not to have more than forty years of equivalent power factor [??]. Mr. Soenen reported when Capsule B is removed in 2025 it will have approximately 101 effective full power years (EFPY) of fluence data and this meets the guidance documents not

to have more than 108 EFPY of data. He confirmed Dr. Peterson's observation that if Capsule B were to remain in the reactor beyond 1R25 it would exceed the guidance documents limit for fluence.

Mr. Soenen described photos and displayed short videos of the interior of the Unit 1 Reactor Pressure Vessel showing the location and configuration of the area around Capsule B and its access plug as well as the tool that was used to attempt to remove the capsule from the vessel. He observed Capsule B is located on the exterior of the core barrel, closer to the fuel than the reactor vessel. He described a video showing the attempts to retrieve Capsule B with a hand tool which failed to engage the gripping mechanism. He remarked DCPP believes there is a distortion or deformation of a specific area on Capsule B and the difficulties are not being caused by swelling or other material defect. Mr. Soenen reported the same tool was able to engage at two other capsule locations. He reported the last time removal of Capsule B was attempted the tool engaged but the force used was insufficient. However, during 1R24 a different issue was experienced. During 1R24 sizing gauges were used to ensure the tooling is within minimum size for Capsule B and this should lead to a greater chance of success.

Mr. Soenen described and displayed visuals of the configuration of the reactor core barrel and the changes in configuration and greater access that will be afforded by removal of the core barrel during 1R25. He remarked during 1R24 there was a concern that the single tool available could be damaged and thereby potentially introduce foreign material into the reactor core or the tool could get stuck and he reported the same tool is also used, after removal of the plug, to retrieve the surveillance coupon and extract it from the capsule. A tool is specifically designed for each unit and Mr. Soenen reported DCPP will have more tools available at the next outage. In response to Consultant McWhorter's observation Mr. Soenen confirmed the tool used with Unit 2 was stored within Unit 2 Containment and was unavailable during 1R24. He reported in the future DCPP will store these tools outside of Containment. Mr. Soenen confirmed Dr. Peterson's observation that when the core barrel is removed from the reactor Capsule B will come with the core barrel and be available to be worked on outside of the reactor vessel which will afford more options, including better access and side access and less chance of introducing foreign material. Mr. Soenen reported that if necessary with underwear cutting technologies the plug could be cut out.

In concluding his presentation Mr. Soenen reported there is limited operating experience available with the challenges inherent with the removal of a surveillance capsule and plug and DCPP is also identifying other options. He displayed a video from the removal of the core barrel during 2024 and he described some of the components involved.

The Chair observed the agenda calls for public comment following the next presentation by Dr. Mark Kirk and he requested DCISC Consultant Dr. Andrew Kadak to introduce Dr. Kirk.

XIX REPORT BY DCISC SPECIAL TECHNICAL CONSULTANT AND DISCUSSION BY THE COMMITTEE & TECHNICAL CONSULTANTS WITH DIRECTION AND/OR ACTION AS APPROPRIATE TO FOLLOW PUBLIC COMMENT PERIOD FOR ITEMS XVIII A.1 &XIX D AS PROVIDED BELOW

Dr. Kadak reported Dr. Mark Kirk holds a Ph.D. in Civil Engineering from the University of Illinois, a Master's of Science Degree in Mechanical Engineering from the University of Maryland and a Bachelor of Science Degree in Engineering Science and Mechanics from the Virginia Polytechnic Institute. Dr. Kirk previously worked for Westinghouse and for the NRC and now runs a private consulting company. Dr. Kirk is a member and former Chair of the American Society of Mechanical Engineers Working Group on Operating Plant Criteria for Reactor Vessel Material Studies and Embrittlement and has worked extensively on the development of codes and standards used in regulatory guidance for assessment of reactor vessel embrittlement.

D. Results of Studies by Dr. Mark T. Kirk Evaluating Unit 1 Reactor Pressure Vessel Integrity and Addressing Public Concerns.

Dr. Kirk stated he would be dividing his report into four sections as follows: background, administrative information, measurement and prediction of embrittlement, and the conduct of reactor pressure vessel integrity management and in his report he would discuss current NRC requirements and guidance on these topics.

Dr. Kirk reported the objectives of his efforts as directed by the Committee were to address concerns raised by the Mothers for Peace and the Friends of the Earth organizations as well as by Mr. Bruce Severance. This resulted in a two-part report, both parts of which have been available on the DCISC website www.dcisc.org since February 1, 2024. Part 1 is focused on explaining reactor pressure vessel (RPV) integrity and embrittlement concepts and addressing public concerns and Part 2 explains Dr. Kirk's evaluation of the embrittlement of DCPP Unit 1. The draft Report was reviewed by the Committee's Technical Consultants and individually by each DCISC Member, but there was no discussion between Members concerning the Report. The draft Report was also provided to PG&E strictly for the purpose of checking for omissions or errors of fact. Dr. Kirk stated these reviews did not affect any of the Report's conclusions.

Dr. Kirk stated the overarching concern of the public is whether the continued operation of Unit 1 is safe and what does data credibility mean when discussed by the NRC and nuclear engineers and how does it affect the analysis. There is also concern about surveillance capsule withdrawal plans and the use of sister plant data obtained from the Palisades Nuclear Plant in Michigan ("Palisades" or sometimes "sister plant").

Relative to background information Dr. Kirk reported embrittlement is the phenomenon that reduces steel's resistance to fracture and it changes the steel RPV at a micro structural level. Dr. Kirk stated it is important to understand that embrittlement does not cause cracking at a macro level such that the cracking can be detected by a routine ten-year in-service ultrasonic inspection. He reported there has been discussion of a postulated linkage between the quantification of the level of embrittlement and the need to do more frequent inspections and he commented there is no linkage between the two. Embrittlement reduces the energy absorbed by steel before it fractures and is measured and surveilled using the Charpy[20] specimen test and he

[20] In materials science, the Charpy impact test, also known as the Charpy V-notch test, is a standardized high strain rate test which determines the amount of energy absorbed by a material during fracture. Absorbed energy is a measure of the material's notch toughness.

displayed a photo of a Charpy specimen and reported specimens are tested across a range of temperatures by being broken into two pieces while measuring the energy it takes to do so. At low temperatures the amount of energy absorbed is very low and at high temperatures the reverse is true and there is a lot of bending of the material before breaking. The temperatures in between are termed transition temperatures. Dr. Kirk stated over time with embrittlement occurring the steel's microstructure is changed by the neutron radiation from a nuclear reactor and the amount of fracture energy from the lower shelf to the upper shelf reduces and this is characterized by the Charpy tests as the reduction or change in Upper Shelf Energy (USE) or as a percentage drop in USE and by an increase above the transition temperature which is measured by convention at 41 joules[21] or 30-foot pounds of absorbed energy, referred to as ΔT41joules.[22]

Dr. Kirk observed embrittlement occurs progressively over the life of a nuclear power plant. It occurs relatively quickly early in a plant's lifetime and slower as the plant ages. Dr. Kirk reported it is a misunderstanding that there is a linear relationship between embrittlement and the passage of time. In context of a license renewal for operations from 40 to 60 or to 80 years of service the phenomenon saturates and the amount of embrittlement is much less, with the form of the curve controlled by the composition of the steel and the temperature of the exposure which are accounted for in predictive equations and reflected by surveillance.

Dr. Kirk stated fracture toughness data is required in order to assess a plant's structural integrity and to ensure sufficient material resistance to breaking under load. However, the Charpy specimen test does not directly measure fracture toughness. The notch on the Charpy specimen is how and where fracture toughness is defined as the resistance of the material's fracture in the presence of a very sharp crack such as would be produced from fatigue or stress corrosion cracking. Fracture toughness data is recommended by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, but only Charpy data can be measured because the specimens are located within the capsules. However, Dr. Kirk reported there is a good correlation between the Charpy T41joules data and fracture toughness and this is used by all nuclear plants to infer fracture toughness.

Concerning the Surveillance Program Dr. Kirk reported surveillance capsules are loaded with both Charpy and fracture toughness specimens and also with dosimeters used to measure the neutron fluence occurring over time. The capsules are loaded into the reactor core as part of the reactor vessel's original construction and he displayed a cross-section of a RPV showing the location of capsules arranged around the reactor core barrel and around the core baffles that hold the fuel assemblies in place. For both DCPP reactors all the capsules are attached to the core barrel or to the vessel wall and all have a lead factor, that is, they are closer to the nuclear fuel than the RPV itself such that they accumulate neutron dosage faster than the RPV which Dr. Kirk described as an important aspect of the Surveillance Program as this allows a forecast based

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[21] A joule is a unit of energy in the International System of Units. It is equal to the amount of work done when a force of one newton displaces a mass through a distance of one meter in the direction of that force. It is also the energy dissipated as heat when an electric current of one ampere passes through a resistance of one ohm for one second.

[22] In many fields, it's common for Δ (the Greek letter *delta*) to represent a change or difference. Math uses it, physics uses it, engineering uses it, etc.

on the lead factor as determined by ASME guidance. He gave as an example a capsule with a lead factor of three having been kept within the core for fifteen years which would then have accumulated a dose representing the amount of neutron accumulation on the vessel after forty-five years of operation. Dr. Kirk observed this lead factor provides sufficient time for regulatory oversight and planning. The specimens in the capsules experience more embrittlement than does the RPV and their condition represents that of the RPV many years into the future. Dr. Kirk observed this is why long intervals between capsule withdrawal are acceptable. In DCPP's case, for Unit 1 Capsule V, the third capsule withdrawn, was removed from the RPV in 2002 and at that time had the same fluence that the Unit 1 RPV will experience this year or next year. He reported the long delay in removal of capsules is part of the surveillance process.

Dr. Kirk stated with the direct measurement of the state of neutron exposure or fluence, this data is used to assess the condition of the reactor in conjunction with a predictive model to forecast future RPV embrittlement and he reported the NRC provides guidance on when plant-specific data or a formula is to be used. He reported this generates the discussion of credibility of data. Dr. Kirk reported a determination is not made based upon a finite number of samples, but is supplemented by a model which has been calibrated to represent embrittlement trends in a fleet of nuclear reactors. He commented until the first capsule is removed all one has is the formula to use to extrapolate current conditions.

Concerning the assessment of RPV integrity Dr. Kirk reported the main point to be understood is the process is designed to ensure that the resistance of the material to fracture always exceeds the structural driving force. The NRC has set up screening criteria on pressure-temperature operating limits, PTS as a value of transition temperature (expressed as RTpTs) which criteria must remain below 130° Celsius and screening criteria on USE which must exceed 68 joules. Dr. Kirk explained the screening criteria are not failure conditions, but represent the conservative establishment of a very low probability. When a plant is expected to exceed these screening criteria at some future time the plant must take some additional action and create and implement a plan and submit the plan to the NRC at least three years in advance to ensure time for review and questions. The plan could include cessation of operation, a more detailed plant-specific analysis to determine acceptability of exceeding the NRC screening criteria, or could employ specific modifications to plant operation. Dr. Kirk remarked that heating of the water used by the Emergency Core Cooling System (ECCS) has not to his knowledge been used by any plant in the United States.

Concerning the NRC's requirements and guidance for embrittlement monitoring and prediction of RPV integrity, Dr. Kirk reported the NRC's rules, set forth at 10 CFR Part 50 Appendix H, set forth the requirements for surveillance during a plant's initial forty-year license period and incorporate AMSE Standard E-185 by reference. He reported a plant is licensed in accordance with the version of ASME E-185 in effect at the time of its construction and DCPP Unit 1 was licensed under the ASME E-185 Standard in effect in 1970 which requires testing of three capsules during the first forty years of operation. Dr. Kirk reported the NRC provided recommendations in NUREG 1801 for extended operation beyond forty years and based upon the level of embrittlement during its initial license it is possible that these recommendations may be for three, four or five capsules or additional capsules may be required depending upon the level of embrittlement.

Dr. Kirk observed for embrittlement prediction purposes NRC Regulatory Guide (RG) 1.99, Revision 2, published in 1986 provides the NRC's embrittlement prediction model which codifies the original PTS Rule including prediction of both ΔT41joules and the percentage drop of USE. He reported there is an alternate PTS Rule, 10 CFR Part 50 61a, which requires the use of a somewhat different model. It is this guidance and the requirements for which data are to be used in the predictions that are the credibility criteria, meaning that credible data follows the predicted trends from the Regulatory Guide while non-credible data deviates from those trends. Dr. Kirk described how data is plotted on a graph with the Y-axis showing Charpy Shift and the X-axis the Fluence, with each dot on the graph representing a different capsule as being within or outside of prediction lines based on the Regulatory Guide which is based upon copper and nickel content and whether the material is a plate or a weld. A predictive line is drawn, along with a plus or minus one standard deviation confidence balance and Dr. Kirk reported it is expected that 68% of the data will fall within those bounds and 32% of the data will fall outside. If more than 32% of the data fall outside the plus or minus bounds then the data is termed not credible. In that case, Dr. Kirk reported more data is collected and permitted to be outside the bounds and still be credible. Dr. Kirk reported credibility is assessed on the entire data set and a credibility assessment is redone with the addition of each data set.

Dr. Kirk reported credibility reveals whether or not a plant's specific data follows the anticipated trend and credible data are used to adjust the ΔT41joules and the USE prediction. Non credible data are modeled more conservatively using the Regulatory Guide formulas. He commented there has been concern that it was wrong that PG&E determined its three capsule data, which was valid from 2002 to 2011, was subsequently found not to be credible and Dr. Kirk remarked there is absolutely no incentive for a utility to call data that is credible not credible as doing so would incur a penalty from the NRC. For PTS, plant specific data is used together with similar data from sister plants. He reported Pressure-Temperature (PT) limits follow the same practice by convention, but it is not a requirement. For USE assessment 10 CFR Part 50 Appendix G makes no reference to sister plant data and Dr. Kirk stated the common practice is not to use sister plant data for USE. He commented RPV integrity screening criteria specify a very high level of material resistance, based on two mechanical properties. Those properties being USE and transition temperature shift for two events, one being normal operation, PT limits during routine heat up and cool down and the other being PTS which he remarked was a postulated accident condition that has never happened, but if it did would be very bad.

Concerning the evaluation of DCPP Unit 1 Dr. Kirk reported he would discuss the Surveillance Program and its status, the Capsule B deferrals, and his evaluation based upon the NRC's requirements and how that compares to PG&E's evaluation. He commented he would also discuss a supplemental evaluation using newer techniques and more data than currently required by the NRC.

The Unit 1 Surveillance Program is licensed to American Society for Testing Materials (ASTM) E-185-70 standard which means three surveillance capsules were required to be tested over the first forty years of Unit 1's operation. Dr. Kirk reported this requirement was fulfilled in 2002. He noted the NRC has stated on several occasions that as Unit 1 was licensed under

ASTM E -185-70 the deferrals of the withdrawal of Capsule B were appropriate during this period. He reported that there were plans during the first forty years of Unit 1's operation to test Capsule B, but PG&E was allowed to adjust those plans as withdrawal was not required. Dr. Kirk stated the Comments Mr. Bruce Severance provided to the DCISC mention a letter from the NRC in 2006 which Mr. Severance claims made withdrawal of Capsule B a condition of recovery of the low power operating time which extended the license from September 2021 to November 2024. Dr. Kirk reported that although he cannot provide a legal interpretation of Mr. Severance's claim, in his twenty years with the NRC it has been his experience that if the NRC were to impose a license condition it would be stated in the cover letter and he does not believe the reference cited by Mr. Severance constitutes a license condition.

Dr. Kirk stated that as Unit 1 goes from forty to sixty years of operation, NUREG 1801 provides the NRC's recommendations which include that two more capsules be tested based upon the anticipated level of embrittlement. He reported Capsule B is planned for withdrawal in 2025 and subsequent testing and Dr. Kirk observed NRC guidance provides for its removal by 2028. Dr. Kirk commented PG&E's plan to test one capsule rather than two will likely be a subject of discussion with the NRC. He reported the Palisades sister plant data which is part of the requirements for PTS assessment was incorporated in 2011 and this provides data through and beyond sixty years of service. He commented that since 2011 the PT limits, the PTS assessment, and the USE assessment have all been informed based on data for beyond sixty years of service.

Dr. Kirk then displayed a series of PowerPoint slides showing how knowledge has evolved over time of the embrittlement level for PTS for Unit 1. From 1985, when the plant began operations to 1987 when the first capsule, Capsule S, was tested the data from this capsule was not credible. From 1993 to 2003, the curve was adjusted downward to follow the data, and the predicted crossing point for the reference temperature estimate for PTS (RTpTs) from the testing of an additional capsule was beyond sixty years. From 2003 to 2011 with the testing of Capsule V the data was deemed not credible due to the predicted crossing point with the Capsule V data and due to the scatter in the data with the unirradiated capsule from the commencement of operation. This was the situation between withdrawal of Capsule V and the recognition that sister plant data was available from Palisades. With two new data points from Palisades the data was again credible and the RTpTs values at forty and sixty years are well below the NRC's PTS screening criteria of 132° Celsius. Dr. Kirk stated this represents the present situation until more data, including from Capsule B, becomes available when the entire process will be redone.

Dr. Kirk reported embrittlement, especially for copper bearing material such as contained in the Unit 1 limiting weld, is highly nonlinear as in the first twenty years the reference temperature (RTpTs) increased by a full 100° Celsius, but from year forty to year sixty the RTpTs will increase by only 15° Celsius. Dr. Kirk reported this is well understood in all modern embrittlement models. He remarked as credibility is assessed using all available data, when Capsule B is withdrawn and tested nothing may change but if the data is extremely low or high the RTpTs assessment could change significantly. Dr. Kirk observed the use of RTpTs data from Palisades not just at forty years but also at sixty years representing interpolations. He reported there are no extrapolations being done and this methodology does not go beyond the level of

knowledge for materials of this type.[23] He reported that his calculations validated PG&E's calculations to within a degree Celsius and he did not find any issues with PG&E's calculations nor with the NRC's review.

With reference to USE Dr. Kirk reported the NRC requires their model, the RG 1.99 model, be adjusted to bound all the available data. For DCPP Unit 1 the model's curve based very near the Capsule Y result, with a difference of only a few foot-pounds which Dr. Kirk observed was not significant. He reported the NRC does not have a position on the use of sister plant data for USE assessments but typically sister plant data is not used. He displayed a graph with the USE projection for Unit 1 which shows at both forty and sixty years both USE projections are well above the NRC's 68 joules screening criterion. He reported his calculations validate PG&E's calculations for USE from 2011. He reported PG&E made a small error on the credibility assessment for USE which the NRC also identified and this small error which was in a conservative direction was corrected.

Dr. Kirk reported the DCISC directed that he employ his personal approach to provide supplemental analysis unconstrained by NRC requirements. Dr. Kirk reported he used more data and more recent analytical techniques which have been discussed, but not yet codified by ASTM or the NRC. He reported he used machine learning inspired technique to identify data from an international database of more than 2,000 surveillance datapoints compiled by ASME and used this database to identify materials with similar embrittlement characteristics and variables based on the copper and nickel content similar to DCPP Unit 1. He reported the intent was similar to the NRC use of sister plant data for PTS. Dr. Kirk reported DCPP Unit 1 has a rather unique combination of copper and nickel and along with Palisades there were only two other pressurized water reactors that previously operated in Germany that provided useful data.

He reported the ASTM embrittlement curve, fit from the larger database, represents the data a bit better than the NRC curve but he reported at this time the plant is required to use the NRC equation which he stated is high relative to the data which in this particular case adds a level of implicit conservatism for the material. The more modern analytical technique is Draft Code Case N-914 in the ASME Code (N-914) and provides instruction on how to use fracture mechanics to determine the presence of adequate fracture toughness. Dr. Kirk reported N-914 is focused on accounting for the effects of embrittlement on fracture toughness properties and permits the use of fracture toughness data along with Charpy data. He remarked that in the past the NRC would only allow use of Charpy data. He commented N-914 provides a methodology that incorporates direct fracture toughness data available for weld testing done at Palisades in both an irradiated and an unirradiated condition. For USE the additional data is identified by the nearest neighbor process but with the RG 1.99 analysis because there has not been as much focus on new embrittlement trend curves for USE.

Dr. Kirk reported regarding the supplemental analysis for PTS the graph now has two added points which trend well after adjustment for differences between fracture toughness and

[23] Mathematically, interpolation is the process of determining an unknown value within a sequence based on other points in that set, while extrapolation is the process of determining an unknown value outside of a set based on the existing "curve."

Charpy, with the fracture toughness data helping to remove some of the unneeded conservatism from the traditional Charpy approach. With the curve falling such that the crossing point between RTpTs and the NRC's PTS screening criteria is off the graph, thus providing further evidence that it is extremely unlikely that Unit 1 will have an issue with PTS screening criteria during a sixty year service life.

Concerning the supplemental analysis for USE, Dr. Kirk stated he considered additional data from the nearest neighbor process, but instead he used the NRC's assessment methodology. He reported the consideration of the similar USE data suggest that Unit 1 may fall below the NRC's 68 joules screening criteria before sixty years, probably in 2029 or 2030. He commented this could be addressed by performing an equivalent margin analysis per RG 1.161. Dr. Kirk stated while he did not perform that analysis he is highly confident that it would show the plant is adequate for sixty years and beyond. He stated that every plant that has done an equivalent margins analysis, removing the unnecessary conservatism in the material properties assumption and the driving force assumption, has without exception been shown to be acceptable relative to the lower USE values.

Dr. Kirk commented with reference to public concern that there were questions regarding the use of sister plant data and whether the accumulation of damage is dependent upon the temperature history of the component and thereby on the power level history and that the complex nature of radiation embrittlement is idiosyncratic to individual reactors and may change unexpectedly over time. Dr. Kirk observed sister plant data provides similar data and allows working with additional data and more data creates increased confidence. Sister plant data is required for PTS but there is no guidance for its application to USE. He stated absolute temperature affects embrittlement and must be accounted for, however, for most of a plant's lifetime the reactor is at 100% power and a reactor is at a higher temperature at a lower power, but the 100% power temperature is conservatively used in these calculations. He remarked it is important to distinguish between science and engineering and the analysis he described looks at the effect through the scatter and through the uncertainty of the Charpy data. Scatter is accounted for conservatively by not basing predictions and lifetime assessments on the mean curve, but rather on the upper bound curve. Dr. Kirk stated it is his belief that the magnitude of the effect on the resultant Charpy shift values is small. He reported data for existing trend curves has been gathered from pressurized water reactors in the U.S., Japan, South Korea, France, Germany and from Belgium and if the idiosyncratic effect of temperature and power level was large, data from France and the United States could not be plotted on the same curve with the same trends identified.

Dr. Kirk remarked concerns have been expressed about the RPV beltline inspections and that the small number of indications found by ultrasonic inspection of Unit 1 were not plausible because twelve years ago many more flaws were found in Belgian reactor pressure vessels. Dr. Kirk reported the flaws in the Belgian reactors were tied to a manufacturing idiosyncrasy that was particular to those reactors and no plausible connection exists between those flaws and Diablo Canyon. He remarked the models cited in the comments, termed Favor and Grizzley, are known to be ultra-conservative and are not intended to represent the flaws that actually occur in vessels and they are not intended to be a conservative representation of flaws for regulatory use. He reported the density of indications found in Unit 1 are similar to those found through industry

experience elsewhere.

Concerning a comment that the ultrasonic inspection interval permitted is too long, particularly as Unit 1 is significantly embrittled, Dr. Kirk observed that embrittlement does not cause cracking and embrittlement cannot be detected by ultrasonic examination as it occurs at a much small level. He reported surveillance is important, but if surveillance is showing high embrittlement this does not change the inspection frequency. The Unit 1 inspection interval of ten years is required by the AMSE.

Dr. Kirk observed there was a comment made that material damage by hydrogen embrittlement was not considered and he confirmed the comment was accurate as there is no operating experience showing hydrogen embrittlement cracking in light water reactors such as operated at DCPP. He commented the stainless steel liner protects the RPV steel from hydrogen effect cracking and cracking of the liner itself, which is more susceptible to hydrogen cracking than ferritic steel, is prevented by control of cooling water chemistry by keeping the oxygen content of the water very low such that the conditions that enable stress corrosion cracking are not present.

Dr. Kirk reported there has been a proposal to use the nanoindentation testing methods developed by Dr. Peter Hosemann to further investigate the embrittlement status of Unit 1 weld samples. Dr. Kirk reported that hardness can be related to fracture toughness and hardness can be measured, but it is data on fracture toughness that is required and the theoretical models to make that determination between hardness and fracture toughness are not validated and therefore an empirical relation would need to be used to determine hardness, then strength, and then strength to facture toughness. He commented there is a benefit in that a great number of hardness measures can be made, but the correlation process introduces uncertainties in the final predicted value and from a regulatory viewpoint Dr. Kirk believes this would preclude the use of the results. He remarked there is no precedent for using the nanoindentation approach with the NRC and it would complicate any interpretation. Dr. Kirk stated he would recommend the direct fracture toughness approach, using tiny fracture toughness specimens machined from the broken halves of Charpy specimens that have already been tested and for which there is regulatory precedent and he opined this approach rather than sampling hardness would lead to a more certain outcome with the regulator.

Dr. Kirk remarked Dr. Macdonald was concerned the existing Charpy methodology is not sufficiently accurate and Dr. Macdonald has proposed a new Charpy embrittlement metric which Dr. Macdonald terms "Extent of Embrittlement." Dr. Kirk reported his evaluation showed Dr. Macdonald's metric is not a measure of fracture toughness and Dr. Kirk compiled data on both fracture toughness temperature and Charpy transition temperature from a wide variety of RPV steel for a variety of fluences and copper and nickel content and found the Extent of Embrittlement metric predicts fracture toughness transition temperature less accurately that does the T41joule metric because at a fixed extent of embrittlement there is a greater uncertainty in the prediction of fracture toughness transition temperature than with Charpy metrics.

Dr. Kirk reported regarding a comment which questioned why account was not taken for the stainless steel liner in determining susceptibility of the RPV to brittle facture and hence a

LOCA. He commented the NRC has accounted conservatively for defects that could possibly exist in the liner by the defect population that was assumed in establishing the PTS screening criteria and by doing so the NRC assumed larger and more flaws than actually exist in the liner in setting the RTpTs screening criteria. He stated the high toughness provided by the thin layer of stainless steel cladding is completely ignored in the structural integrity calculation and therefore the liner is accounted for in a very conservative manner, over-estimating its contribution to cracking and underestimating by eliminating its structural contribution.

Regarding a comment concerning why no attention has been given to low temperature thermal annealing of radiation damage Dr. Kirk replied the surveillance samples are exposed not only to fluence, but also to temperature and the temperature affects are inherently quantified. So whatever self-annealing has occurred at whatever temperature, that is reflected by the samples and therefore in the data used for surveillance.

Dr. Kirk reported on a question raised regarding about how the vessel nozzles were assessed, that is, in the area above the RPV beltline where water enters the core. Dr. Kirk reviewed PG&E's documentation and he stated he is certain PG&E demonstrated that the nozzle materials do not restrict plant operability any more than the beltline weld which is the basis for PT limits and PTS assessment.

Finally Dr. Kirk reported a concern has been expressed that Unit 1 was constructed with deficient materials and known metallurgical flaws due to excessive copper and nickel impurities in the welds and plate material and there were well documented engineering errors made in the metallurgical specifications for Unit 1. Dr. Kirk provide a graph showing the copper content of the entire operating fleet of reactors in the United States and in France plotted by their construction dates. The graph showed that at the time of Unit 1's construction weld and plate materials contained copper and this was typical of pre-1973 chemistries. He reported at the time of Unit 1's construction it was not widely recognized that copper was a factor for causing embrittlement and hence at the time Unit 1 was constructed copper was not restricted. After 1973 the use of copper significantly declined. Dr. Kirk reported a number of plants with greater copper content than Unit 1 have operated safety for many years and 25 reactor vessels with more copper than Unit 1 remain in service today.

In summarizing his presentation Dr. Kirk stated he confirmed and validated PG&E's current reactor vessel integrity calculations and that Unit 1 meets the NRC's requirements for reactor vessel integrity through sixty years of service. He reported PG&E has correctly assessed the credibility of the data and its use of sister plant data was consistent with NRC guidance. He stated deferral of testing of Capsule B was appropriate during the first forty years of service and the vessel inspection schedule was appropriate. Capsule B is recommended to be removed by 2028 consistent with NRC guidance and removal is planned during 2025. Once the data from Capsule B is available this will change the numbers for PTS, for USE, and for the PT limits but the extent of those changes cannot be known until the Capsule B data is available. The supplemental analysis Dr. Kirk performed using additional data and more modern analytical techniques for PTS showed Unit 1 is very unlikely to exceed the NRC's screening criteria in sixty years of operation or beyond. For USE, the NRC's upper shelf energy limit screening criteria may be exceeded in five or six years but Dr. Kirk remarked he is confident that using a

more accurate USE analysis, following NRC guidance and using fracture mechanics data, would show acceptable margins well past those dates, but one would first need to do the calculations to be certain.

The Chair requested comments from the other Members and the Technical Consultants on Dr. Kirk's report.

In response to Dr. Peterson's comment Dr. Kirk confirmed test data from Capsule B would be useful to resolve the question around USE as testing the specimens provides both USE and transition temperature data.

Dr. Budnitz commented that he has reviewed Dr. Kirk's report as well as the Comments from Mr. Severance and the Declaration from Dr. Macdonald and he has not identified any arguments to challenge his conclusion that Dr. Kirk's evaluations and conclusions are correct and appropriate and in his view the Committee should not only accept Dr. Kirk's report but also endorse its conclusions but Dr. Budnitz commented he was not ready to make such a motion until he has the opportunity to hear from the public and he reported there is a pending assessment by Dr. Macdonald. He stated he is also open to hearing from Mr. Severance and from any other interested persons.

Dr. Lam reported the Committee has been informed that Dr. Macdonald is ill and his comments on Dr. Kirk's report will be forthcoming in the future. In response to Dr. Lam's request Dr. Kirk confirmed Dr. Lam's impression that Unit 1 meets all NRC regulations without having tested Capsule B. Dr. Budnitz remarked that the NRC criteria appropriately include a good deal of conservatism and even if Unit 1 were approaching the NRC criteria he would not be convinced that the reactor vessel would be in unacceptable condition. Dr. Kirk remarked that based on the screening criteria and the currently available data Unit 1 is not even close to not meeting the NRC's criteria. Dr. Lam observed Dr. Kirk's statement was based on two margins, that is, both the built-in margin of the NRC regulations and based on currently available data. Dr. Budnitz remarked that if DCPP were closer to not meeting the NRC's criteria for continued operation there are actions the plant could take.

Consultant McWhorter observed that Dr. Kirk included in his report supplementary analysis techniques that are not based on NRC regulations and using those techniques has demonstrated Unit 1 is safe.

Dr. Kadak thanked and commended Dr. Kirk for what he described as an incredible effort and for addressing a very technical topic into a format most people could understand. Dr. Kadak stated the detail of Dr. Kirk's analysis plus the supplemental work undertaken by Dr, Kirk demonstrate that the NRC's regulations are met. Dr. Kadak stated he was curious why the PTS criteria are so well met, but the USE criteria are not, based on the Palisades data in the master curve, and Dr. Kadak remarked he would like to better understand the science of why USE data, using sister plant data or other plant data, does not follow the trend of the PTS data. Dr. Kirk replied that one would need more time and access to the original data records to resolve this question. Dr. Kadak commented that when he served as President and Chief Executive Officer for the Yankee Atomic Electric Company, the Yankee Rowe Nuclear Power Plant in Rowe,

Massachusetts had an issue concerning USE and he stated that despite the fact the plant was below the screening criteria it was able to do the fracture mechanics analysis which demonstrated sufficient margin for USE. Dr. Kirk commented the analysis performed for Yankee Rowe was groundbreaking and that analysis is now quite common. Dr. Kirk remarked that every plant that has done a USE analysis has demonstrated USE is far below the 68 joule value which Dr. Kirk commented was a statement of its embedded conservatism.

Mr. Wardell stated he found Dr. Kirks Report to be very impressive and he took from the report that the Unit 1 reactor pressure vessel is in a good condition for operation for up to sixty years according to NRC requirements. However, Dr. Kirk's report goes further with its supplemental analysis and Mr. Wardell inquired what might be required to do the additional analysis of USE. Dr. Kirk responded this would entail a fracture mechanics analysis such as is done for PTS limits, that is, by estimating a flaw that is too large and assuming you have loads that are too high and using fracture toughness properties obtained in principle through direct measurement of plant material and testing the data on the USE to get a J-R curve,[24] but it is a matter of obtaining the data needed for the loading. He confirmed Mr. Wardell's observation that if that analysis were done it would determine the USE. Dr. Kirk commented he would be shocked if the results did not confirm operability for sixty years as it would be the first time for that analysis and there is much uncredited margin in the current requirement.

Mr. Wardell commented it is important to retrieve Capsule B and to receive and review the results of the testing of Capsule B. Dr. Kirk reported at the present time the data includes all the existing capsules which have been removed from the vessel as well as the Palisades data and he commented the Capsule B data although it cannot be predicted with certainty is likely, probably with a degree of confidence of around 95%, to be another data point on the line on the graph in his report. In response to Consultant Wardell's question as to the options available if Capsule B cannot be removed, Dr. Kirk reported one could reconstitute previously tested surveillance coupons as small Charpy specimens which would provide data, but this would not collect data at a higher fluence. He reported capsules could be reinserted and Capsule A, which is currently also in the reactor, could be tested. Dr. Kirk remarked accordingly there are a number of options remaining if Capsule B cannot be removed. Dr. Kadak remarked Capsule A could be removed and tested which would provide sufficient datapoints. Dr. Kirk, in response to Mr. Wardell's question, reported there are no longer capsules in the Palisade's reactor vessel and the capsules with the data from Palisades are supplemental capsules which have the DCPP sister weld components which were placed in Palisades in the 1990s and withdrawn a few cycles later because they were in an accelerated position. Other Palisades capsules do not contain the DCPP sister weld. Dr. Kirk remarked making small CTs from existing specimens is straightforward as the location of those specimens is known, Capsule A is still in Unit 1 and current location of the Palisades supplementary capsules is known. Mr. Wardell stated he concludes from the discussion that the NRC analysis provides sixty or more years of operation which would accommodate a twenty year license renewal, and while the USE supplemental analysis does not have the margin sought, there are options to reanalyze USE.

[24] A J-R curve, is a useful tool for evaluating a material's structural integrity in the presence of preexisting defects. The J-R curve can calculate the work (energy) per unit of fracture surface area needed to drive crack growth.

In response to Consultant McWhorter's inquiry as to the options if the Capsule B data results show a huge amount of data scatter, in that event Dr. Kadak replied the next step would be to try to understand why and if considered as not credible to go back to the existing non credible dataset. Dr. Kirk observed a significant problem would be encountered if the value is much greater than expected. Dr. Budnitz remarked and Dr. Kirk concurred that one neither includes nor discards data but accounts for it through a probabilistic analysis as to whether this results in a low or high confidence in the dataset. Dr. Kirk observed that whatever data is produced by Capsule B, the data will represent one hundred years' of neutron exposure and at this point in time there is no contemplation that the license extension for DCPP Unit 1 would even approach that.

At the Chair's request, relative to time limits for public comment, Assistant Legal Counsel Rathie suggested and the Committee agreed that Mr. Severance be given the ten minutes he previously requested for his comments and the other speakers be allowed four minutes each.

XX PUBLIC COMMENTS AND COMMUNICATIONS ON ITEMS XVIII A.1 AND XIX D

Dr. Lam requested that members of the public who wish to address the Committee on the topics presented this evening do so now.

Dr. Gene Nelson was recognized and he remarked the NRC has evaluated certain second license renewals, that is, for plants planning to run from sixty to eighty years and he stated these plants, all of which had a higher neutron fluence than DCPP for their first relicensing, have been determined to have a through wall crack frequency of less than one in a million per year. He commented no reactor pressure vessel anywhere in the world has experienced a through wall crack and he observed from having seen the graph in Dr. Kirk's report that there is a significant population of operating reactors with a higher copper content than DCPP and 25 of those reactors are operating today. He remarked the screening criteria is very conservative and while more data could be obtained the NRC guidance for second license renewals support continued operation of DCPP.

Mr. William Doe was recognized and stated he is a part-time consultant for PG&E. Mr. Doe reported and Dr. Kirk agreed that if the surveillance capsule data turns out to be a non credible, if the results are more limiting then the standard in RG 1.99 requires that the data be used even though it is not credible and Mr. Doe stated this introduces even more conservatism. He observed that if Capsule B data proves to be an outlier from the six sets of data there will still be six data sets, including Palisades, and one set is allowed to be excluded with the data set still remaining credible. Dr. Kirk stated Mr. Do was correct and he thanked him for his comments.

Ms. Margaret Frerking was recognized. Ms. Frerking stated she recently retired from the position of Associate Chief Engineer at the Jet Propulsion Laboratory and she remarked that what she sees from Dr. Kirk's report is a great deal of scatter in the data. She stated she had two inquiries, the first concerns the basis of the scatter and if it a telltale sign of something unexpected, and the second why not also retrieve Capsule A as plans are in place to retrieve Capsule B, as this would give two additional data points and reduce the scatter. Dr. Kirk replied as to the source of the scatter, in his work for ASTM data has been reviewed from worldwide

databases and two-thirds of the scatter is related to the experimental uncertainty of establishing the T41joules value from fitting the Charpy data and he described this, given the amount of specimens available, as an inherent uncertainty. The remainder of the uncertainty in Dr. Kirk's opinion is due to lack of fidelity in simple engineering models to represent the underlying complex physics. He pointed to the embrittlement trend curves as evidence that progress has been made as the curves now account for the effect of fluence on more elements, not only copper and nickel but also manganese and phosphorous in product form although he commented the difference produced by phosphorous or manganese is very small. From an engineering viewpoint Dr. Kirk stated he is not hopeful much improvement is possible from this point and the fact remains that the greater part of the scatter is a function of the fact the Charpy tests are testing only eight to ten specimens. Dr. Kirk concurred with Ms. Frerking's observation that the model uncertainty was approximately 40% and he remarked that for a regulator the solution is drawing an upper bound curve to have a lot of margin. Dr. Kirk replied concerning removing Capsule A that DCPP would need to make a decision as to the value in continuing to keep Capsule A in the reactor and having that data available and he confirmed that Capsule B has a very long lead time and the NRC guidance is that it should be removed when the fluence exceeds twice the fluence that's projected at sixty years, which for DCPP Unit 1 is by 2028. Dr. Kirk reported Capsule A has a much lower lead factor so it can remain in the reactor for a time and still remain relevant.

Mr. Bruce Severance was recognized and stated that he is a member of the Diablo Canyon Decommissioning Engagement Panel, but was speaking individually. He stated he first started reading accounts that there was severe embrittlement in Unit 1 due to metallurgical flaws when he joined the DCDEP and when he asked for the fluence reports that were submitted with the 2009 LRA he was told that the current Westinghouse reports were confidential and that Westinghouse would not release them because they were confidential for the proprietary mathematical formulas they contained. He stated he later found that that was not true. He commented the Mothers for Peace group had to submit a Freedom of Information Act request in order to get access to the documents. Mr. Severance said that last June he called the NRC and spoke with a clerk who told him the NRC must never have gotten the documents and Mr. Severance remarked he would like PG&E to identify the documents it considers to be proprietary.

Mr. Severance thanked the Committee for engaging Dr. Kirk and for committing much time and energy to taking a close look at embrittlement. Mr. Severance reported he worked as a Regulatory Compliance Engineer for the Vice President of Engineering for North American operations at the Mitsubishi firm for many years and as he is not a nuclear physicist or engineer he approaches addressing his concerns from a regulatory perspective through looking for inconsistencies in the data in the historic record and he reported he has found many such inconsistencies. He remarked after an amicable conversation with Dr. Kirk he hopes to have an opportunity to review the inconsistencies he has identified with Dr Kirk.

Mr. Severance stated it was recognized early on that there were metallurgical deficiencies in the Unit 1 vessel and it was anticipated early on by Westinghouse and PG&E that Unit 1 would not have the same durability and projected lifespan as Unit 2. He remarked there is no limiting weld in Capsule A and only Capsule B contains the "27204 specification" that is the subject of his concern and it appears to Mr. Severance from the record that it doesn't contain

entire samples. He stated his belief Capsule B contains some of the broken samples from Capsule S, and it has something in it called nozzle dropout which may be leftover scraps from a manufacturing process and there is a proposal written in document 92-072 that these be reconstituted after they have been irradiated which is unknown to Dr. Macdonald, but which Dr. Kirk reported could involve having tabs welded. Mr. Severance remarked he supports the idea of micro CT[25] testing if the DCISC believes that to be the most reliable method and he does not care if testing involves nanoindentation. He commented that by 1992 PG&E could not even get this [weld] material sample as a specification had been erased such that they were only able to get fragments to include in one of the four supplementary capsules that were inserted into the reactor at that time. He stated Capsule B is the only capsule in position at 45 degrees where it receives the highest fluence and data from Capsule S and Capsule V both indicated strongly that there is a pattern and the RTpTs value for one was at 258°, the other was at 250.9° Fahrenheit and at the end of the Capsule V report there is a reference to letter, DCL 03052, which states in the introduction that PG&E deemed the Capsule V data to be credible, which Mr. Severance said is not consistent with what Dr. Kirk said but PG&E was applying the new CT graph software model to the Capsule Y data and because of that application PG&E found it was two degrees out of range, which Mr. Severance stated was like 6% out of range for the limiting weld material. He remarked there are data points at 258° and 250.9° and in 2003 PG&E said the data was not credible and would try to invalidate it but PG&E only mentioned this in an appendix. In 2006 Mr. Severance reported PG&E realized it wanted to seek a 37-month extension and stated something akin to "well, wait a minute, maybe it is credible. We want this extension, so we're going to regard it as credible."

Mr. Severance stated PG&E then provided a recalculation such that instead of 32 effective full power years (EFPY) having a mean of around 254°, which is within 6% of the maximum of 270°, PG&E projected that it would be 257° by 35.2 EFPY which Mr. Severance stated runs to approximately 2024, so this represents the difference in the EFPYs and he observed that this is the difference between ending the license at September 2021 versus 2025. Mr. Severance reported the NRC's calculation determined the number that was 258.8°. He commented if one looks at the full change, the range from negative 56° of the unirradiated material, you have a "runway" of 326° with only 11° left before hitting the maximum in November of 2024. Mr. Severance remarked he believes that is this is the plants current status.

Mr. Severance remarked he does not understand Appendix D of the Capsule V report wherein there is a table showing the credibility of the different data sets and PG&E has stated you must have two sets of credible data for each limiting material, but the table shows there are two sets for each limiting material and immediately following the table it is stated "therefore all of our data is not credible" which Mr. Severance commented is completely contrary to what is stated by RG 1.99 and 10 CFR 50 and he stated he does not believe that the regulations were followed in this case as the data cannot be said to be credible, then stated not to be credible, and

[25] Micro-CT is a 3D imaging technique utilizing X-rays to see inside an object, slice by slice. Micro-CT, also called microtomography or micro computed tomography, is similar to hospital CT or "CAT" scan imaging but on a small scale with greatly increased resolution. Samples can be imaged with pixel sizes as small as 100 nanometers and objects can be scanned as large as 200 millimeters in diameter.

then stated to be credible again. He observed this situation occurred without the datasets changing and there was what he described as waffling that went on four different times and he observed this raises for him a serious concern about how PG&E reached its conclusions at various points in time.

Mr. Severance cited a document he stated was the NRC's approval in 2006 of the 37-month extension that allowed Unit 1 to run until 2024 and he commented this document states that the request to recover the testing time for DCPP Unit 1 amends the projected withdrawal for Capsule B to approximately 20.7 EFPY, when the capsule is projected to achieve a neutron fluence of 2.9×10^{19}. Therefore, he stated the approval of the 37-month extension recognized the neutron fluence complies with the criteria for a four capsule withdrawal program. Mr. Severance remarked this supports his belief that PG&E was supposed to remove Capsule B in 2009 but it did not do so. He observed PG&E asked for an extension to defer removal of Capsule B until 2010 and then did so again in 2012 and the NRC allowed PG&E to do this on the basis of the table he referenced.

At this point Mr. Rathie remarked Mr. Severance's comments had taken the full ten minute time limit set aside for his comments. Mr. Rathie remarked in response to Mr. Severance's assertion that the Committee had denied him the ability to use PowerPoints during his comments that this was untrue and the Committee policy is to allow the use of visual materials by members of the public with the caveat that those materials do not negatively affect the computer the Committee uses for its public meetings. The Chair suggested that Mr. Severance submit his remaining remarks to the Committee in writing. Mr. Severance replied that in many ways he believes Dr. Kirk's report has dismissed his concerns and he hopes to have an opportunity to further discuss his concerns with Dr. Kirk.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis stated the DCISC has been in the past very generous in its practice of letting members of the public speak at length and she asked why in this situation Mr. Severance was not being allowed to continue to speak. Drs. Peterson and Lam stated they were persuaded by Ms. Lewis' comment and Mr. Severance was invited to continued addressing remarks to the Committee.

Mr. Severance continued his remarks and commented that he has dedicated a great deal of time to his research and has analyzed approximately 4,000 pages of NRC documents and believes he can provide real value to the DCISC and Dr, Kirk. Mr. Severance commented he finds much of what Dr. Kirk has written is accurate and correct and he has an affection for things being correct. He commented he believes that Unit 2 is fine and he questions why an investment should be made of $1.4 billion in two reactors for five years when one reactor could be run for ten years for one-half this amount. Mr. Severance stated he looks at this issue from not just a safety standpoint, but also from the viewpoint of financial risk to both the state and the ratepayers. He confirmed he realizes that the Committee somewhat divorces itself from financial concerns but he does not believe continuing to operate Unit 1 is "a good bet" and Mr. Severance said he differs with Mothers for Peace and he is not an anti-nuclear person and believes if he were to sit down with Dr. Kirk all of his concerns and what he sees as anomalies could be addressed.

Mr. Severance addressed what he described as his next issue, that being the comparison of Table T6 in Part 2 of Dr. Kirk's report with its references to the credibility analysis of all the different capsules and Mr. Severance stated for some reason the results of Table T6 are exactly opposite to Table T2, Capsule B report, appendix D, HD 5, and he does not understand why, as the data addresses credibility and he remarked one analysis says Capsule S is not good for the limiting material, the other analysis says, no, it's Capsule Y and B, or you know, they're opposite. He stated this needs to be investigated.

Mr. Severance stated he began looking at the USE value and he remarked at the very beginning of the Capsule Y report it says the USE is predicted to be 66 foot pound and ten years and later the reports say USE is 66 foot pounds. Mr. Severance stated if one looks at the tables in the appendix of the Capsule D report, Table C1 in Appendix C states Capsule Y USE was only 60 foot pounds and he questions the inconsistency in how those data is reported and if those data are used graphically whether the scatter and the credibility determination might be different and he commented different data reported in supposedly the same dataset may explain some of the issues he has with credibility. **Dr. Peterson remarked if there are different reports for the same samples that have different numbers then it is important for the Committee to determine which number is correct and to use that number.** Mr. Severance commented he has theories for this including that it may be due to the application of the new "CV graph"[26] to the best fit curve approach and this was reactively done on the report from ten years earlier. Mr. Severance questions if one is fitting the best fit curve and has a critical data point on a limiting material, is the curve allowed to push the datapoint or must it stay close to things that are known?

Dr. Kirk inquired if Mr. Severance said Capsule D had an upper shelf energy of 66 foot pounds and Mr. Severance confirmed this was his statement based on the text in the introduction. Dr. Kirk observed the only way to resolve Mr. Severance's many questions would be to sit down and go through them line by line, but Dr. Kirk stated in this particular case he believes what Mr. Severance is doing, as the data from each capsule does not change, is Mr. Severance is reading the predicted values and he reported those can change based on the data that you use in the prediction and based on the credibility criteria some data are in and some are out, so the predicted values can change.

Mr. Severance asked if Dr. Kirk feels that the micro CT procedure, reconstituting and machining down as opposed to welding, is a credible procedure. Dr. Kirk stated reconstitution was extensively studied in the late 1990s and in the early 2000s there were extensive inter-laboratory studies done on how the tabs should be attached and what the weld input should be so as to prevent any changes in the properties and this has been codified in ASTM standard E-1253, so there should be no concern if that ASTM standard is followed to reconstitute the Capsule S inserts. Mr. Severance stated he would like to read the ASME standard and he inquired if there is an advantage to doing the micro CT with more samples such that the standard deviation is reduced because more trials are performed. Dr. Kirk replied that is not a simple question and if you reconstitute the samples and test them as Charpy samples then everything fits into the existing regulatory framework and you get another T41joule value and another USE value and

[26] CV curves are curves controlled by control vertices (CVs). The CVs don't lie on the curve. They define a control lattice that encloses the curve. Each CV has a weight that you can adjust to change the curve.

carry on with the standard analysis. Dr. Kirk remarked if many micro CT tests are performed there is regulatory precedent for that, but there's not an approved process. Dr. Peterson remarked a key element would be the challenges in comparing the data from the micro CTs to the data from the Charpy samples but if one could reconstitute and get additional Charpy data using these methods then that would be something that could be directly compared. Dr. Kirk replied that this is an option and there are advantages, but from his perspective if he were asked if it would be better to test samples as reconstituted Charpy samples or to test them as micro CT samples this would be a difficult determination.

Mr. Severance inquired if the Committee would consider testing the samples or the fragments of samples that are remaining from prior testing. **Dr. Peterson replied the Committee would be able to develop some recommendations and he believes at this point he has a good understanding of the basic areas of concerns that Mr. Severance is raising and he does not believe it to be possible to cover all of them in the context of this public meeting and a different process will need to be developed to try to make that happen**.

Mr. Severance thanked the Committee for allowing him the extra time to speak as he has dedicated thousands of hours to his inquiries and he cares about the community, the ratepayers and the taxpayers and he believes the prudent decision would be to operate Unit 2 for ten years and he stated he would now step aside and let someone else speak.

Mr. John Geesman representing the Alliance for Nuclear Responsibility was recognized. Mr. Geesman remarked the embrittlement issue is one in which his client has no particular expertise or chooses to engage, as the Alliance for Nuclear Responsibility focuses its efforts on the concerns of state agencies and this issue will be resolved by the NRC. He observed the DCISC is a creature of state government and state law and to his knowledge no state agency is pressing the Committee to rush into a decision or a recommendation on the topic of the embrittlement of Unit 1. Mr. Geesman stated he found Dr. Kirk's presentation to be impressive and stated he believes the DCISC owes Dr. Macdonald the opportunity to present his version and the Committee should protect its credibility and not get in front of the data and therefore should wait for the Capsule B data before making a conclusive recommendation.

Ms. Kathy DePerry, a citizen of San Luis Obispo, was recognized. Ms. DePerry stated Dr. Kirk's report presented theories and projects which are not evidence. Ms. DePerry suggested the DCISC should wait for the capsule to be removed to learn the real data. She commented the DCISC is "all about nuclear power" and wants it to continue and will do whatever it has to do to change the data or the graphs to "make it look right" and it is all theory and speculation. She questioned if the Price-Anderson Act[27] were to be overturned would the citizens get to sue the members of the DCISC personally? She remarked the DCISC is making decisions for people in the community who have been subject to being spewed with radiation and are being asked to pay for an embrittled reactor that should have been shut down a long time ago.

[27] The Price-Anderson Act (PAA) provides a system of financial protection for persons who may be liable and persons who may be injured by a nuclear incident.

Ms. Linda Seeley was recognized. Ms. Seeley stated she is greatly concerned about Capsule B because of Mr. Soenen's presentation that in is prior attempts DCPP was unable to remove it. She remarked DCPP knew ten years ago there were problems removing Capsule B and yet it turned out to be a different problem from what the plant believed it to be. She stated Capsule B appears to be a very important item in terms of extending the life of DCPP as Dr. Kirk has reported numbers could change when Capsule B is removed and tested. She remarked PG&E should not have had issues in 2023 with the tool used to try to remove Capsule B because they knew they were going to try again to do so and a contingency plan should have been in place. Ms. Seeley remarked it is her impression the Committee seems to be giving its approval for the plant to continue to run following expiration of the operating license from the NRC, which she believes expire in November 2024, on what she described as a conditional license. But, she commented that the results of the tests of Capsule B will not be available until 2026 with no assurance the reactor vessel will not have a terrible accident, including taking into account new data about seismic issues which puts the reactors at more risk. She closed her comments by stating she was impressed by Dr. Kirk's presentation but she urged the Committee to follow Mr. Geesman's advice.

Dr. Peterson stated it was helpful to hear from the members of the public and he recommended the Committee consider that Dr. Kirk's report as a very useful compilation of analyses and the report supports the conclusion that the NRC is very likely to conclude the license extension can be approved. **Dr. Peterson also observed however, the DCISC has a basis to collect more data going forward and to see if there is any additional information or anomalies identified from Mr. Severance's work. Dr. Peterson suggested the Committee accept and endorse Dr. Kirk's report and direct ongoing investigation into this open area while continuing to engage Dr. Kirk's services to that end. Dr. Peterson remarked gathering more data will reduce uncertainty and he stated he believes the Committee should recommend that Capsule B be removed and the Committee should evaluate the opportunity to do additional testing and he believes the reconstituted Charpy tests may provide the best comparison. The Committee should then revisit this topic at its June 2024 public meeting.**

Mr. Wardell remarked it is good that NRC regulatory approval appears likely for sixty years of operation, together with Dr. Kirk's confirmation that PG&E has done the correct analyses. However, Mr. Wardell agreed Capsule B will provide more data. Mr. Wardell stated he is not sure about the need for further testing but he believes Capsule B will answer many questions. **Mr. Wardell remarked it would be useful for Dr. Kirk to complete the USE reanalysis as it could provide additional assurance regarding Unit 1 embrittlement.** Mr. Wardell commented that just because a reactor vessel is embrittled it does not mean it is automatically going to fail as other things need to take place in addition to the physical state of the vessel, including cold water injection during high pressure. Mr. Wardell remarked the LTOP System discussed previously during this public meeting is in place to prevent the occurrence of those precursors and Mr. Wardell stated he is comfortable with Unit 1 continuing to operate but he would like to see the results of the testing of Capsule B and a reanalysis of USE.

Dr. Budnitz remarked regarding Ms. Seeley's remarks that she appears to believe there is a possibility that when Capsule B is removed and tested it may be found the Unit 1 reactor

pressure vessel is so embrittled that it should have been shut down previously and must then be immediately shut down. Dr. Budnitz observed and Dr. Kirk agreed that this is a misreading of Dr. Kirk's report as whatever data comes from the testing of Capsule B it would only change the interpretation for twenty years of operation from today and would not call into question the integrity of the vessel as it sits today. **Therefore, Dr. Budnitz stated it is not necessary for the Committee to take a position on an extended operational period of twenty years, but Dr. Budnitz stated that with what he knows today from Dr. Kirk's report the vessel is not going to be in an unacceptable condition for embrittlement within the next few years and it can continue to run for the next few years without a compromise to safety from the PTS phenomenon**. Dr. Budnitz stated he offers this opinion with the caveat that he has not heard Dr. Macdonald's opinion. Dr. Kirk observed that whatever the tests of Capsule B reveal the results will describe the condition of the vessel after it would have operated for one hundred years and Dr. Kirk agreed with Dr. Budnitz interpretation and confirmed the impact of the Capsule B test data when it is available will be very minimal on operation of Unit 1 for forty plus years. Dr. Budnitz observed this data could potentially cast doubt on whether the vessel was good for sixty or eighty years of operation but not likely on whether it is good for five or ten more years.

Dr. Peterson made a motion, seconded by Dr. Budnitz, that the Committee accept and endorse Dr. Kirk's report and continue to perform further work to investigate and identify new information on an ongoing basis. Dr. Lam stated he was not persuaded as to the timing of a Committee endorsement of Dr. Kirks' report because the Committee has yet to hear from Dr. Macdonald and Dr. Hosemann may have some alternative means to bring forward, while Mr. Severance claims he has discovered that there are inconsistencies in the data and Mr. Geesman observed on the lack of state agency involvement and questioned the wisdom of the Committee getting in front of the data. Dr. Budnitz remarked that the concerns are safety-related and there is no need for state agency involvement before the DCISC can investigate and take a position. **Dr. Peterson then amended his motion to state the Committee accepts Dr. Kirk's report and will continue to investigate the topic to gain new information from the sources identified as well as others and then return to this topic at the June 2024 public meeting to consider endorsing Dr. Kirk's report.** Dr. Budnitz stated his second holds on Dr. Peterson's amended motion. Mr. Rathie remarked that the need for further investigation would normally be incorporated into the Open Items List and the Committee would need to provide further direction on Dr. Kirk's engagement. **Dr. Peterson then asked that his motion be tabled until tomorrow for a vote and Mr. Rathie confirmed this was appropriate.**

The Chair expressed the appreciation of the Committee to Mr. Soenen and Dr. Kirk.

XXI ADJOURN EVENING MEETING

Dr. Lam then adjourned the evening meeting of the DCISC at 8:45 p.m.

XXII RECONVENE FOR MORNING MEETING

The September 14, 2023, public meeting of the Diablo Canyon Independent Safety Committee was called to order by its Chair, Dr. Peter Lam at 9:00 a.m. This was the second day of a two-day meeting. Dr. Lam welcomed those persons attending in person and by Zoom Webinar and watching the proceedings on live streaming video. Dr. Budnitz was present and was

attending remotely from his home office in Berkely, California.

XXIII COMMITTEE MEMBER COMMENTS

Dr. Peterson commented the Committee held an important discussion during the evening session yesterday and having tabled the discussion intended to continue the matter later today.

XXIV PUBLIC COMMENTS AND COMMUNICATION

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

Dr. Gene Nelson, senior legal researcher and President of Californians for Green Nuclear Power was recognized. Dr. Nelson read from an email sent earlier this day to the Committee's Office of Legal Counsel concerning Section 4.2 of the PG&E License Renewal Application (LRA) for DCPP from which Dr. Nelson in his message cited the vessel neutron embrittlement analysis and included it as an attachment. Dr. Nelson sated his belief the Committee and the public would benefit from Drs. Kirk and Kadak's analysis and summary of Section 4.2 with a focus on identifying similarities and differences in the embrittlement determinations for Unit 1 and Unit 2. Dr. Nelson commented he believes Section 4.2 while it contains much information does not clearly communicate that information.

Mr. David Weisman representing the Alliance for Nuclear Responsibility was recognized. Mr. Weisman observed that in the DCISC fact finding reports words are used inconsistently in that some conclusions are couched using terms that results of the fact finding investigation appear satisfactory while other conclusions concerning results of the fact finding team's reviews are definitively stated and he commented he wonders whether this practice by the Committee is intentional. Mr. Weisman stated he believes this practice introduces an element of subjectivity into what might otherwise be objective statements as certain areas provide measurable metrics. Drs. Budnitz, Lam and Consultant Wardell responded and confirmed the distinction in the wording is intentional and the choice of words is determined based on the level of confidence by which the Committee makes statements in its reports. Dr. Lam remarked the fact-finding teams have only a finite period of time to review any issue presented by a team of PG&E technical staff and senior managers and Dr. Lam remarked the use of the term "appear" in his fact finding reports indicates to the reader a level of reasonable confidence in the fact finding team's conclusion. Dr. Budnitz commented that even with measurable and observable metrics, there is a possibility of error and in some cases the Committee's conclusions depend upon the nature and significance of the uncertainties imbedded in the metrics. Consultant Wardell confirmed the use of specific conclusory language in fact finding reports is intentional based upon these reports having been written by engineers and their subsequent review for technical accuracy.

XXV INFORMATION ITEMS BEFORE THE COMMITTEE (Cont'd.)

The Chair introduced and requested Mr. Blair Jones, DCPP Director of Strategy, Policy, Organizational Effectiveness and Chief of Staff to the Chief Nuclear Officer, to introduce the second of the PG&E informational presentations for this public meeting. Mr. Jones introduced DCPP Senior Director and DCPP Station Director Mr. Dennis Petersen. Mr. Jones reported Mr. Petersen holds a Bachelor of Science Degree in aeronautical engineering from California Polytechnic University at San Luis Obispo (Cal Poly) and has been employed at DCPP for more than 35 years. Mr. Petersen has previously held various leadership positions as Director of Operations Services, Director of Nuclear Work Management, Director of Learning Services, Director of Quality Verification and as an outage manager. Mr. Petersen spent the earlier part of his career in Operations and held a Senior Reactor Operator License.

Presentation on the State of the Plant including Key Events, Highlights, Maintenance Outage 1X25, Organizational Changes, and Other Station Activities since the DCISC's September 2023 Public Meeting.

Mr. Petersen remarked he no longer holds a license as a senior reactor operator and this would be his final presentation to the Committee as he will be retiring soon and his successor will be Mr. Justin Rogers. Mr. Petersen stated in his presentation he would provide a brief overview and update on station activity. He reported both DCPP units are currently operating at 100% power with all probabilistic risk assessment indicators and NRC Performance Indicators currently in Green status.[28] He reviewed recently completed activities during late 2023 and 2024 including:

- Power reduced on both units to 50% due to Pacific Ocean high energy swell, cleaning (i.e., pick and dredge) and condenser backwash on December 28-29;
- Completion of Unit 1 1R24 refueling outage critique on January 16;
- Completion of Unit 2 2R24 refueling outage readiness review on January 17;
- Completion of company-wide Safety Week focusing on use of human performance tools during January 22-26;
- Completion of management-vendor meeting for 2R24 on January 29; and
- Completion of the NRC Cyber Security Program Inspection on January 29-February 1.

In response to Consultant Kadak's inquiry Mr. Petersen reported the Pacific Ocean swells in late December were approaching 15 to 20 feet and long period swells of between 15 and 20 seconds from storm activity in the Gulf of Alaska generate considerable energy.

Mr. Petersen provided an update on emergency diesel generator (EDG) maintenance conducted during the first quarter of 2024 and reported DCPP has completed maintenance on EDG 2-3, maintenance is in progress and includes major inspections for EDG 2-1, and maintenance is scheduled for EDG 2-2.

[28] A probabilistic risk assessment of Green means there is no equipment out of service or some other compromise to safety that would make the relative risk higher than the probabilistic risk assessment baseline for normal operation and maintenance activity and accordingly trigger a classification, in descending order, of White, Yellow or Red.

Mr. Petersen reported San Luis Obispo County issued a tornado warning for the region on February 7, 2024, and DCPP entered its severe weather procedures. He reported the plant is designed and licensed to withstand external hazards including tornados and the effect of significant wind loading on buildings such that if necessary the plant can be safely shut down. He commented DCPP has operating procedures and emergency plans in place, including conducting walkdowns and securing loose materials and additional recovery equipment is in place and prepared if needed to respond to excessive wind and tornado conditions. He confirmed in response to Dr. Kadak's query that the plant is designed to withstand tornado missiles as well as severe wind.

Mr. Petersen reported that following 1R24 Unit 1 was shut down to address a small leak on a pressurizer safety valve and the valve was changed out and sent to the vendor for a forensic analysis as to why the leak occurred. He reported Unit 2 stayed near full power for 2023 except for a tunnel cleaning in November and in December. In response to Dr. Peterson's inquiry Mr. Petersen confirmed that prior to 1R24 there was a drop in power generation to keep the reactor parameters within specifications as he explained that with fuel planning if the unit is not taken offline during an operational cycle, it begins to run low on fuel by the end of the operational cycle and this can result in reducing load until the unit is shut down for a refueling outage. In response to Dr. Budnitz' inquiry Mr. Petersen replied that in almost all cases the power reductions were planned, and typically those that are unplanned are related to Pacific Ocean swell conditions. Dr. Budnitz commented unplanned shutdowns can often result in the start of an accident condition and can result from failure of a component. Mr. Peterson confirmed a reduction in power for Unit 2 in March 2023 was due to a break in a saltwater line at the Intake Structure which could have damaged a bearing for a circulating water pump and the power reduction was not planned. He remarked that INPO defines a planned outage as one planned 28 days in advance or more and he commented there is an exception for power reductions requested by the State of California grid operator which are also considered to be planned. Dr. Budnitz commented that prior to the accident to the Three Miles Island Nuclear Power Plant in Pennsylvania in 1978 the U.S. reactor fleet typically experienced approximately 1,000 unplanned outages each year and by year 2000 that number dropped to approximately 300 and today the entire fleet of 93 nuclear units experiences less than 100 unplanned outages each year.

In response to Consultant Wardell's inquiry Mr. Petersen replied that overall capacity factor data includes refueling outages.

Mr. Petersen reviewed certain of the activities which will take place during the remainder of 2024 as follows:

- Nuclear Safety Oversight Committee (NSOC) visits on February 26-29 and June 24-27;
- NRC License Renewal Inspections (2R24) – April 8-26;
- NRC Inservice Inspection (2R24) April 8-19;
- NRC Radiation Protection Inspection – April 15-19
- NRC License Renewal Inspection – June 17-21; and
- NRC Age-Related Degradation Inspection – June 10-28

Dr. Gene Nelson of Californians for Green Nuclear Power was recognized. He observed Mr. Petersen's presentation showed a very high quality of operation and he congratulated Mr. Petersen on his retirement.

Mr. Bruce Severance was recognized. Mr. Severance stated he appreciated PG&E's staff for the coordination, effort and good work it takes to keep DCPP operating and commented he found the plant to be extraordinarily impressive when he visited in person.

Dr. Lam thanked Mr. Petersen for his presentation.

Mr. Jones then introduced the Director of Outage Management at DCPP Mr. Erik Werner and reported Mr. Werner has more than 20 years' experience in nuclear plant engineering including in the Engineering, Operations, Training, Decommissioning Planning and Outage Management organizations. Mr. Werner has been employed at DCPP for 18 years as a licensed senior reactor operator and holds a Bachelor of Science Degree from Cal Poly at San Luis Obispo.

Refueling Outage 1R24 Results (Including Initial License Renewal Inspection Results) and Preparation for Refueling Outage 2R24.

Mr. Werner stated in his presentation he would summarize performance during refueling outage 1R24, including license renewal inspection results, outage 1X25, and the preparations for 2R24. He summarized the outcome of 1R24 which he stated was planned as a 50-day duration outage including high level license renewal inspections that required outage conditions to perform. During 1R24 approximately 1,000 temporary workers were engaged. DCPP met the majority of the goals set, but experienced challenges in meeting the dose and reliability goals. In response to Consultant McWhorter's question concerning the dose goal Mr. Werner reported going over the goal set was due to the work on the pressurizer valve as well as the large scope of the outage with more work activities which resulted in more items being discovered on the primary side[29] of the plant to be address in the outage. In response to Consultant Kadak's question Mr. Werner reported the 45 days required for 1R24 was approximately 10 days longer than recent outages, but not all the additional time was related to license renewal activities as the license renewal inspections were not all on the outage critical path and the few that were did not represent principal drivers of the extended time. He reported some items in the outage scope focused on plant reliability and long-term operation were on the secondary side in the Turbine Building.

Mr. Werner reported valve maintenance and containment fan cooler unit motor overhauls were main focuses of 1R24 on the primary side while on the secondary side high pressure Main Turbine inspection and valve maintenance were principal items. The 4kV and 480V vital electrical bus maintenance work was also completed as was the license renewal inspection of the Refueling Water Storage Tank. For the 1R24 project scope, the Intake Structure travelling screen frames were related to license renewal.

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[29] Primary and secondary side refer, respectively, to the Reactor Coolant System which is used to remove heat from the nuclear reactor and to the Main Steam and Feedwater Systems which provide cooling to the steam generators and generate and provide steam to the turbines.

Mr. Werner reported outage 1X25 was a planned Mode 5[30] outage which took place in December 2023 to replace Pressurizer Safety Valve 8010B. He reported during 1X25 all goals were met for safety, human performance, outage duration, dose goal and reliability.

Mr. Werner gave a preview of refueling outage 2R24 which is scheduled for the spring of 2024. The outage is planned to take 50 days and will be very similar in scope to 1R24, encompassing scope for license renewal required inspections, planned maintenance and other refueling activities. Again, approximately 1,000 temporary workers will be engaged for 2R24 as was the case during 1R24. He reviewed the 2R24 outage goals which he commented were similar to those set for 1R24 and reported final goals will be established just prior to the start of the outage. He reported the dose goal for 2R24 is less than it was for 1R24 which he attributed to lessons learned in 1R24 and also a slight difference in the work on the primary side during 2R24. Mr. Werner observed a big contributor to lower dose goal for 2R24 is the plant will not be doing eddy current testing of the Steam Generators which he remarked was a fairly significant dose contributor during 1R24. Consultant McWhorter observed and Mr. Werner agreed Unit 2 also has a lower source term.[31] Dr. Budnitz observed the outage dose goal is established in person rem and there is a different dose goal for each person which at DCPP has never been exceeded. **Dr. Budnitz suggested that a category be added to dose goal for "individual dose goal" that represents the amount of radiation received that no person should exceed**. Dr. Peterson observed exceeding an individual dose goal represents a safety issue and does not really fit within one of the outage goal specific categories. Mr. Werner commented he appreciated and would take Dr. Budnitz' observation and suggestion into consideration and he reported radiation permits for entry into radiological controlled areas (RCAs) have appropriate dose limits which are well under the federal standards and also under the administrative levels set by the plant. In no case has any individual come close to any threshold, administrative or federal for dose exposure. He reported DCPP uses the As Low As Reasonably Achievable (ALARA) principles to challenge work practices to achieve the lowest dose for any work activity.

Mr. Werner reported the scope of 2R24 will include large motor overhauls on the primary side, valve inspection and maintenance on the secondary side, electrical 4kV and 480V Bus G maintenance, license renewal inspection of Unit 2's Refueling Water Storage Tank., and replacement of traveling screen frames at the Intake Structure. In response to Dr. Kadak' question Mr. Werner reported dredging of the Intake Cove will take place as a daily activity and is not part of the refueling outage. In response to Consultant Wardell's query Mr. Werner reported in 1R24 the majority of license renewal inspections were completed and 2R24 should have the same result, however, work on projects for long-term reliability has just begun and project work will be incorporated into future outages and may drive those outages to durations of more than 30 days. In response to Consultant Wardell's question Mr. Werner reported the focus of the project component of work during outages is to assure DCPP's ability with both units to support continued operation and reliable electrical generation for the state. In response to

[30] There are six Westinghouse PWR operation Modes: Mode 1 - power operation, Mode 2 - startup, Mode 3 - hot standby, Mode 4 - hot shutdown, Mode 5 - cold shutdown, and Mode 6 - refueling.

[31] Source term refers to the types, quantities, and chemical forms of the radionuclides that encompass the source of potential for exposure to radioactivity.

Consultant Kadak's inquiry Mr. Werner reported PG&E began planning in September 2022 after approval of SB846 and while there is no guarantee of operations beyond 2030 the decision-making model and long-range planning takes into consideration the possibility of operations proceeding past 2030 and having maintenance plans and projects in place. In response to Dr. Kadak's follow up questions Mr. Werner stated there are no deferred maintenance activities to be addressed as the frequencies for preventative maintenance remained on schedule during the period between 2016 and 2022 when the plant was expected to cease operation by 2025.

Ms. Sherry Lewis of Mothers for Peace was recognized. Ms. Lewis inquired as to how much an average temporary outage worker makes in wages for an outage and she also commented that the point of SB846 addressing five years of extended operation was a recognition that continued nuclear generation is only a stopgap. Mr. Jones and Dr. Lam responded and directed Ms. Lewis to make her inquiry concerning wage for the temporary workforce in the CPUC's general rate case proceedings. Mr. Jones remarked SB846 directed PG&E to do everything necessary for continued operation through 2030 and any operation beyond that date would need to have new legislative authority. He reported it is incumbent on PG&E now to ensure it meets the state's direction and to allow the state the opportunity to continue to bring other sources of clean energy to replace DCPP.

Dr. Gene Nelson of Californians for Green Nuclear Power was recognized and he reported as a temporary outage worker at DCPP in 2007 he received $26.00 per hour plus some fringe benefits. He reported the California Senate Committee on Energy, Utilities and Communication held a hearing recently during which Dr. Nelson testified and he has offered to speak at the California Assembly's Utilities and Energy Committee meeting on the issue of economical and reliable power.

Mr. John Geesman representing the Alliance for Nuclear Responsibility was recognized. Mr. Geesman commented in CPUC Decision 23-12-036 issued to extend the retirement dates for DCPP the CPUC Commissioners made findings and conclusions of law that the Commission lacked the evidentiary basis to make a finding that the extension of DCPP would be cost-effective, prudent, or reasonable. He reported PG&E is directed to file by March 29, 2024, a complete and transparent forecast for Commission approval of the costs that it expect to charge ratepayers. He observed that cost is still very much in play and in last year's proceeding PG&E revised its cost forecast upward by approximately 54% during the course of the proceeding.

The Chair thanked Mr. Werner for his presentation and the members of the public for their comments.

The Committee then took up their discussion of the Report on Unit 1 reactor pressure vessel integrity prepared by Dr. Mark Kirk. Dr. Lam asked for comments from the Committee's legal counsel.

Assistant Legal Counsel Rathie observed Dr. Kirk's Report was prepared at the behest of the Committee and has been reviewed individually by the Members of the DCISC and their comments have been received and the Report has been on the Committee's website for members of the public to review. Mr. Rathie stated it was his view it would now be appropriate for the

Committee to accept the Report, that is, to receive the report with consent and in that context the ratepayers and citizens of California at this time deserve to hear from the Committee on the endorsement of the report's conclusions. Mr. Rathie observed that this would not represent the conclusion of the Committee's review of this matter as the review will continue, including considering input from Mr. Severance, Dr. Macdonald, Professor Hosemann and possibly others as well as the data from Capsule B when it is withdrawn and tested. He observed as the report would then be a part of the 34th Annual Report the Committee would have the opportunity to draw its own specific conclusions in its approval of the Annual Report. He stated his recommendation was for the Committee to accept the Report and endorse its conclusions and direct the Technical Consultants to draft an open item for issues to be followed, recognizing there is an opportunity for further consideration and conclusion based on information which may be received between now and the approval of the Annual Report .

Dr. Peterson stated he concurred with the approach described by Mr. Rathie and it is important to discuss the upcoming activities to be pursued through the Open Items List. Dr. Peterson commented he found Dr. Kirks' presentation, along with his review of the report, to be very helpful in allowing a better understanding of the set of issue associated with vessel embrittlement and the use of the samples placed in the capsules in the reactor and in the sister reactor in order to quantify the temperature at which the material transitions from being ductile to brittle which he described as probably the most important parameter in terms of an analysis of pressurized thermal shock. Dr. Peterson stated he agrees with the conclusions in the Report and is prepared to endorse them provided the Committee has an open item to continue its review and to collect additional information. Dr. Peterson observed the history of what was done previously is largely superseded and the Committee's focus now needs to be on the current conclusions reached in Dr. Kirks' Report and anything that might cause the Committee to modify those conclusions. He commented Dr. Kirk's conclusions are based on data that with inclusion of sister plant data covers a greater than sixty year period for the limiting weld material and one can interpolate that there is significant margin based on the analyses and screening criteria that one can conclude the plant is currently safe and is likely to be safe at least for the next five years of operation. **Dr. Peterson stated he believes input should be received from the external stakeholders, in particular Mr. Severance and Dr. Macdonald as an open item and Dr. Kirk should be requested to identify an approach to obtain this data and this would be one of the open items to be reviewed at the June 2024 public meeting**.

Dr. Peterson stated he also considered, in terms of a potential recommendation, whether the Committee should recommend additional testing on the existing materials removed from the capsules and Dr. Peterson stated he has concluded there is probably not sufficient value in doing additional testing. He stated he has concluded it is quite important that Capsule B be extracted during the upcoming refueling outage and its data analyzed and added to the existing database. Dr. Peterson stated his belief it would be very valuable to have Dr. Kirk perform an analysis that would assume a range of data from that test and to determine the likelihood that the results would change the current conclusions.

Dr. Lam stated he was not persuaded that the Committee should endorse the Report. He remarked he believes it is appropriate for the Committee to accept the report and defer consideration of endorsing the report until receipt of additional information from Dr. Macdonald

and Professor Hosemann and upon the receipt of the data from Capsule B and a final review from Mr. Severance. Dr. Lam stated he is hesitant to endorse the Report in case Capsule B's results turn out to be a surprise and he speculated that the conclusions in the Report will require adjustment. He stated his view that the Committee should accept the Report as is and consider endorsing it when more information is received.

Dr. Budnitz observed it appears the Committee is divided and he was prepared to offer two [substitute] motions [to Dr. Peterson's motion of last evening], the first motion being to accept Dr. Kirk's Report, and a second motion to endorse the conclusions in the Report. He then moved that the DCISC accept Dr. Kirk's report and received a second to his motion by Dr. Peterson.

Ms. Sherry Lewis was recognized and commented she believes accepting the report is appropriate and although she has not read Dr. Macdonald's report it is her understanding Dr. Macdonald has several objections to certain parts of Dr. Kirk's Report.

Dr. Gene Nelson of Californians for Green Nuclear Power indicated his support for accepting the Report.

Mr. Bruce Severance stated he completely supports accepting the Report and he has had amicable discussion with Dr. Kirk and Dr. Kirk seems to him to be extremely knowledgeable and open to collaboration. He stated he has read Dr. Macdonald's report and he believes it is approximately 90% complete and in it Dr. Macdonald found many concerns Mr. Severance has not previously investigated which point to possible errors on inputs and as he has indicated, misstatements concerning the historical record. Mr. Severance stated he is willing to travel to New Hampshire where Dr. Kirk resides and work with him on refining possible misstatements of historic fact in the same manner as PG&E was allowed to have that opportunity which Mr. Severance believes appears extremely biased. Mr. Severance stated he would like the Report to be endorsed when there has been an opportunity to get Dr. Macdonald's comments and he does not believe the Committee should rush its endorsement.

The Committee Members then unanimously approved accepting Dr. Kirk's Report.

The Committee then took up consideration of endorsing the conclusions as stated on pages three through five of Part 2 of Dr. Kirks' Report.

Dr. Lam suggested relative to the motion of endorsement suggested earlier by Dr. Budnitz the addition of a sentence be added to the motion qualifying that the endorsement is made before the Committee received comments from Professor Macdonald, from Professor Hosemann and from Mr. Severance.

Dr. Peterson referred to the work the Committee will be undertaking in accordance with the Open Items List and he stated it is quite important to reach a conclusion on what the Committee will request of Dr. Kirk in terms of taking input from key external stakeholders, those persons being Dr. Macdonald and Mr. Severance and possibly Professor Hosemann. Dr. Peterson observed the question to be addressed is the current state of embrittlement and he observed Dr.

Kirk's Report leads to the conclusion that the current state is within regulatory limits and the plant is therefore safe to operate. Dr. Peterson remarked he does not believe the history around regulatory compliance and previous positions are relevant to the Committee's inquiry as to the current state of embrittlement. Dr. Peterson observed the data from Capsule B will not be available in June 2024 and he suggested the Committee can consider a recommendation that PG&E should remove Capsule B during the upcoming refueling outage and extend the outage if necessary to do so.

Dr. Lam stated he fully concurs with Dr. Peterson's comments and he believes the plant fully complies with NRC regulations regarding PTS. But Dr. Lam believes the issue concerns the Committee's engagement of Dr. Kirk to address public concerns expressed to the Committee and he sees this as different than an assessment of the compliance with NRC regulations and it is incumbent upon the Committee to listen to Dr. Macdonald, Professor Hosemann and Mr. Severance and to see the results of Capsule B as this is a different matter than considering the condition of the facility.

Dr. Peterson remarked that in this case the regulations have both a screening criteria and a method for evaluating data built in and it is his assessment that achieving regulatory compliance means the plant is safe to operate due to the conservatisms and methods used and therefore the key question becomes a question of current regulatory compliance and it is incumbent on the Committee to review whether there may be data in Dr. Kirk's Report which is inaccurate. Dr. Peterson emphasized his view that the historical record from the period when less data was available is not relevant to this key question.

Consultant Kadak agreed that public comment is very important and he observed Dr. Kirk's Report has been available on the Committee's website now for one month. The Committee has had the opportunity to review Dr. Macdonald's Declaration and address comments in that document and to read and review Mr. Severance's numerous emails, comments and reports and all the above are reflected in Dr. Kirk's Report. Data from the Report has been supplied and verified by PG&E and Westinghouse. Dr. Kadak commented to date there has been no evidence or information presented of any errors in Dr. Kirk's Report. Nothing will be known concerning the data from Capsule B for several years and Dr. Kadak stated he did not believe the Committee should wait that long to make a statement that the plant is safe to operate with regards to embrittlement. When data is available for Capsule B it can be assessed and appropriate modification made should they disprove the assertion that the plant is safe to operate for sixty years. Dr. Kadak observed the data from Capsule B will indicate the condition of the vessel at eighty years of operation not sixty. Dr. Kadak closed his remarks by stating making an endorsement subject to additional studies and findings would be appropriate at this time and any updates in the future can reflect the outcome of any discussion between Dr. Kirk, Mr. Severance and Dr. Macdonald.

Dr. Budnitz stated that in his long career whenever he has made a technical evaluation it is never final in that as new information is received it is assessed and evaluated against the previous conclusions, actions or even recommendations to determine if these were or were not appropriate based on the new information. Dr. Budnitz stated he has studied and evaluated the information received from Mr. Severance and the document submitted by Dr. Macdonald to the

NRC docket and he remarked he has looked at those documents and the information in light of Dr. Kirk's Report and in light of his own separate evaluation of Dr. Kirk's Report and the history of previous inquiry into the matter which goes back to the 1980s. Dr. Budnitz stated he has come to a conclusion that supported offering a motion which he then made that the Committee endorse the conclusions of pages 3, 4 and 5 of Part 2 of Dr. Kirk's Report and that the Committee should do all it can to hear and evaluate any other input it may receive between now and the June 20-21, 2024 public meeting and then revisit the endorsement at the June meeting.

Dr. Peterson commented that given a contingent endorsement it would be better to defer a decision on making an endorsement to the June 2024 public meeting and in the meantime focus on seeking additional information that could cause conclusions as to the current state of the plant and its future safety to change in the interim and return to the matter at the June public meeting.

Dr. Budnitz remarked if one accepts Dr. Kirk's conclusions concerning the embrittlement phenomenon the plant is certainly safe to run for several years and based on his reading of Mr. Severance and Dr. Macdonald's reports Dr. Budnitz has concluded the plant is certainly safe to operate for the next five years and Dr. Budnitz stated his opinion that it is important for the Committee to say that now. He remarked that last night a member of the public stated she concluded from Dr. Kirk's remarks that this was not so and the plant could be in immediate danger and Dr. Budnitz remarked in his view it is important that the members of the public understand that there is nothing he has seen that would challenge the conclusion the plant is safe to run for the next few years relative to the phenomenon of pressurized thermal shock. Dr. Budnitz further stated his view that he does not believe the data from Capsule B would change that conclusion and he believes the Committee owes it to the public to go on the record now and state its belief that Dr. Kirk's conclusions are correct while remaining open to new information.

Dr. Peterson remarked that any endorsement at this time will be contingent upon additional input between now and June and in his view, given the ambiguity, it is not necessary for the Committee to now adopt the motion suggested by Dr. Budnitz. Dr. Budnitz commented he can accept Dr. Peterson's position provided that the public has now heard from him and infers that the Committee agrees with him on the safety of the plant for the next few years. Dr. Lam stated that he believes the plant is certainly safe to continue operating until June and a timely motion for endorsement should be made in June. Dr. Peterson observed Dr. Budnitz' motion will not more forward, however, the Committee is committed to return to the issue in June. Dr. Budnitz then withdrew his motion which was not seconded.

In response to Dr. Peterson's request Dr. Kirk stated that he is not available to attend the June 20-21, 2024, public meeting either in person or remotely. At Dr. Peterson's request Dr. Kadak confirmed he believes he will be available to attend the June meeting and he reviewed the Committee's "asks" with respect to Dr. Kirk's report, those being: to receive from Mr. Severance and Dr. Macdonald their assessment of what is wrong with Dr. Kirk's analysis; determine if there is data that is incorrect or that was incorrectly provided by DCPP; to understand relative to Capsule B the prior attempts made to remove it and to investigate the plans for how the plant is planning on removing Capsule B during the next refueling outage and all identified options. **Dr. Kadak also stated he recommends that the Committee investigate the contents of Capsule A to determine if it contains the weld material and the fluence level as to whether that**

information would provide information on the condition of the Unit 1 reactor pressure vessel for between forty and sixty years of operation. He remarked that although the Committee may not have all that data between now and June it is hoped that both Dr. Macdonald and Mr. Severance will provide their assessments. Dr. Lam added and perhaps Professor Hosemann. **Dr. Peterson remarked this will give time for additional comments to be submitted but those comments must be focused on what might change the conclusions of Dr. Kirk's report and not on other matters.** Dr. Budnitz commented the review of the License Renewal Application also provides a parallel activity as the document contains information on embrittlement and the NRC staff may pose questions to PG&E. Dr. Kadak raised the issue of continuing the matter until the October 2024 public meeting and Dr. Peterson replied that a decision need not be taken now as to whether to schedule this matter for the June or the October 2024 public meeting and it would be prudent to preserve flexibility in the matter of scheduling based on what is learned.

In response to the Chair's inquiry, Mr. Rathie stated that as public comment on this matter was received the previous evening, the state's Bagley-Keene Open Meeting Act does not require another opportunity for public comment on the matter.

The Chair then asked Mr. Blair Jones to introduce the next speaker. Mr. Jones then introduced the DCPP Director of Risk and Compliance Mr. Jordan Tyman to make the next presentation concerning the NRC's assessment of plant performance. Mr. Jones reported Mr. Tyman is responsible for oversight of the Risk Management Program, also known as Regulatory Services and Emergency Planning. Mr. Jones reported Mr. Tyman has been employed by PG&E for more than seven years and spent ten years prior to coming to PG&E at Westinghouse Electric Corporation in support of a number of its subsidiaries. Mr. Tyman holds a Degree in Mechanical Engineering from the University of Massachusetts.

Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC Inspection Reports, NRC Current Issues, and Current and Future License Amendment Requests.

Mr. Tyman commented in his presentation he would include the status of NRC oversight of DCPP from September 2023 to February 2024. Mr. Tyman stated the period covered by his report includes approximately 2,000 hours of NRC inspection time including by the two on site resident inspectors who live and work in the local community and Mr. Tyman described this independent oversight by the NRC and the DCISC as critical to DCPP's success in continuing to provide reliable power. During this period there were five routine programmatic NRC inspections. All violations received since September 2023 were of very low safety significance and DCPP has continued to meet the requirements to remain in Column 1 of the NRC's Reactor Oversight Process (ROPs) Action Matrix. All sixteen NRC Performance Indicators assessed monthly are within Green[32] parameters.

Concerning the violations received Mr. Tyman reported they fell within three categories

[32] The safety significance characterizations used for the Performance Indicators as either Green (very low), White (low to moderate) Yellow (substantial) or Red (high). A Green non-cited violation indicates very low safety significance, with no impact to public health and safety.

which he identified and discussed as follows:

➢ Procedure use and adherence - Mr. Tyman described this as centering around opportunities for continuous learning with respect to level of detail to be incorporated in certain of the 9,000 procedures guiding work at DCPP;

➢ Opportunities to have more level of detail - Mr. Tyman provided as an example the heat sink (the Pacific Ocean) upper temperature allowed per Technical Specifications, but which exact temperature was not included in procedures; and

➢ Enhance compliance controls - Mr. Tyman remarked within procedures there are opportunities to implement or incorporate controls as proactive preventative measures to add defense-in-depth and gave as an example the use of signage or human performance tools.

In response to Dr. Lam's question Mr. Tyman reported DCPP received eight low level violations between September 2023 and February 2024.

Mr. Tyman stated there was one licensee event report (LER) submitted by DCPP since the last public meeting of the DCISC in September 2023. LER 2023-001-00 was submitted on November 27, 2023, for a Unit 1 shut down in accordance with plant procedures during a preplanned outage while the unit was at approximately 11% power due to increasing water level in a non-safety related feedwater heater. In response to Consultant McWhorter's query Mr. Tyman reports a LER was required due to the manual trip.

Mr. Tyman reported on upcoming NRC inspections as follows:

➢ Cyber Security Inspection – on-site inspection activities completed in early February.
➢ 2R24 Inservice Inspection – April 2024 (Unit 2 outage).
➢ 2R24 Radiation Protection Inspection – April 2024 (Unit 2 outage).
➢ License Renewal Inspections – April 2024 (Unit 2 outage).

In response to Dr. Lam's request Mr. Tyman described the Cyber Security Inspection as being very intense including a vertical slice of all programmatic aspects, technical controls and protection and preventative measures required under the NRC cyber security framework. The inspection generally lasts for one week and includes numerous requests for information. Dr. Peterson remarked while the DCISC has been briefed on cyber security the Committee recognizes DCPP cannot share certain security-related information and the DCISC focuses its attention on the interface and alignment between security and operational safety.

Mr. Tyman reported a License Amendment Request (LAR) was requested and issued for revision of Technical Specification 3.7.8 for the Auxiliary Saltwater (ASW) System to permit on a one-time basis an additional 72 hours for replacement of ASW Pump 2-2 motor. Mr. Tyman reported DCPP has ongoing LARs for Risk-Informed Technical Specification Completion Times, pending since July 2023; 10 CFR 50.69 Risk-Informed Categorization of Structures, Systems and Components, pending since September 2023; and a for a revision of Technical

Specification 5.6. Pressure Temperature Limits Report, to include additional NRC-approved calculation methodologies for continued operation to be submitted in late February 2024.

Mr. Tyman concluded his presentation with the comment that DCPP continues to remain in the highest NRC regulatory performance categories and uses the Corrective Action Program to drive continuous improvement. The eight violations received were each of very low safety significance. In response to Dr. Lam's query Mr. Tyman reported the NRC evaluates regulatory performance under the Baseline Inspection Program conducted by the on-site resident inspectors, the programmatic inspections conducted throughout the year, and based upon the Performance Indicators.

In response to Consultant Wardell's inquiry concerning plans to implement an Integrated Public Alert and Warning System (IPAWS) Mr. Tyman reported DCPP does not presently use an IPAWS, but it is being evaluated in discussions with San Luis Obispo County and he confirmed Mr. Wardell's observation that implementation of IPAWS would be in addition to not a replacement of the present emergency warning siren system.

The Chair thanked Mr. Tyman for his presentation.

Ms. Brandy Lopez introduced Mr. Blair Jones and reported Mr. Jones is Chief of Staff to the Chief Nuclear Officer and Director of Strategy, Policy and Organizational Effectiveness. She stated Mr. Jones began his career with PG&E in 2009 and previously served as a Senior Manager in Marketing and Communication. Prior to coming to PG&E Mr. Jones worked for President George W. Bush and several members of Congress. Ms. Lopez reported Mr. Jones holds a Bachelor of Arts Degree in Communications from the University of Alabama.

Update on Proposed New Staff Retention Incentive Program in Support of Extended Operations; Results of the 2023 Operating Plan and Key Elements of the 2024 Operating Plan.

Mr. Jones began his presentation with a review of the results of the 2023 Operating Plan and remarked the approval of SB846 in September 2022 directing PG&E to seek to continue operation of DCPP until 2030 made 2023 a pivot year for the organization. He reported a great deal of time in 2023 was devoted to the transition to continued operations including hiring approximately 200 new DCPP employees and completing the 1R24 refueling outage with no safety or performance challenges. Mr. Jones stated that for the third successive year in 2023 DCPP maintained 100% availability during the peak summer electric demand period. He observed that the duration of the peak season continues to grow longer. Mr. Jones reported DCPP completed submittal of its License Renewal Application ahead of schedule and the Application has been found sufficient by the NRC which represented a considerable effort by the DCPP organization. He observed, as Mr. Tyman just reported, DCPP continues to be in Column 1 demonstrating high performance on the NRC's ROP Matrix.

Concerning Operating Plan results in 2023 Mr. Jones reported DCPP achieved 100% on the Reliability and Safety Indicator which he described as a key metric used industry wide. The plant achieved first quartile performance for the metric measuring Days Away, Restricted or Transferred Cases and in response to Dr. Peterson's query Mr. Jones reported there were zero

cases under this metric. Dr. Peterson remarked the nuclear industry in terms of lost work days is generally an order of magnitude safer than other industries and Mr. Jones agreed and pointed to pre-planning briefings, de-briefings, identification of precursors, and observation of work in the field as contributors to the industry's good performance. Dr. Peterson remarked the evidence shows that the DCPP workforce continues to report injuries at a low level. In response to Consultant Wardell's request Mr. Jones explained the Days Away, Restricted or Transferred Cases metric accompanies the Lost Work-Day Cases metric as a measurement of the organization's commitment to worker safety.

For 2024 Mr. Jones identified focus areas aligned with PG&E's corporate strategy which include identification, recognition and alignment of an organization based upon purpose, virtue, and stands. He commented these principles are part of organizational decision making with the purpose being to identify the reasons for the organization's existence, virtues the recognition of who the organization is, and stands being what the organization is charged with delivering and to whom. Mr. Jones reported the organization's mission is to safely generate clean, reliable and affordable energy for California hometowns and he noted with the passage of SB846 DCPP will be delivering electricity to areas beyond PG&E's service territory. He remarked on the organization's recognition that it must earn the right to continue to operate each day, focusing on reliability but making safety the first priority.

Mr. Jones discussed what he described as the pillars to sustain a culture of excellence in generation performance including the rigorous use of performance improvement tools and the Corrective Action Program, excellence in equipment reliability, and safe and event-free operations. He observed that with change come challenges to keep a workforce aligned and to maintain focus and Mr. Jones reported these pillars have not changed for a number of years.

Mr. Jones described the Lean Operating System, a business model used throughout the world which PG&E Chief Executive Officer Ms. Patricia K. Poppe brought to PG&E several years ago. Mr. Jones remarked the Lean Operating System introduced new insights into programs, budgets and costs and its use at DCPP has been reviewed with the Committee during fact finding. He stated the Lean Operating System provides a vehicle for assessing how the organization is succeeding or falling short in achieving its goals and milestones in order to take appropriate and timely action. In response to Consultant Kadak's query Mr. Jones identified setting a target for the annual elimination of waste as including redundant or duplicative work and he confirmed it is a metric used to evaluate the effectiveness of the Lean Operating System.

Regarding an update on the DCPP Employee Retention Programs Mr. Jones reported the first retention program, a seven year program which went into effect in 2016 was recently concluded. He described this program as very successful with a 98% participation rate for Tier 1 for 2016 through 2020, and a 95% participation rate for Tier 2 from 2021 to 2023. He reported with the passage of SB846 PG&E was directed to continue with an Employee Retention Program based upon extending the conclusion of operations by five years. Mr. Jones reported this five-year period is not seen as a long-term commitment, as positions at a nuclear power plant often require a considerable training period for new employees which is specific to an individual plant. He reported PG&E has filed an application for the extended retention program with the CPUC and a decision is anticipated to be issued sometime in August 2024. In response to Dr. Lam's

inquiry Mr. Jones confirmed the retention incentive continues to be set at 25% of an employee's base pay which would be a continuation of the program which ended in 2023 and upon approval from the CPUC would be effective retroactively. He reported there would be no funds paid out under the continued retention program until March 2025. In response to Dr. Peterson's inquiry Mr. Jones stated the extended retention program is proposed to be broken into four tiers, with the first being from August 2023 to the end of 2024, the second tier would be for one year with the two latter periods being three years and two years respectively. Mr. Jones reported these tiers were proposed strategically in recognition of the fact a number of DCPP employees are approaching retirement and in light of the need for those employees to be available to transfer valuable institutional knowledge and to train new employees. In response to Consultant Kadak's query Mr. Jones replied the extended Employee Retention Program will be funded through PG&E's CPUC ratemaking cases and is unique in that all of the investor owned utilities in California will participate in various ratemakings to support the extended operation of DCPP including through the Employee Retention Program.

Mr. John Geesman representing the Alliance for Nuclear Responsibility was recognized. Mr. Geesman stated that the supplemental retention program described by Mr. Jones is unique from a ratepayer standpoint and while his client supports the program, including the 25% enhancement, he remarked the CPUC declined to consider the Alliance's challenge as to the source of payments for that retention. He commented it is his client's belief that the statute [SB846] provided taxpayer funds to cover at least the transitional portion of the supplemental payments. He remarked not only will all of the ratepayers in California be covering the additional cost but they will also be covering the cost for the tail of the past program from 2023 until the beginning of extended operations which means ratepayers in non-PG&E service territories will be paying these pass through charges before they receive any of the electricity produced by DCPP. Mr. Geesman closed his remarks with the observation the state is strongly behind the concept of supporting the DCPP workforce as is his client, but his client believes the ratepayers ought not to be responsible before they receive any electricity.

Dr. Gene Nelson of Californians for Green Nuclear Power offered congratulations to Mr. Jones for his presentation.

Mr. Bruce Severance, a member of the Diablo Canyon Decommissioning Engagement Panel, speaking as an individual, was recognized. Mr. Severance remarked he does not question the commitment to safety described by Mr. Jones and he believes good communication and humility are important aspects. Mr. Severance stated DCPP and Palisades were among the foremost embrittled reactors in the country and when he hears about a commitment to safety he finds an inherent difficulty in thinking all the various threads of communication are properly connected. Mr. Severance reported that in 2017 the firm of Black and Veatch, as consultants to PG&E, prepared a report entitled Historic Site Assessment on Safety with what he described as a long list of potential areas where safety concerns might occur at DCPP and he stated these areas need to be managed. He stated the report described 22 different instances where the report was not able to document the status due to data gaps. He remarked a discussion of safety should include returning to the Historic Site Assessment on Safety and filling in the blanks in that report. He reported he brought this issue to the attention of the Engagement Panel because he wants to see the best economic outcome for the community and he questions how DCPP assets

can be repurposed if reports such as the Black and Veatch report are not complete as there a 500 different safety-related subsystems and components that could fail and each has to be monitored and he encouraged more thought be given to long-term planning for DCPP facilities. He closed his remarks by stating he would send a copy of the Black and Veatch Historic Site Assessment on Safety to the Committee.

Dr. Budnitz observed that in several of his PowerPoint slides on various metrics Mr. Jones made reference to DCPP performance being within the first quartile. Dr. Budnitz remarked with not quite 100 pressurized water reactors on some fifty or sixty sites that sounds like good performance by PG&E. But Dr. Budnitz remarked this might not be the case as perhaps even the best performing plants are not performing good enough or perhaps the worst performing plants are performing much better than any criterion of concern and he remarked this is the problem with metrics and peer comparisons as the question is really whether the distinction is meaningful, for example the statement made by Mr. Severance about DCPP and Palisades being embrittled could be better informed by information that while embrittled, both plants are very safe to operate than simply stating the plants are the most embrittled, as the statement without additional context is of insufficient value. With regard to DCPP Dr. Budnitz stated that what is important to him is not whether Unit 1 is the most embrittled reactor, but whether it has plenty of margin concerning embrittlement and he remarked he does not believe that this distinction is sufficiently appreciated in the recent discussions and he remarked the Committee needs to identify and adhere to criteria rather than relying on relative measures.

The Chair thanked both Mr. Jones and Dr. Budnitz for their comments.

XXVI ADJOURN MORNING SESSION

The Chair adjourned the morning session of the Committee at 12:10 p.m.

XXVII RECONVENE FOR AFTERNOON SESSION

The February 22, 2024, afternoon session of the Diablo Canyon Independent Safety Committee was called to order by its Chair, Dr. Peter Lam, at 1:25 p.m. Dr. Lam welcomed everyone to the afternoon session. Dr. Budnitz was in attendance via remote technology.

XXVIII COMMITTEE MEMBER COMMENTS

Dr. Lam requested any of the Members who wished to make remarks to do so at this time. There were no remarks by the Members.

XXIX PUBLIC COMMENTS AND COMMUNICATION

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

XXX INFORMATION ITEMS BEFORE THE COMMITTEE (Cont'd.)

Dr. Lam asked Mr. Jones to continue with the informational presentations requested by the Committee of PG&E for this meeting. Mr. Jones then asked Mr. Philippe Soenen, Director of Strategic Initiatives at DCPP, to make that presentation. Mr. Soenen made a presentation to the Committee during the evening session of this meeting.

Overview of New License Renewal Application Organization, Information Contained and Highlights of Sections with Significant New Information.

Mr. Soenen reported he would be discussing the dedicated team assembled for the development of the new License Renewal Application (LRA), the guidance documents followed for that effort, and any significant changes from the prior application as well as license renewal activities to be conducted in 2024.

Mr. Soenen stated SB846 directed PG&E to take all necessary steps to relicense DCPP for an additional five years of operation. He remarked this effort differed from that of other applicants due to the compressed period of time available and a team was assembled to undertake this task. He reported a new LRA was developed and submitted to the NRC on November 7, 2023, and DCPP received a determination of sufficiency from the NRC on December 19, 2023. Mr. Soenen stated the LRA was developed in accordance with NUREG 1801 documents, specifically the second revision of the Generic Aging Lessons Learned (GALL) document. As part of the development of the LRA the scoping and screening results from DCPP's prior LRA from 2009 were used as a baseline and updated based on changes to the plant, together with operating experience from other license renewals to ensure the appropriate aging mechanisms are identified for the Aging Management Programs. Mr. Soenen reported the same systems are in scope now as were in the scope of the 2009 LRA. Annual updates continued to be required while the 2009 LRA was under review including reviewing design changes and changes to the licensing basis and that process was taken and applied through a longer period for the current LRA with the application now having been updated through 2023.

Mr. Soenen reported the next major subset of the LRA process involves the Aging Management Programs and DCPP used information from the 2009 LRA including the requests for additional information, the safety evaluation reports and the open items and incorporated these into the 2023 LRA. He reported DCPP also reviewed recent license renewal applications by the Comanche Peak Nuclear Power Plant in Texas and the Waterford Steam Electric Station Unit 3, a nuclear power plant in Louisiana. He reported the guidance documents specifically refer to a review of five to ten years of operating experience and DCPP reviewed ten years' worth of operating experience to ensure there is nothing unique to DCPP as far as aging management.

Mr. Soenen reviewed the Chapters and Appendices of the 2023 LRA and any significant changes implemented since the 2009 LRA was withdrawn as followed:

Chapter 1 – Administrative Information, no significant changes.

Chapter 2 – Scoping and Screening Methodology – significant change identified with reference to DCPP transition to National Fire Protection Association Section 805 regulations.

Chapter 3 - Aging Management Review Results – updated to incorporate latest NRC guidance.

Chapter 4 - Time-Limited Aging Analysis – review of design changes including additional structural weld overlays in both units, ASME required additional crack growth and flaw analysis based on indications.

Appendix A - Final Safety Analysis Report Supplement – high level descriptions of aging management programs with no significant changes.

Appendix B - Aging Management Programs – based on new guidance documents, NUREG 1801 Revision 2, level of detail with changes for new programs for aboveground metal tanks, buried and underground piping and tanks, new periodic inspections for selective leaching, and four commitments planned for implementation by December 2028.

Appendix C - Commodity Groups - Not used at DCPP.

Appendix D - Technical Specification Changes - Not used at DCPP.

Appendix E - Environmental Report – has been completely redone due to the five years of time which elapses since the previous LRA was submitted in 2009. Mr. Soenen reported that due to the environmental assessments made for decommissioning for coastal resources and endangered or threatened species being similar and having been done recently the same information was able to be used for the 2023 LRA Environmental Report. Mr. Soenen reported public comments are still being ```` received on the Environmental Report.

Mr. Soenen reported DCPP is on schedule to have 90%, that is, more than 700, of the inspections completed prior to entering the period of extended operation for each unit to demonstrate DCPP does not have anything unique or unexpected relative to aging mechanisms and the Aging Management Programs are able to identify effects of aging. He reported the deferral of other more risk-significant systems is permissible because those components are already under surveillance programs and are covered by other aging management programs. He remarked the main point of implementing these inspections is to be able to demonstrate to the NRC the basis for a determination that DCPP is safe to continue to operate while the NRC completes its detailed review of the 2023 LRA. In response to Dr. Budnitz' request Mr. Soenen identified the replacement of copper alloy piping in the plant's domestic systems as a non-safety related system for which repair is being deferred and which failure could have a negative impact or prevent a safety-related component from performing its function. He remarked this represents a license renewal commitment to replace the piping with either greater corrosion resistant material or provide a shielding so there can be no interaction with a safety-related component. Mr. Soenen confirmed Dr. Budnitz' observation that the technical basis for the extended implementation time is provided within the LRA.

Mr. Soenen concluded his presentation by displaying a graph with the NRC activities and the schedule. He reported for inspections performed during the Unit 1 outage, prior to the new LRA having been submitted, the NRC was on the site and performed inspections as well as reviewing documents and closing out previous commitments and the NRC will be reviewing

what was previously completed and what is in the 2023 LRA. He reported an operating experience audit is now in progress and the NRC will be on-site next week for a scoping and screening audit. For Unit 2 inspections will be performed during the upcoming refueling outage. Mr. Soenen reported some of the NRC reviews are performed remotely and these are very intensive and involve breakout meetings with a great deal of detailed information reviewed. He reported annual updates of the LRA are required for any new information and there will be a public meeting scheduled specifically for the supplemental Environmental Impact Statement.

Dr. Peterson remarked in the past there have been issues with NRC and DCISC public meeting schedules and he wondered if there might be an opportunity to coordinate schedules such that meetings would not be on the same days. Mr. Soenen stated he would take note of Dr. Peterson's comment in the process of scheduling the public meeting on the Environmental Impact Statement. In response to Dr. Lam's inquiry, Mr. Soenen replied there are 44 separate Aging Management Programs some of which span multiple systems which experience similar environments and some of which are component-based and Mr. Soenen commented the Aging Management Programs are developed to be generically applicable to all nuclear sites. Mr. Soenen, in response to Dr. Lam's query, remarked that not all requests for additional information from the NRC reflect a deficiency, but each must receive a response and they tend to require clarification or resolution of inconsistencies to make sure of a clear understanding and he remarked that with the breakout meeting format DCPP expects to receive fewer requests for additional information. He confirmed that no requests for additional information have been received to date concerning the pending 2023 LRA. Dr. Budnitz suggested that members of the public interested in this topic may want to review the GALL Report, NUREG 1801, as it sets forth the logic used by the NRC in reviewing aging management of systems, structures and components at a nuclear power plant. In response to Consultant Kadak's request Mr. Soenen replied the reviews for the LRA process are very detailed and are conducted both from NRC Headquarters and from the Regional Office and the inspectors from the region perform inspection of specific components at the plant in person.

Mr. David Weisman of the Alliance for Nuclear Responsibility was recognized. Mr. Weisman inquired whether, in addition to the Environmental Impact Statement, Coastal Zone Management Act certification is required and whether that process overlaps with the proposed schedule. Mr. Soenen confirmed this Coastal Zone certification was required and a request was submitted in 2023, concurrently with the submission of the LRA to the NRC, and the process for the Coastal Zone Management certification will run in parallel with the LRA. Mr. Soenen reported the certification process is in the early stages and he stated the schedule for the review will be determined by the state's lead agency.

Mr. Bruce Severance was recognized. Mr. Severance stated he has reviewed the GALL Report and found it thorough and detailed and he was comforted that the data has been gathered from a broad range of different experience as this reduces uncertainty and provides better operating parameters. Mr. Severance called Mr. Soenen's attention to the Historic Site Assessment Report he mentioned previously and he referred again to the need to fill the data gaps in that report. Mr. Severance commented in terms of aging management it is extremely important to have accurate data concerning reactor vessel embrittlement including the possibility of needing to comply with 10 CFR 50.61a which he remarked would require additional

mitigating measures to reduce the chances of thermal shock. He stated he fundamentally disagreed with a comment earlier during this meeting concerning the need for an understanding of the degree of margin against the effects of embrittlement and he repeated his statement about the importance of having sufficient data to understand the context of a problem and the appropriateness of mitigating measures. He stated he does not understand why, as operating conditions differ, even if nanoindentation testing, micro CT, or micro-Charpy testing is not endorsed by the NRC one would not try to gather more information in those categories and assess the standard deviations and uncertainties using alternate physical stress testing techniques for materials that have been irradiated. He referred to Dr. Kirk's Report and observed Dr. Kirk, from his analysis projected Unit 1 would reach the maximum USE screening criteria with reference to embrittlement by 2029 and he remarked that was in contradiction to a report by Westinghouse.

Dr. Lam thanked Mr. Severance for his comments and asked Mr. Jones to introduce the next speaker. Mr. Jones introduced Mr. Jearl Strickland, presently serving as a consultant to PG&E but Mr. Jones remarked Mr. Strickland was employed at DCPP as an engineering for 43 years and in his capacity with PG&E oversaw the Seismic Program and the Spent Fuel Storage Program. Mr. Jones also introduced Dr. Chris Madugo and Dr. Albert Kottke of the PG&E Geosciences Department and he stated Dr. Madugo holds Ph.D. in Geoscience and Dr. Kottke holds a Bachelor's Degree in Theological Engineering and a Ph.D. in Civil Engineering.

Update on the Status of PG&E Sponsored Study Required Under SB846 for Conducting an Updated Seismic Assessment.

Mr. Strickland began his presentation by stating he would describe the overall process and then for the technical results of the Updated Seismic Assessment (sometimes the Assessment) he would turn the presentation over to Drs. Madugo and Kottke and Mr. Strickland would then return to the podium to provide closing comments.

Mr. Strickland began his presentation by reporting the NRC included as a condition of the initial operating licenses for DCPP that PG&E continue to study and evaluate seismic information and perform updated studies as necessary. In response PG&E developed and implemented the Long-Term Seismic Program (LTSP) in 1985 to satisfy that license condition and has staffed a Geosciences Department with experts to keep abreast of new geological, geophysical, seismological, and seismic engineering updates and lessons learned as well as to operate a strong motion accelerometer array to collect real time data that is shared with the U.S. Geological Survey (USGS) and other organizations through the Central Coast Seismic Network. Mr. Strickland reported PG&E is committed to continuing the LTSP for the duration of any extension of the operating licenses for DCPP.

In describing key takeaways from the recently completed Updated Seismic Assessment required by SB846 Mr. Strickland reported the Assessment was completed in January 2024 with no significant findings. He commented the Updated Seismic Assessment found that continued research since 2015 identified only minor changes in the source characterization of hazard-significant seismic sources, but no significant increase in the seismic risk. The Assessment found no new seismic information that would change the conclusions from the assessment conducted in

2015 that were reviewed and accepted by NRC following the accident at the Fukushima Daiichi nuclear power plant in Japan. The process and results of the recent Updated Seismic Assessment were independently verified by the Participatory Peer Review Panel (PPRP) and a panel from UCLA's B. John Garrick Institute for the Risk Sciences (the Garrick Institute).

Mr. Strickland reported the Updated Seismic Assessment was modeled after the NRC Senior Seismic Hazard Analysis Committee (SSHAC) process, as updated in 2018 and found in NUREG 2213, which includes a two-step evaluation and integration process that is focused on capturing the center, body, and range of technically defensible interpretations, robust peer review, and clear, transparent documentation. He reported this is the standard approach for conducting nuclear seismic hazard studies. Mr. Strickland observed the SSHAC process outlines specific roles and adhering to those roles is important for success of a project. A project Technical Integrator (TI) is at the center, gathering inputs and developing the model. The PPRP, made up of subject matter experts, remains engaged throughout the process and there are primary reviewers engaged to review the product. Mr. Strickland reported observers from the DWR and the DCISC were invited to and attended all the workshops allowing the regulatory bodies or other decision-makers to witness the process first-hand. Questions and comments were incorporated into project documentation. Mr. Strickland displayed an organizational chart for the project showing the various components of the project team.

Dr. Madugo stated that his background is in earthquake geology and he would be discussing the seismic source characterization portion of the Updated Seismic Assessment, following which Dr. Kottke will discuss ground motion, site response, and the results of the hazard evaluation.

Dr. Madugo reported the last evaluation [of seismicity at DCPP and its environs] was the SSHAC study performed in 2015 and since then there have been eight years of new data to evaluate. He stated the primary drivers for the seismic source hazards are the principal faults around the power plant, those being the Hosgri, Los Osos, San Luis Bay, Shoreline, and certain other faults including the connecting faults that link the primary sources and have a lesser impact on the seismic hazard, and the regional faults, such as the San Andreas Fault which is located far to the east. He reported the 2016 model has aerial sources for the Local, Vicinity, and Regional Source Zones to consider, catalog and account for the seismic sources that are not well constrained in terms of the data. Dr. Madugo commented in terms of impact on the hazard it is the local source zone that is the most important to DCPP. He described the sources as the key drivers for the seismic hazard to the power plant and the focus areas for the Updated Seismic Assessment.

Dr. Madugo reported in terms of the faults source review process, specific focus was placed on fault-specific models for geometry and slip rate and general information was reviewed for new methods in rupture and slip rate allocation, magnitude-recurrence distribution, and time dependency. In response to Dr. Peterson's query, Dr. Madugo stated the depth studies were conducted from twelve to fifteen kilometers and he stated this is the depth where seismicity dies out as the crust is no longer rigid enough to support large earthquakes. He observed earthquake magnitude is a function of the rupture area which for a large earthquake can extend from the depth to the surface. He displayed the three fault geometry models for the Hosgri, Shoreline and

the Los Osos Faults. Those being the Outward Vergent, Southwest Vergent, and Northeast Vergent Models which Dr. Madugo stated take into account and represent the uncertainty in all the different types of data.

Dr. Madugo provided and described the following fault-specific matrix developed from new information in terms of the geometry of the faults:

Fault	Geometry	Slip Rate
Hosgri	No Change	Updated geologic rate. Pt. Estero (Cross-Hosgri slope).
Los Osos	No Change	Updated marine terrace uplift rate, new model for Irish Hills.[33]
San Luis Bay	No Change	New model for Irish Hills uplift rate.
Shoreline	No Change	Updated geologic rate, SLO Bay
All Faults	No Change	Updated regional deformation models.

Dr. Madugo reported kinematics is the sensitive movement of the faults and there was no new information for the Local Area Source Zone Model, which he described as the most important to the plant regarding the recurrence rate, activity rate, or estimated magnitudes for earthquakes based upon eight to ten years of additional data received since the last model was developed. For the Vicinity and Regional Models there were also updated earthquake catalogs and updated models developed from the USGS national seismic hazard count. He reported for all these source zones, local area, vicinity and regional, there are the USGS models which he described as largely geodetic based models which calculate on-fault deformations on the mapped faults and off-fault deformations that occur between the faults. Dr. Madugo remarked there have been calls to use the off-fault deformation as background seismicity for source zones, but he stated the data is not mature enough.

Dr. Madugo reported that external contentions were reviewed in the Updated Seismic Assessment including questions concerning the following aspects of the 2015 seismic source characterization model:

- Use and incorporation of geodetic/kinematic models (e.g. NeoKinema);
- Lack of inclusion of Seismic Hazard Inferred from Tectonics Model; and
- New proponent models of fault geometry and uplift rate of the Irish Hills.

Dr. Madugo reported all the potential applications of these models were evaluated and considered in the 2023 Updated Seismic Assessment, but not as direct inputs to the logic tree and rather for comparison. He commented the review team did not believe they are applicable as direct inputs as they are more regional in extent and the Updated Seismic Assessment is a site-specific hazard study. He commented there were models that were not applicable to a site-specific hazard assessment as well as models that were not technically defensible and data or

[33] The Irish Hills embrace the rugged, western portion of the San Luis Range, extending from the Pacific Ocean to Los Osos Valley, and from the town of Los Osos on the north to the San Luis Obispo Creek on the south. The largely undisturbed and highly scenic site includes PG&E properties surrounding the DCPP.

reports in previous studies that directly contradicted some of these models. He observed there were also models that were not ready yet and he cited the auxiliary fault deformation portion of the geodetic models as an example as it is unclear what signal is being recorded by this model. Dr Madugo in response to Consultant McWhorter's inquiry confirmed the evaluation of the new proponent models of fault geometry and uplift rate of the Irish Hills focused specifically on information provided by Dr. Peter Bird.

Mr. Strickland then discussed the parts of the model that were changed based on new information beginning with the Hosgri Fault slip rate characterization. He described slip rate as a estimation or proxy based on observed offset and the age of a geologic feature, that is, distance over time. He reported for the 2015 model there were four Hosgri slip rate characterizations investigated, with the northern most having been made at the San Simeon marine terraces which are offset by the Hosgri Fault. Then, moving south, at Point Estero where a submerged beach berm formed about 12,000 years ago is offset by the fault, and in the Estero Bay and Point Sal submerged channels, that on the order of hundreds of thousands of years have been offset by the Hosgri Fault. The mean slip rate for the Cross-Hosgri Slope Site was 2.5 millimeters per year at the Point Estero site which over a period of 11,000 to 12,000 years is approximately 30 meters or about 100 feet. Mr. Strickland commented the Point Estero site had the highest slip rate of the four investigated, but the data were poorly constrained and the beach berm was not directly dated. He reported a study by the USGS and the University of California at Santa Barbara and others developed a stratographic model that supports the Point Estero feature being a submerged berm and dated it approximately the same as did the Update Seismic Assessment. Mr. Strickland reported in the 2023 model the mean slip rate was revised from 2.5 millimeters per year to 2.6. millimeters per year.

Mr. Strickland provided the updated weights for the Hosgri Slip rate sites as follows:

Site	2015 Weight	2023 Weight
San Simeon Terraces	0.3	0.25
Cross-Hosgri Slope/Point Estero	0.2	0.50
Estero Bay Channel	0.3	0.2
Point Sal Channel	0.2	0.05

He reported the Point Sal Channel site was downrated based upon the slip rate on the Hosgri Fault decreasing from north to south. The weighting factors were based upon location, that is, proximity to the plant and the applicability of the location, applicability of the age, uncertainty of the age and uncertainty in the offset and he commented in the modern tectonic regime the slip rates are likely representative of the current activity. He remarked uncertainty in age and in offsets were improved for the Cross-Hosgri Slope/Point Estero site which is why it was updated. In response to Dr. Lam's inquiry as to whether there has been any random analysis by using a Monte Carlo[34] simulation by assigning different weight and determining how sensitive the final

[34] A Monte Carlo simulation is a model used to predict the probability of a variety of outcomes when the potential for random variables is present. Monte Carlo simulations help to explain the impact of risk and uncertainty in

results might be, Mr. Strickland replied that the process used by the Updated Seismic Assessment in assigning weights to the model was judgmental based upon criteria and he stated these criteria and the weights assigned are discussed in the report.

Dr. Kottke stated the Participatory Peer Review Panel had the same question as just posed by Dr. Lam and he remarked that the question of subjectivity is part of any SSHAC project. He commented determining the slip rate weight tells how active the fault is and that information is important as it is directly proportional to the hazard and the changes in the slip rates are supported by data. In response to Dr. Kadak's inquiry as to whether benchmarking was done to establish the weights Mr. Strickland replied they are not related directly to previous earthquakes and he observed slip rates decrease as you approach the end of the fault and the end of fault was given a lower weight and this is supported by research.

Mr. Strickland provided data on the updated Hosgri slip rate for 2015 and 2023 and the range of uncertainty shown by a curve:

Percentile	2015	2023	Change
Mean	1.70	2.14	26%
5th	0.62	0.90	46%
50th	1.68	2.07	23%
95th	2.95	3.64	23%

Dr. Lam remarked seismic analysis is a complicated topic and in response to Dr. Lam's query Mr. Strickland stated that a 25% increase in the slip rate means an earthquake is more likely to happen than previously determined, but it does not mean that the earthquake will be larger. He commented that seismicity from all the primary and regional zones including the San Andreas Fault combine for the hazard. In response to Dr. Lam's comment that it would be good for members of the public to understand how the assignment of judgmental values which result in a greater value by 25% is done in order to refute certain conspiracy theories. Mr. Strickland reported all the meetings of the team assigned to make the Updated Seismic Assessment are documented and the report clearly documents all decisions made. Dr. Kottke stated the change seen is primarily a factor of the change in weight and if there was a conspiracy the sites could have been down rated, but the team relied on the most current information on age and this resulted in an increase in the slip rate.

Mr. Strickland displayed a graph showing the Hosgri slip rate cumulative distribution function on a curve that compared to the 2023 Uniform California Earthquake Rupture Forecast (UCERF) regional deformation models with the different model slip rates shown as vertical bars and he remarked the cumulative distribution function captures all the different preferred rates very well, including the older version and the more recent version of NeoKinema cited by Dr. Bird. He commented all the different slip rates in the models are within the 95th percentile uncertainty developed for the site-specific study based upon the four sites. Dr. Budnitz observed

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prediction and forecasting models. A Monte Carlo simulation requires assigning multiple values to an uncertain variable to achieve multiple results and then averaging the results to obtain an estimate.

the essence of the SSHAC process is to seek to capture the center, body, and range of the technically defensible interpretations and he commented one could argue that any one of the vertical lines on the graph Mr. Strickland referred to is a technically defensible interpretation. He stated that the data shown on the graph constrains the range of the Hosgri slip rate and over time more will be learned. Dr. Budnitz reported the analysts' task, having captured the center, body, and range of technically defensible interpretations, is to then find through argument and analysis some way of weighting each. He remarked the value of the graph Mr. Strickland displayed was in the use of the information to design and analyze a power plant, in that one needs to be sure there is an understanding of the origin of the variability in this one parameter which propagates its way into the design and the safety of a plant. He commented what is being shown on the curve is the analysis team's current best understanding of the state of knowledge of the Hosgri Fault slip rate. Mr. Strickland observed the distribution is an input into the hazard analysis and Dr. Budnitz observed that even at the higher slip rate, if the design of a plant's systems, structures and components can be shown to adequate, at what Dr. Budnitz described as the pessimistic end of the curve, one can have confidence the design will be adequate for the main body of the information and it is necessary to use this current state of knowledge in order to have confidence in the design.

Mr. Strickland discussed the slip rate model for the Los Osos Fault which he said is dependent upon the uplift of the Irish Hills which is determined from the data from the elevation of two key marine terraces cut around the southwest and west side of the Irish Hills which data indicates the sea level was higher when the terraces formed. Mr. Strickland reported the sea level used for the new model was almost double that used for the 2015 model and the new model was tested independently, added to the previous models, and the data weighted. He reported the result was a change in the slip rate for the Los Osos Fault by a decreased of 9% to 15 %. He reported the slip rate for the Los Osos Fault is significantly lower than that for the Hosgri Fault and accordingly the decrease does not have as much impact on the hazard as the increase of 26% in the Hosgri Fault slip rate.

In response to Dr. Lam's observation concerning the numerous inquiries from members of the public on the synergy of multiple faults Dr. Kottke reported the possibility of faults rupturing together was considered in the 2015 model and for the Updated Seismic Assessment the team reviewed the literature for any new changes in fault connection and the magnitudes assigned to joint rupture and as to how earthquakes move past structural complexities and the team found all the new information was consistent with what was included in the original model Dr. Kottke reported that this was a key component of the 2015 model and was reevaluated. Dr. Lam remarked that members of the public often question whether, given what is now known about the multiple earthquake faults, would DCPP still be built in its current location and he commented the PG&E Updated Seismic Assessment team is making a huge contribution to that inquiry and to the question of do we have reasonable assurance that the facility will perform in the design basis earthquake. Dr. Kottke replied Dr. Lam's comment speaks directly to why PG&E has a commitment to its Long Term Seismic Program to monitor new developments and he is working with research teams monitoring new development for fault characterization and PG&E always remains active in terms of trying to understand these issues. Dr. Lam remarked that he has yet to hear as an objective of this research if, hypothetically, significant deficiencies were discovered whether a proposal for strengthening and improving any structures would be

introduced. Dr. Peterson commented the higher seismic hazard was clearly recognized at the time the plant was designed and many of its features differ from plants in other areas of the country and if one looks systematically through the design of DCPP it has in every aspect been designed with a much higher level of seismic requirement which he stated is appropriate for any location in California. Dr. Peterson observed in the Committee's evaluation of DCPP the Committee has found the design has the capacity to meet the seismic loads that could occur with the higher seismic hazard at this location and that is the correct way to construct infrastructure in general, that is, to determine the local levels of hazard. Mr. Strickland agreed and he remarked looking at the history of the plant additional seismic knowledge was gained which was associated with the location and capabilities of the Hosgri Fault and the other faults and the original design for DCPP evolved to include substantial upgrades and improvements to meet the predicted hazard but also to provide long-term additional margin as more information was obtained concerning the potential hazard. Dr. Lam stated he is persuaded that DCPP complies fully with existing regulations relative to seismic safety but he remarked although the long-term seismic studies have increased design margins there are no physical improvements based on those studies and he stated his belief that there have not been any major strengthening of any vulnerable structures at DCPP. Mr. Strickland agreed and stated no such work has been undertaken at DCPP since the 1970s. Dr. Peterson observed that some time ago the amount of seismic bracing that was installed was found in some places in the plant to have made the plant too stiff and consequently to have been counterproductive and accordingly some seismic bracing has been removed.

Mr. Strickland reported that in comparing the median model to new data three additional sources were considered: (1) the West3 Project, a project conducted and funded by California Department of Transportation (CalTrans) and PG&E as well as by some other agencies to collect a new database of ground motions from three earthquakes in California which were not included in the 2015 study, but was reviewed and it was found those earthquakes were too far from DCPP to provide information; (2) data from the recent magnitude 7.8 earthquake in Turkey which he described as a large strike-slip event is being reviewed and evaluated; and (3) two magnitude 5.1 events. Mr. Strickland stated these comparisons found there was no trend between the current median model and the new data with respect to magnitude of distance and found there is no need to update the median model and the 2015 models were consistent with the new data and no changes were needed. Mr. Strickland reported one of the primary thrusts of ground motion development since the 2015 effort has been to move nonergodic[35] ground motion models. Nonergodic ground motion models are models that have spatially varying coefficients that smoothly vary across a region. He reported the 2015 effort developed models specific to DCPP and models are now being developed on a scale that varies smoothly over the state. He displayed a graph showing two nonergodic models and he commented there is very good agreement between the nonergodic models and the site specific nonergodic models previously developed. Dr. Budnitz observed different items of equipment and different structures are sensitive to different frequency period ranges on the horizontal access of the graph and Dr. Kottke confirmed the model includes modeling of the epistemic[36] uncertainty.

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[35] Ergodic relates to a process in which every sequence or sizable sample is equally representative of the whole (as in regard to a statistical parameter).

[36] Epistemic means of or relating to knowledge or the conditions for acquiring it.

Dr. Kottke reported that in 2015 there were two efforts to evaluate the site characteristics, one was analytical modeling which he said was still used today, and the second was empirical modeling which relies on a limited number of recordings. He reported there have been no additional data recorded at the plant that could be used for further empirical modeling. Dr. Kottke reported non-ergodic modeling was applied to the preliminary dataset with a spatial correlation built-in to allow use of regional data to both interpolate behavior and extrapolate trends. He reported the non-ergodic site adjustment factor agreed quite well with the other models from 2015 and falls well within the bound of the empirical model that was considered. He commented at this time the approach of using non-ergodic models in this manner is preliminary and the dataset that is based from them is also preliminary, but at this point there were no changes found in terms of the site adjustment factor.

Dr. Kottke reported with the evaluation of the models there were no changes warranted in the ground motion characteristics. When the seismic source characterizations were reviewed, changes to the slip rate were identified but other aspects to the models such as the logic tree remain the same. Because changes of the source characterization are limited primarily to the slip rate he reported that those changes can be accommodated through changes in scaling of the hazard curve which eliminates the need to recompute the hazard and allows the hazard curve to be directly modified for the changes in the slip rate. Accordingly, he reported the total hazard has gone up very slightly. Dr. Kottke discussed and described the hazard curves and commented what is seen are slight differences between the uniform hazards response spectra at different return periods, but he observed they are in very good agreement. He commented the difference in contribution as a function of frequency is due to different earthquakes contributing more at different frequencies, with the Hosgri Fault being an important source for longer frequencies and as it goes up it controls more, which results in more increase at longer, lower frequencies. He reported the changes are less than the threshold of 10% which is used by NRC's Process for Ongoing Assessment of Natural Hazard Information (POANHI) and accordingly the NRC's determination would be that no change is significant. Dr. Kottke reported that instead of terminating the study at this point a risk calculation was performed. Dr. Budnitz observed what Dr. Kottke described is an increase in the annual frequency of when this rare earthquake would occur but this does not represent a change in how large that earthquake might be. Dr. Kottke agreed and he stated there is nothing learned in this effort that changes the characteristics of the event for which the plant is designed.

Mr. Strickland reported PG&E chose to review the Probabilistic Risk Assessment (PRA) Model used at DCPP which includes seismic as one of its elements and the PRA Model was updated in August 2023. He reported the update included equipment reliability data and industry peer review comments. The inputs from the revised slip rate on the Hosgri Fault were evaluated using the updated PRA Model and the results show that the amount of change in core damage frequency and large early release frequency was insignificant. The PRA Group then evaluated the change in risk to the overall risk criteria used by the NRC and set forth in RG 1.174 and found the plant continues to be essentially where most other plants are in Region 2 of that model, essentially without an impact. Dr. Peterson observed the Committee has had interest in the

question of how FLEX[37] capabilities can further reduce the residual risk level associated with earthquake events which are outside the design basis and therefore events for which some action by plant staff could be helpful. He commented ensuring plant staff have the training and the resources to do that is very important and is akin to the Committee's continuing interest in workplace seismic safety. Dr. Peterson observed that the people at the plant play a critical role in a response and he commented the DCISC has a recommendation that regard. He stated there has been work done to integrate these concepts into post-earthquake procedures but he stated it is difficult to integrate the additional risk reduction produced into a quantitative PRA as damage states can occur outside the design basis due to the unanticipated strength of the earthquake or because of a design defect. Dr. Peterson remarked DCPP has been subjected to earthquakes and is very well instrumented in terms of its structural response and has responded as expected and this improves confidence in the performance of the plant in larger earthquakes. **Dr. Peterson remarked the Committee is interested in maximizing the benefits and availability of FLEX response capabilities and at some point hopefully to credit them in the overall PRA**.

Mr. Strickland stated Dr. Peterson raised an interesting point and that after the accident to the Fukushima Daiichi Nuclear Power Plant in Japan, which occurred in 2011 while Mr. Strickland was still employed by PG&E, a tremendous investment in time and resources was made to not only evaluate the potential impact but to make substantial changes to the plant for secondary response capabilities and for additional resources. He reported accordingly there are significant procedures and training models developed which are now in use at the plant. Mr. Strickland stated the matter of updating the PRA to take credit was explored, but the decision was that this would be difficult to do. Dr. Peterson commented in his view one of the most effective tools to reduce the remaining residual risk of core damage and releases due to earthquakes is to think through the question of FLEX response and to be better prepared in terms of anticipating what could potentially break and accordingly the plant staff's response and it is important to confirm they have the training and equipment resources available. Dr. Peterson remarked an earthquake would lead to serious problems off-site and the same philosophy could be employed in and by the local community to evaluate other infrastructure in the region.

Mr. Strickland reported as part of the close-out process for the Updated Seismic Assessment PG&E received letters from the PPRP and from the Garrick Institute. The PPRP agreed with the conclusion that the new information for the seismic source characterization and ground motion characterization developed since 2015 has not significantly changed the estimate of the seismic risk for DCPP. He stated the Garrick Institute reached a similar conclusion and both the Garrick Institute and the PPRP provided multiple comments on the evaluation process and the technical issues covered in the draft report, all of which were considered by the Technical Integration team and the Assessment revised accordingly. Mr. Strickland reported many agencies including the DCISC were provided with draft copies of the Updated Seismic Assessment and PG&E is in the process of making the report compliant with the Americans with Disabilities Act before publicly releasing the document, which is approximately 400 pages. Dr.

[37] FLEX is not an acronym but describes a strategy developed by the nuclear industry to provide diverse and flexible coping strategies to address the loss of safety-related systems due to certain beyond design basis events. It is a group of supplemental components, many of them portable, which are seismically stored, and can be made available for timely attachment to permanent plant systems for accident mitigation.

Budnitz observed the DCISC has a fact-finding visit scheduled for March 18, 2024, and a discussion is planned to cover some questions and issues as part of the DCISC's review.

In concluding his presentation Mr. Strickland stated the Updated Seismic Assessment found that the continued research since 2015 identified only minor changes in the source characterization of the hazard posed by significant seismic sources but no significant increase in the seismic risk. The Assessment found no new information that would change the 2015 assessment's conclusions that were reviewed and accepted by the NRC at that time and the process and results were independently verified and found to be of high quality by the PPRP and the Garrick Institute.

Dr. Budnitz asked Mr. Strickland to explain to the public the extent to which the Updated Seismic Assessment did not precisely follow the SSHAC process as set forth in RG 22[2213?]. Dr. Kottke reported whereas many SSHAC processes represent a wholly new effort, the Updated Seismic Assessment is a revision and accordingly was accomplished in a two-stage fashion with the first stage being a coping evaluation stage looking at what potential changes there were in information and then determining how to take those changes and incorporate them into the hazard evaluation. He commented in a typical SSHAC process a new hazard logic tree and hazard input documentation would have been developed. He reported in undertaking the Updated Seismic Assessment PG&E was able to take an analytically correct approach to scale the hazard curves instead of recomputing the hazard. Dr. Budnitz observed that having the PPRP and the objective of capturing the center, body, and range of technically defensible interpretations were both principal features of the SSHAC process as well as of the Updated Seismic Assessment. Dr. Kottke confirmed Dr. Budnitz' observation and he remarked that the Updated Seismic Assessment, unlike a typical SSHAC process which stops at a hazard assessment, continued and followed through to a risk assessment.

In response to Dr. Kadak's inquiry Mr. Strickland replied Dr. Peter Bird's assessment of seismic conditions did not include the seismic hazard or the seismic risk. He reported Dr. Bird's assessment cited potential model inputs to be considered and all were assessed. These model inputs were not integrated directly into the models as an update to the logic tree but for some of the models comparisons were done and then and they were shown with the cumulative distribution function. Some of the models suggested by Dr. Bird were found not to be appropriate and this determination was reviewed by the PPRP and the external reviewers in context of the site specific hazard assessment. He remarked some of the component models, for example the model on geometry, had been the focus of in-depth discussion during previous hazard updates and studies and as such had been evaluated. Dr. Bird mentioned slightly different geometry, but he did not provide new data or information to support his position and if in the future there is more information brought forward to support Dr. Bird's models it would be considered. He confirmed Dr. Kadak's observation that Dr. Bird's assessment was not used due to a lack of data and for the reason that it was not technically defensible. Mr. Strickland reported Dr. Bird's uplift rate for the Irish Hills, provided for purposes of previous reports, completely contradicted the Updated Seismic Assessment's model. Mr. Strickland stated Dr. Bird's model was developed using a very regional scale, almost a United States' scale data, but for the 2011 shoreline report PG&E had site-specific evaluations done which came to an opposite conclusion.

Mr. Strickland confirmed that the justification for excluding Dr. Bird's data is fully set forth in Chapter 6 of the Updated Seismic Assessment.

Dr. Gene Nelson of Californians for Green Nuclear Power was recognized. Dr. Nelson offered his commendation to the members of the team who prepared the Updated Seismic Assessment for what he described as a very high quality report. He commented that during previous visits to DCPP he observed the massive scale of the steel I-beams which provide its seismic capabilities. Dr. Nelson reported the slip rates for the San Andreas Fault of 20 to 35 millimeters per year are approximately ten times those of the Hosgri Fault and he observed that with a lower slip rate the hazard is correspondingly lower. Dr. Nelson commented that each time a seismic event occurs in an area of multiple fault as the motion crosses a fault a part of its energy is attenuated over distance. He contrasted the site of DCPP with the site of the North Anna Nuclear Power Station in Virginia which he observed is built on a single block of granite. He remarked at DCPP the rock is mostly metamorphic which has been heavily faulted and therefore attenuates much faster.

Mr. Bruce Severance was recognized. Mr. Severance stated he was grateful for the thorough review provided by the PG&E representatives and he is a proponent of the peer review process. He stated he was concerned about a conversation he had with Dr. Sam Miranda and he requested that the DCISC verify the information he recalled from that conversation as Dr. Miranda, who Mr. Severance reported was formerly associated with the NRC, discussed a program called "leak before you break" and Mr. Severance stated he believes that program to be in use at DCPP. He inquired if cross members for parts of the plant's cooling system had been removed in order to detect leaks before a catastrophic break occurs and whether that action [removal of the cross members] had been evaluated for interaction with stress corrosion cracking in addition to a loss of coolant accident (LOCA) scenario which he observed could be initiated by multiple causes. Dr. Peterson replied the rationale for the "leak before you break" concept is to discover the existence of a through-wall flaw in a pipe before it proceeds to a point where it propagates a rupture and a LOCA results. Dr. Peterson observed the plant's Technical Specification requirements are to detect any leak that exceeds one gallon per minute, as it is likely that detection of such a leak would preclude it developing into a situation where a break could occur. Mr. Severance stated he understood that there are five different, redundant, systems for leak detection at DCPP and there have been occasions where more than one has been unavailable, although he stated he has been unable to discover evidence to back up this statement. Dr. Peterson reported the plant is designed with an Emergency Core Cooling System (ECCS) that is capable of coping with a leak of any size, including a double 'guillotine' break, and the "leak before you break" philosophy is to be able to detect leaks before a break can develop and thereby reduce the frequency by which large breaks would occur. Mr. Severance stated his understanding that Dr,. Miranda was concerned about the potential for leakage in excess of what the ECCS could withstand. Dr. Kadak recommended a book to Mr. Severance entitled Nuclear Engineering by Professor Ron Knief to provide him with information on nuclear power plants.

Ms. Jill ZamEk, attending remotely, was recognized. In response to her question as to the role of the Independent Peer Review Panel (IPRP) Dr. Budnitz explained the IPRP was created by the State of California and the California Public Utilities Commission facilitates its meetings.

The IPRP consists of several seismic experts who are employed by state public agencies and their purpose is to provide an independent review of the technical quality of PG&E's Seismic Safety Programs for DCPP. The IPRP meets once or twice each year and provides written reports of its reviews which concentrate upon seismicity and ground motion aspects and the IPRP has also done reviews of the seismic adequacy of buildings at the site. Dr. Budnitz reported the IPRP was not involved in the Updated Seismic Assessment and the PPRP (Participatory Peer Review Panel) is a separate and different entity from the IPRP. Dr. Budnitz stated it is his understanding the IPRP is planning to meet sometime in April or May of 2024 to discuss and provide its evaluation of PG&E's Updated Seismic Assessment.

Mr. Tim Dawson, with the California Geological Survey and a Member of the IPRP, was recognized and Mr. Dawson reported he was present representing the IPRP and other IPRP members were attending remotely. Mr. Dawson stated the IPRP just received a copy of the Updated Seismic Assessment and will be doing an independent review as required by SB846 and will provide that report when it is complete to the DCISC.

Dr. Peter Bird, attending remotely, was recognized. Dr. Bird stated he was representing the San Luis Obispo Mothers for Peace and he stated he was not surprised by the PG&E response to his input but he was very disappointed as he believes PG&E has made two fundamental errors and is justifying those errors on transparent and weak excuses. He first observed he presented arguments that there are active thrust faults at shallow depths under DCPP and the Updated Seismic Assessment failed to consider these faults because there was no new data. He commented the primary basis for his expert opinion was based on old data, on information that existing prior to 2015, including published geologic maps and sections and uplift maps produced by PG&E. To the extent PG&E failed to take this alternative expert interpretation of existing data into account Dr. Bird stated PG&E failed to follow the SSHAC process.

Dr. Bird then remarked that PG&E has asserted that the Updated Seismic Assessment was only an update and therefore it was not necessary to follow the SSHAC process and only necessary to change numbers in the existing deformation models and logic trees. Therefore, he stated the designation of a SSHAC process should be removed from the Updated Seismic Assessment and the Assessment should be termed an update of the seismic source characterization.

Dr. Bird commented the omission of the shift model for converting distributed deformation rates into seismicity was very important. He remarked if the deformation model is missing thrust faults, but the GPS data shows that there is horizontal compression occurring then the shift method will produce a calculated regional seismicity that largely compensates for the missing thrust faults in the deformation model. He observed the fact PG&E has decided not to use this data simply because the USGS is not using it is to Dr. Bird due to the fact PG&E has a guilty conscience about neglecting those thrust faults.

Dr. Bird stated that in 2018 PG&E filed a Seismic Probabilistic Risk Assessment (SPRA) report with the NRC that stated the seismic core damage frequency was 2.8×10^{-5} per year and now in the PG&E filing in November 2023 of the environmental report this number has change to 2.96×10^{-5} per year which is approximately a 6% increase. Dr. Bird said he has a question whether the

new figure in the environmental report includes the findings from the Updated Seismic Assessment seismic source characterization even though the filing of the environmental report occurred three months prior to completion of the Updated Seismic Assessment. Mr. Strickland replied that the number used in the environmental report did not derive from the Updated Seismic Assessment but rather from the results of the updated model from August 2023 which he referred to in his presentation.

Dr. Madugo explained that Chapter 6 of the Updated Seismic Assessment goes into considerable detail as to why certain models were not included and as to how they were considered or found not technically defensible. Dr. Madugo, in response to Dr. Lam's prompt, explained the Updated Seismic Assessment is not a SSHAC report but borrows elements of the SSHAC process and it describes what elements were used and which are different from the SSHAC process. In terms of not including certain models such as the shift model, the Technical Integration team reviewed it as did the PPRP and the Garrick Institute and at this point it was not felt it was applicable for seismic hazard evaluation for the plant and the justification for this is explained in Chapter 6.1.

Mr. John Geesman representing the Alliance for Nuclear Responsibility was recognized. Mr. Geesman stated in 2008 the California Energy Commission requested that PG&E in its AB 1632 report[38] do a deterministic evaluation of the possibility of a thrust fault directly beneath the plant and Mr. Geesman stated PG&E has never released a public response to that request. Mr. Geesman stated his belief that Dr. Bird raises an important point in that this has been left unaddressed at least in a public forum and while the Updated Seismic Assessment provided that forum, the issue remains unaddressed.

Mr. Geesman stated with respect to the SSHAC requirements he believes the NUREG document referred to by Mr. Strickland is expressly designed to address how to update an existing SSHAC report and for some time now everyone has 'danced around' how close a replication of those requirements the Updated Seismic Assessment will represent. Mr. Geesman commented that no one has explained in any detail, and Dr. Budnitz has apparently forgiven the differences, exactly what variances have taken place and exactly what justification supports those variances. Mr. Geesman remarked that although it may be unpleasant to recall, the PG&E Geosciences Department has a past history of problems with adherence to established procedures and he commented he believes these are all questions that will undermine the credibility of what may be a very worthwhile seismic update.

Mr. Geesman commented with reference to the impact of a smaller earthquake on reliability of plant equipment that Dr. Abrahamson, who is one of the members of the PPRP, in 2008 told the California Energy Commission that the primary threat to the plant comes from one of the lesser earthquakes that could cause a prolonged shut down. He recalled the experience of the

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[38] The purpose of the report required by California Assembly Bill (AB) 1632 and prepared by the California Energy Commission was to assess the potential vulnerability of California's largest baseload power plants, Diablo Canyon Power Plant and San Onofre Nuclear Generating Station, to a major disruption due to a seismic event or plant aging; to assess the impacts of such a disruption on system reliability, public safety, and the economy; to assess the costs and impacts from nuclear waste accumulating at these plants; and to evaluate other major issues related to the future role of these plants in the state's energy portfolio.

Kasiwazaki-Kariwa Nuclear Power Plant in Japan which suffered just such a prolonged shut down just prior to the release by the Energy Commission's AB1632 Report. Mr. Geesman observed Mr. Jones previously highlighted as a pillar of PG&E corporate planning the issue of corporate values and Mr. Geesman believes this comment was an emphasis on equipment reliability. He commented the taxpayers are financing a forgivable loan of $1.4 billion to PG&E and one of the covenants in the loan is to perform a seismic update. He commented the premise of extended operation is to improve reliability of the electrical system and it appears, and Mr. Strickland confirmed, from the DCISC's last meeting that the Updated Seismic Assessment does not address the impacts of lesser earthquakes on equipment reliability. He stated he looks forward to receiving a copy of the final report when it is made available.

Dr. Budnitz remarked that he had not forgiven differences between the process used for the Updated Seismic Assessment and the traditional SSHAC process but he has not yet gotten to the stage of reviewing that issue and a DCISC fact finding team is scheduled to meet with PG&E representatives next month and Dr. Budnitz stated he will have several questions at that time and until then he does not have an opinion on whether or not the deviations between the literal SSHAC process and the Updated Seismic Assessment are important or not. Mr. Geesman stated he understood Dr. Budnitz' remark.

Dr. Lam stated that be believed Mr. Geesman has informed the Committee and made an allegation that information was withheld from members of the public and he asked if PG&E would like to respond. Mr. Strickland stated he was a PG&E employee when the AB1632 studies were undertaken and the DCPP AB1632 team reported to him. He commented he has no memory of any requirement in the AB1632 studies to evaluate thrust faults underneath the plant. He observed the AB1632 studies were couched in terms of better qualifying the faults in the area using a combination of low energy and high energy assessment techniques and PG&E complied with the requirements of AB1632 with the exception of a component to conduct offshore high energy seismic surveys due to the refusal of the state to issue required permits. He remarked the contention posed by Mr. Geesman that PG&E has hidden information or not shared information is incorrect and if there is a question that the Alliance for Nuclear Responsibility would like to pose to PG&E he suggested that a letter be provided to this effect and PG&E will review and provide an appropriate response. Mr. Jones stated he concurred with Mr. Strickland and invited Mr. Geesman to send such a letter.

Mr. Strickland stated that the thrust faults beneath the Irish Hills and beneath the plant have been considered in past studies and in models. The AB1632 report looked at specific proponent models for thrust faults beneath the plant and there is an entire chapter devoted to that topic. As part of the SSHAC Level III process proponents made similar contentions and there were also evaluations of the state of stress and strain beneath the Irish Hills and whether it was possible to have thrust faults or strike slip faults or a combination of the two. In the three geometry models he mentioned during his presentation the center, body and range of the differing geometries are accounted for and this included thrust faults. He reported the local area source zone which includes the plant includes virtual faults, because there is uncertainty as to whether there could be strike slip or reverse faulting, He remarked the probability is that those virtual faults are strike slip but there is a possibility they are reversed faults dipping beneath the

plant. The spacing of those faults in the model is one kilometer throughout the zone surrounding the plant and therefore the model allows for and considers these types of faults beneath the plant.

Dr. Budnitz stated he listened to Dr. Bird's comments and remarked he has studied sections of the draft Updated Seismic Assessment that deal with Dr. Bird's propositions and he understands the information provided but he has some questions to pose to PG&E at the fact finding to be conducted in March 2024 and until then he will not have a final conclusion or judgment as to his agreement with Chapter 6 of the Updated Seismic Assessment.

Mr. David Weisman of the Alliance for Nuclear Responsibility was recognized. Mr. Weisman stated that there are certainly thrust faults under the Irish Hills as there have been two recent earthquakes, one about eight kilometers northwest of Avila Beach to the east of the plant, and the other five kilometers west of Baywood offshore from Los Osos. He remarked that per the 'beach ball charts' both were very clearly thrust fault mechanisms albeit small in magnitude, but representative of data points which post-date the Updated Seismic Assessment. Mr. Strickland observed the earthquakes mentioned by Mr. Weisman occurred in areas where similar small earthquakes with similar focal mechanisms, similar to thrust or reverse faults, have occurred in the past and there are various earthquakes that occur beneath the Irish Hills which is what generates the element of uncertainty. He observed PG&E has worked with USGS to develop a refined seismic catalog and has identified seismic lineaments based on that seismicity and the background model accounts for this variation in seismicity from these small earthquake.

The Chair thanked the PG&E speakers on behalf of the Committee for an exceptionally good briefing on an exceedingly difficult scientific matter. Dr. Lam then asked Mr. Jones to introduce the final presentation by PG&E for this public meeting. Mr. Jones then introduced Senior Director of Engineering, Projects and Outages Mr. Allen Wilson. Mr. Jones reported Mr. Wilson has fourteen years of experience with PG&E and has served in various responsible roles in the Engineering, Maintenance, Decommissioning and License Renewal Departments. Prior to working for PG&E Mr. Wilson served with the United States Navy and Coast Guard and in various civilian engineering capacities.

Results of Study Required Under SB846 by Independent Consultants to Catalog and Evaluate Any Deferred Maintenance.

Mr. Wilson stated that at DCPP all necessary investments have been made and continue to be made to ensure safe and reliable operations. He remarked maintenance practices are assessed continually by the NRC and DCPP is among the highest performing plants in the nation. Mr. Wilson observed a provision of SB846 required PG&E to commission a study by independent consultants to catalog and evaluate any deferred maintenance [due to the expectation of the plant closing sooner] and to provide recommendations on the risk, the potential remedies, and the cost estimates and how soon or timely those remedies needed to be implemented. Mr. Wilson reported to meet this requirement PG&E hired two independent industry experts, Mr. Bill Dean and Mr. Ed Cowan.

Mr. Wilson reported the consultant's final Report, "Senate Bill 846 Independent Review Team Report" (Report) issued on October 31, 2023, concluded that DCPP has not experienced

any deferred maintenance that would create a vulnerability to future operation and there were no remediations necessary. The Report found DCPP has been well-maintained, the plant has a strong performance record and plant staff and management are clearly focused on safe and reliable operation of the plant and since no deferred maintenance was identified there were no recommendations. Mr. Wilson reported the review team reviewed data over the previous twelve to fifteen years, from the periods prior to decommissioning, upon the decision to proceed to decommission the plant, and then when direction was provided to commence efforts to maintain continued operations with the passage of SB846. Mr. Wilson reported the review team interviewed staff and DCPP contractor personnel who support preventative maintenance work. Mr. Wilson stated the team performed walkdowns to assess the plant's general condition and reviewed various reports from the NRC and other industry experts to ensure a full picture was provided regarding maintenance. In response to Dr. Lam's inquiry Mr. Wilson replied the two consultants produced a single report which was sent to Mr. Wilson's organization for fact checking and further validation through the review of additional records. He reported Mr. Dean reviewed maintenance from a regulatory perspective and he contracted with Mr. Cowan to do the technical review.

Mr. Wilson reviewed and summarized the results of other reviews conducted of maintenance at DCPP as follows:

➢ By the DCISC – August 2023 : "DCPP's process for reviewing the need for changes to Preventive Maintenance activities, Corrective Maintenance activities, and projects to support five years of extended operations (the PMO++ Program) appeared well planned and implemented."

➢ NRC – 4th Quarter of 2023: "…No maintenance plan was deferred that would impact plant safety or reliability" and the process used was reasonable and prudent.

➢ STARS[39] -: "…[O]bjective was to review the Project Results for the purpose of identifying potential gaps or opportunities in consideration of Risk, Project Timing / Prioritization and Organizational Ability to Execute" that is, an industry peer review from an operating experience perspective.

➢ INPO/Industry Executives: "Overall, the approach is aligned to industry practice" and reviewed from the perspective of the process for reviewing items and how DCPP was measuring compared to excellence standards.

Mr. Wilson commented these reviews support DCPP's focus on maintaining the plant to the highest standards and ensure all regulations and requirements to support extended operations are met. In response to Dr. Lam's question Mr. Wilson replied the NRC review was not done in context of the License Renewal Application but rather as part of the NRC's regular quarterly

[39] Strategic Teaming and Resource Sharing (STARS) joint utility cooperative consisting of Union Electric Company, with its Callaway plant in Missouri; Arizona Public Service Company, with its Palo Verde plant in Arizona; Luminant Generation Company LLC, with its Comanche Peak plant in Texas; Pacific Gas and Electric Company, with its Diablo Canyon plant in California; Southern California Edison Company, with its San Onofre plant in California; STP Nuclear Operating Company, with its STP plant in Texas; and Wolf Creek Nuclear Operating Company, with its Wolf Creek plant in Kansas.

reviews and inspections with an additional inspection reviewing DCPP's processes and compliance with the NRC Maintenance Rule.[40] Mr. Wilson observed the Maintenance Rule is the NRC's guiderail for ensuring preventative maintenance and corrective actions are done properly. Mr. Wilson confirmed Dr. Lam's observation that the NRC did not review the Report.

Consultant McWhorter remarked that Mr. Wilson was asked to make this presentations because the Committee's timeframe imposed by SB846 for review of the issue of deferred maintenance required that the DCISC make its efforts during the first half of 2023 and throughout the summer months and to report on those efforts at the Committee's September 2023 public meeting and the independent consultant's Report was not finalized until October 2023, and therefore this represents the first opportunity to discuss the final Report in a public forum. Mr. McWhorter reported DCPP shared the preliminary results with the DCISC prior to the final Report's release and the DCISC's conclusions were based upon that knowledge and once the final Report was issued it was reviewed and a determination made that there was no effect on the Committee's conclusions as expressed at the Committee's September 2023 public meeting.

In concluding his remarks Mr. Wilson stated the Report by the independent consultants was sent to PG&E, to the DCISC and also to the State of California Department of Water Resources but at the present time it has not been made available to the general public. **In response to Dr. Budnitz' request, Mr. Jones stated that he would review to ensure there was no confidential or privileged information contained in the Report and advise as to whether the Report could be made public.**

Mr. John Geesman representing the Alliance for Nuclear Responsibility requested that when the Report is permitted to be made public that it be posted on the DCISC's website.

Ms. Jill ZamEk was recognized. In response to Ms. ZamEk's inquiry Mr. McWhorter and Dr. Budnitz explained that while the item on the Committee's Open Item List regarding review of deferred maintenance was closed at the conclusion of the Committee's review in 2023, there are many items on the Open Items List related to maintenance of systems and programs which remain permanently on the Open Items List for the Committee's review and the Open Items List is publicly available.

XXXI CONCLUDING REMARKS & DISCUSSION BY COMMITTEE MEMBERS OF FUTURE DCISC ACTIVITIES

There being no concluding remarks by the Members and all business of the Committee having been addressed, Dr. Lam expressed the thanks of the Committee to Mr. Blair Jones and Ms. Brandy Lopez for providing excellent technical and other assistance to the Committee and to all the persons who participated in this public meeting in person or remotely by Zoom or listened to the livestream broadcast and also to all PG&E's senior managers. Mr. Rathie expressed his

[40] The NRC Maintenance Rule requires plant owners to develop programs that periodically evaluate the effectiveness of their existing maintenance activities to help assure that safety equipment remains able to perform safety functions.

appreciation to the AGP Video technicians for ensuring the virtual aspect of the meeting ran smoothly.

Mr. Rathie announced the next public meeting of the DCISC would be held on June 20-21, 2024, in Avila Beach, California, and Dr. Lam remarked this would be his final meeting as a DCISC Member as his term ends on June 30, 2024.

XXXII ADJOURNMENT OF ONE HUNDRED AND SEVENTH PUBLIC MEETING

There being no further business, the one hundred and seventh public meeting of the Diablo Canyon Independent Safety Committee was then adjourned by its Chair, Dr. Peter Lam, at 4:30 p.m.

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE	
AGENDA TRANSMITTAL FORM	
MEETING DATE:	June 21, 2024
AGENDA ITEM:	XXII - A
AGENDA TITLE:	Nomination and Election of DCISC Chair & Vice-Chair for the July 1, 2024 - June 30, 2025 Term
CONSENT [ ] ACTION [X] INFORMATION [ ]	

Staff Summary: Pursuant to the Committee's Policy No.1 a Chair shall be selected from the Committee at the second public meeting of the calendar year, to serve for the next annual report period and shall preside at all meetings, coordinate the activities of the Committee and its members, as required, and execute all documents in the name of the Committee during that period. When appropriate, the Chair shall designate a DCISC members to execute consultant contracts and contract documents on behalf of the chair. A Vice-Chair shall also be selected at the second public meeting and shall act in the absence of the Chair.

RECOMMENDED COMMITTEE ACTION: On motion by a member, Committee members should be nominated and elected to the offices of DCISC Chair and Vice-Chair.

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE	
AGENDA TRANSMITTAL FORM	
MEETING DATE:	June 21, 2024
AGENDA ITEM:	XXII-B
AGENDA TITLE:	Review and Discussion of the Open Items List.
CONSENT [ ] ACTION [X] INFORMATION [X]	
Staff Summary: It is anticipated that the Committee will hold discussion concerning the items appearing on its Open Items List prepared by Committee Technical Consultant Wardell with the assistance of Consultant McWhorter.	
RECOMMENDED COMMITTEE ACTION: As appropriate, review and provide direction.	

Diablo Canyon Independent Safety Committee Open Items List – 2023-2024

Open Item Type: **M= Monitor** **F = Follow-up** **I = Issue**

Items in *Red Italics* are new or revised
Items in Yellow are for the next 3 FF Meetings
Items ~~struck through~~ were deleted

ITEM NO.	TYPE	OPEN ITEM CATEGORY/DESCRIPTION	Last Actions	Next Action
CO		**Conduct of Operations (CO)**		
CO-7	M	Review DCPP storm response experience and strategy every two years [or as necessary] during or after annual winter storm season.	5/17FF 3/21FF	As necessary
CO-8	M	Monitor all reactor trips – automatic and manual – and forced outages. (review trip LERs at public meetings).	11/21FF 2/22PM	Post-trip FFs & PMs 3/24FF (1X25 Cause)
CO-9	F	Reactivity Management – review every 18-24 months. ~~[Reviewed Reactivity Management 5/16FF, 4/18FF, and 11/19FF – satisfactory.]~~	List end of OIL 4/23FF *4/24FF*	Regularly
CO-10	M	Mispositioning Errors (Equipment Status) – monitor the status of mispositioning errors and actions to resolve.	12/21FF 4/23FF *5/24FF*	~~5/24FF~~ *2Q25FF*
CO-13	M	Review any initiatives to operate DCPP in different modes, such as load following due to renewable energy fluctuations, during its final years of operation. Include 230kV voltage stability issues. Dr. Peterson observed there is potential that an increase in the risk of transmission problems or outages might affect the availability of alternate off site power sources for DCPP due to increasing incentives to curtail power output because of production or grid-related reasons. Mr. Peck and Dr. Peterson agreed this might be a suitable topic for a future DCISC fact-finding which should include representatives from the PG&E transmission organization.	12/19FF 12/21FF	As necessary *Close?*
CO-14	F	The DCISC team found the operator retention project to be effectively managed but the Committee should follow this issue closely with reference to licensed operators and well as the station in general. Review operator staffing. (Also see EO-5.)	9/23PM 11/23FF	4Q24FF
CM		**Conduct of Maintenance (CM)**		

CM-7	I	Review PG&E's progress in complying with (1) the amendment to 10CFR50.55a, which provides the requirements for ISI of containment structures (degradation) and (2) ASME Code requirements for steel liner weld inspections.	5/22FF 7/22FF	Each Pair of RFOs
CM-10	M	On-line Maintenance: review the implementation of on-line maintenance bi-annually, including the 12-week Rolling Maintenance Schedule about how well it is working & impacting risk. Review trend of amount of on-line maintenance. DCPP Assessment of Maintenance Risk and On-Line Maintenance Risk Procedures have been substantially upgraded with the addition of an Integrated Risk Review Team.	See list at end of OIL *5/22FF*	Regularly ~~2Q24FF~~ *3Q24FF*
CM-13	M	Review Maintenance Department performance measures, staffing, etc. approximately annually.	*3/24FF* *4/24F* *5/24FF*	~~3/24FF~~ *2Q25FF*
EN		**Engineering Programs (EN)**		
EN-16	F	DCPP Systems – review a system (or structure or component), system health, long-term plan, Maintenance Rule performance & walkdown with System Engineer at FFs. [Note: Systems reviewed are listed with dates at the end of this Open Items List.]	See list at end of OIL	Regularly
EN-19	F	Review every 12-18 months major Engineering Programs, including Configuration Management, Management, System Engineering (system health & long-term plans), Valve Testing, Margin Management, Staffing, etc. [Note: Programs reviewed are listed with dates at the end of this Open Items List.] Review Engineering reorganization 1Q23FF.	See list at end of OIL	Regularly
EN-20	F	Each Member should review or observe Plant Health Committee, Notification Review Team, Corrective Action Review Board, Performance Review Quarterly Meeting, Plant Health Prioritization Committee, Plant Health Working Group, Outage Management Team, and other regular meetings.	See list at end of OIL	Regularly
EN-21	F	Regularly review projects long-term planning	8/23FF	*6/24PM* 3Q24FF
HP		**Human Performance: Human Errors and Improving Safety & Efficiency of Plant Performance**		
HP-1	M	Review human performance & human behavior items (including error reduction programs, HP PIs, aberrant behavior statistics, FFD, stress reduction programs, Personnel Accountability Policy, Human Performance Steering Committee & Subcomm, Centers of Excellence, Org. Development). [Review biennially operator aging, physical fitness, "no solo" issues, attention enhancement, stress management, & incentives for operator focus.	4/22FF 3/23FF *5/24FF*	~~5/24FF~~ *2Q25FF*
HP-25	M	Further observations and improvements in the Management Observation Program should be reviewed by DCISC.	4/19FF 7/21FF *12/23FF*	*2Q25FF*
HS		**Health, Nuclear Safety and Safety Conscious Work Environment**		
HS-6	F	Follow DCPP progress in establishing/improving its safety culture (and its subset Safety Conscious Work Environment, including Safety Culture Monitoring Panel, and including Employee Concerns & Differing Professional Opinion Programs).	9/22FF *8/23FF#1*	*3Q24FF*
PI		**Performance Improvement Programs**		

PI-1		DCPP Performance Improvement Programs: Corrective Action, Self-Assessment, Operating Experience, Benchmarking, etc. Programs reviewed are listed with dates at the end of the Open Items List. [CAP reviewed 4/23FF – satisfactory.] [Observed Corrective Action Review Board 5/24 – satisfactory.]	See list at end of OIL *5/24FF*	*Annually*
EP		**Emergency Preparedness (EP)**		
EP-2	M	Attend and observe DCPP emergency drills and exercises annually [including Hostile Action Based Exercises], paying special attention to JIC communications to the media and public, including radiation release communications to the public, use of social media, coordination of information release with SLO County, and extension of drills to better exercise FMTs & JMC. DCISC drill attendees should assure the confidentiality of the drill scenario by keeping the scenario hidden and under their control at all times. *[Reviewed MIDAS 5/24FF – satisfactory.]*	9/22FF 3/23FF *5/24FF*	Next evaluated exercise 7/31/24 (PFP/ RFW)
EP-3	F	Meet with Emergency Preparedness Group for updates and performance in years with no major exercises.	-	~~12/23FF~~ *3Q25FF*
RA		**Risk Assessment and Management (RA)**		
RA-5	M	Review overall [non-seismic] PRA program annually. Include Fire PRA Upgrade & Shutdown Analysis. Review PRA Group resources/capabilities. (see SC-6).	9/22FF 11/23FF	11/24FF RJB
RA-6	F	Review DCPP response to NRC re: 10CFR50.59 risk-informed rule changes. Review in FF.	3/23FF	4Q24FF
NS		**Nuclear Safety Oversight and Review (NS)**		
NS-5	M	Monitor NSOC meetings periodically to observe their processes and their review of nuclear safety issues.	7/23FF 11/23FF	Next meeting [see FFPM]
NS-9	M	Monitor DCPP's program to track INPO Areas for Improvement. Review with DCPP Coordinator. Review DCPP August 2022 INPO evaluation.	12/22FF 11/23FF	9/24FF
RP		**Radiation Protection (RP)**		
RP-3	M	Regularly review outage RP performance. *Observed ALARA Committee meeting at 4/24FF.*	11/23FF 12/23FF *4/24FF*	~~4/24FF or 5/24FF~~ *1R25*
RP-12	M	Review annual DCPP radioactivity release report each year. Review at Summer or Fall FFs.	7/22FF 8/23FF#1	3Q24FF
QP		**Quality Programs (QP)**		
QP-3	M	Review the activities, organization and results of QV audits as well as PG&E's outside biennial audits, including timeliness of corrective actions. Review annually – include 4th quarter QPAR with yearly results.	3/22FF 9/23PM	3Q24FF
QP-9	F	Software QA Program	See list at end of OIL	Regularly
NF		**Nuclear Fuel Performance (NF)**		

NF-9	M	Nuclear Fuel Performance & Issues (review after RFOs). Observed new fuel receipt and inspection 8/22FF.	12/22FF 1/24FF	Each RFO *1R25*
ER		**Equipment Reliability and Life Cycle Management (ER)**		
ER-5	M	Monitor the Equipment Reliability Process approximately annually.	See list at end of OIL ~~5/23FF~~ *5/24FF*	Annually ~~3Q24FF~~ *3Q25FF*
OE		**Organizational Effectiveness & Development (OE)**		
OE-1	F	Review DCPP Operating Plan each January after development.	1/24FF *2/24PM*	*2/25PM*
OE-2	F	Station Excellence Plan & Management Review Meeting	3/23FF	3Q24FF
SE		**System and Equipment Performance/Problems (SE)**		
~~SE-26 Returned~~	~~F~~	~~Review reactor pressure vessel compliance status after next set of surveillance samples is analyzed and effective vessel lifetime projections are updated. [Reviewed specimen status at 10/10 FF: satisfactory.] [RV Coupon status 5/13FF.] [Reviewed Pressurized Thermal Shock Rule 8/13FF – satisfactory.] [Reviewed 1/15FF – satisfactory.]~~ *Close to new EMB-3.*	~~1/15FF~~ ~~8/23FF#1~~ ~~11/23FF~~	~~2/24PM~~ ~~1R25RFO~~ *Close to EMB-3.*
SE-39	F	Review and tour the inspections and repairs of concrete Intake Structures following selected refueling outages.	12/19FF 8/21FF 8/23FF#2	Next RFO ~~5/24FF~~ *1R25*
SE-49	F	Emergency Diesel Generators (EDGs): *Reviewed EDG 2-2 Maintenance Outage Window 4/24FF*	See list at end of OIL 1/24FF *4/24FF*	Regularly
SE-50	F	Maintenance Rule Functional Failures [Change from SSFFs to MRFFs beginning 3/21FF.]	See list at end of OIL 4/22FF *11/23FF*	Regularly
SE-51	*F*	*Cause Evaluation for Auxiliary Saltwater Pump 2-2 Failure – Extended to include observations during 7/24 pump motor overhaul.*	*3/24FF* *5/24FF*	*4Q24FF*
OM		**Outage Management (OM)**		
OM-3	M	During outages, monitor Outage Coordination Center, Control Room, and containment walkdown/inspection (end of outage). Review outage turbine work. Review Steam Generator performance metrics and inspection results.	*11/23FF* *3/24FF*	Each RFO ~~2Q24FF~~ *1R25*
OM-4	M	Review Outage Safety Plan, safety margin trends, outage results, including clearances, following each outage at FFs and PMs.	1/24FF *3/24FF* *4/24FF*	Each RFO *1R25*

OM-5	F	Review FME Program Performance.	See list at end of OIL 12/23FF *4/24FF*	Each RFO *1R25*
OM-6	F	Monitor Changes in 1R24/2R24 Outage Scopes Needed to Support Extended Operations. Outage 1R24 scope complete. Review 2R24 outage plans 1Q24FF. *Review Results of 2R24 June 2024 PM.*	 1/24FF *2/24PM*	4Q24FF *6/24PM*
SEC		**Security (SEC)**		
SEC-3	M	Monitor interaction of Security and Operations, Engineering, Maintenance, and Emergency Preparedness for effects on nuclear safety. Plant security per se not reviewed but reviewed only in the context of impact on plant operation.	12/19FF 12/20FF 12/22FF	*4Q24FF*
SEC-4	M	Review status of DCPP cyber security (but not physical security) program in compliance with NRC requirements.	9/22FF 1/23FF *3/24FF*	~~*3/24FF*~~ *3Q25FF*
SF		**Independent Spent Fuel Storage Installation – ISFSI (SF)**		
SF-1	F	Monitor ISFSI operations, including the development of new procedures by Orano for the loading of new Dry Storage Canisters (DSCs), movement of DSCs from SFP to ISFSI, and loading of DSCs into new Horizontal Storage Module (HSM). Review and observe 2024 loading campaigns.	10/20PM 5/21FF 1/24FF	*6/24PM* 7or8/24FF
SF-2	M	Follow technical advances of relative risks of existing (Holtec) casks and pool storage. Follow relicensing of ISFSI including seismic adequacy reviews and the implementation of aging management plans.	6/23PM 8/23FF#2	3Q24FF
SF-4	F	Review the adequacy of the design for new (Orano) spent fuel TBD storage system focusing on items of safety significance including seismic adequacy, criticality control, storage of damaged fuel, thermal analyses, effects of extreme environmental conditions, long-term (>100 years) integrity assurance, radiation/neutron shielding, and accident analyses.	1/23FF 8/23FF#2	TBD
SF-5	F	Monitor the submittal and approval of license amendment(s) for the Orano spent fuel storage system.	1/23FF 6/23PM 8/23FF#2	TBD
SF-7	M	Monitor Plans for Storage of Greater than Class C Waste	8/22FF	TBD
SF-8	M	EPRI study [Radiological Consequences of a Release of Radionuclides from a Spent Fuel Storage Cask] has not yet finished although some supporting studies have been concluded regarding source term and what flow rate should be estimated for use in the study. He reported EPRI plans to issue its study in early spring of 2023 and the DCISC should review it at that time. Update 5/23 – study completion deferred until 2025 to obtain additional research data from DOE.	5/23FF#1	4Q25FF

SC	M	Seismic, Tsunami and Other External Events		
SC-3	M	Long-Term Seismic Program: review periodically. Review significant seismic events as they occur. (See also EO-9.)	9/22FF 11/22FF 5/23FF	*4Q24FF*
SC-12	F	Workplace seismic safety – review annually.	5/23FF#1	7/24FF PFP
SC-14	M	Monitor the Work of the Independent Peer Review Panel	11/22FF 3/23FF 5/23FF#2 *5/24FF#2*	Next mtg. ~~Mar or Apr 24FF~~ *5/30/24*
SC-15	M	The DCISC should review post-earthquake procedures for the fire department and for security personnel with respect to FLEX equipment and plant access. *DCISC recommendation partly implemented by DCPP.*	5/23FF *7/23FF* 12/23FF *5/24FF*	7/24FF
FP		**Fire Protection (FP)**		
FP-5	M	Review NFPA-805-based Fire Protection Program and Systems every two-three years, including QV audits and NRC triennial inspections. Review the health and correction of degraded systems every six months. Monitor fire doors (Plant Door Life Cycle Management Plan) for correction of impairments.	See list at end of OIL 4/23FF	Regularly 3Q24FF
LD		**Learning & Development Programs (LD)**		
LD-3	M	Review non-license technical, operations & accredited training programs at least annually. *[Reviewed Learning Services 5/24FF – satisfactory.]*	5/23FF#1 12/23FF *5/24FF*	3Q24FF
LD-6	F	Observe operator license, re-qualification, classes periodically in FF meetings.	4/23FF 1/24FF	4Q24FF
NR		**Nuclear Regulatory Commission Items (NR)**		
NR-3	M	Monitor the Non-Cited Violation Tracking & Trending Program annually at the Jan/Feb Public Meetings.	3/year	Each PM
NR-4	F	Meet with NRC Resident Inspectors regularly.	Most FFs	Regularly
DEC	F	**Decommissioning**		
DEC-1	F	Review DCPP decommissioning plans periodically as a result of the Joint Proposal plant shutdown in 2025. Review the timing of spent fuel transfer from wet to dry storage and when the spent fuel pools are decommissioned the plant will lose the capability to open multipurpose canisters for inspection. DCISC should actively review the decommissioning plans for DCPP because of the potential impact on staffing and future options with respect to managing spent fuel.	10/22PM 2/23PM 6/23PM	4Q24FF ADK
DEC-4	F	Emergency preparedness during decommissioning. [Met with SLO OES 11/22FF.]	11/22FF 2/23PM	4Q24FF ADK

DEC-5	F	DCPP's approach to submitting LAR requests for decommissioning appears appropriate and the DCISC should continue to follow from a safety perspective all the regulatory activities which will define the reduction in requirements which will occur at shutdown.	9/22FF 9/22PM	4Q24FF ADK
EO		**Extended Operations (EO)**		
EO-1	M	Monitor the Purchasing of New Fuel [12/22FF fuel performance & future purchases satisfactory for 2030 operation.]	12/22FF	As ap-propriate
EO-2	M	Monitor the Procurement of New Spent Fuel Canisters to Support Extended Operations and Changes to the Schedule for Fuel Movement from SFP to ISFSI	2/23PM 6/23PM 8/23FF#2 1/24FF	*6/24PM*
EO-3	M	Monitor the State and Local Permitting Process	-	As needed *6/24PM*
EO-4	M	Monitor the NRC License Renewal Application and Review Process	6/23PM 8/23FF#2 12/23FF	3Q24FF
EO-5	M	Monitor Staffing for Extended Operations	8/23FF#2 11/23FF *2/24PM*	4Q24FF
EO-9	F	Monitor and review the updated seismic assessment required by SB846.	11/23FF *3/24FF* *5/24FF#2*	6/24PM *then Close*
EMB		***Unit 1 RPV Embrittlement [New]***		
1	*F*	*Determine DCISC Next Steps on Unit 1 Reactor Pressure Vessel Embrittlement. Request/receive comments on Kirk Report by Severance and Macdonald in April/May 2024 and address them as needed in Kirk Report for discussion at 6/24PM. Scope of discussion is "current state."*	*2/24 PM*	*6/24PM*
2	*F*	*Mark Kirk to review and report on the possible outcomes of Capsule B test results.*	*2/24PM*	*6/24PM*
3	*F*	*[Former SE-26] Review reactor pressure vessel compliance status after next set of surveillance samples is analyzed and effective vessel lifetime projections are updated. [Reviewed specimen status at 10/10 FF: satisfactory.] [RV Coupon status 5/13FF.] [Reviewed Pressurized Thermal Shock Rule 8/13FF – satisfactory.] [Reviewed 1/15FF – satisfactory.]*	*11/23FF* *2/24PM*	*6/24PM* *1R25RFO*
O		**Other Items (O)**		
O-1	F	Perform observations of evolutions (work processes) within the plant periodically. Continue with these about annually. Work process observations: Observe in the plant work processes important to nuclear safety, such as operator rounds, Control Room shift turnover, surveillance tests, preventive and corrective maintenance, system modifications, system walk downs with system engineers; outage activities, etc.	11/22FF *8/23FF#1* *4/24FF*	Regularly
O-2	F	COVID-19 responsibilities/practices.	9/21FF 1/22FF	As appropriate
		Public Meeting Items (PM) (Reference: Public Meeting Minutes Pages)		

9/22 PM 16	F	Ms. Seeley stated DCPP was scheduled to conduct testing of a coupon from the reactor vessel to assess the extent of embrittlement of the Unit 1 vessel in March 2021 or 2022, but that test did not take place. She inquired if the DCISC were following up on the matter and whether the public could get answers about the embrittlement issue for Unit 1 which she stated PG&E claims as proprietary information. Dr. Peterson replied that the issue raised by Ms. Seeley is one the Committee should review in context of continued operation as it represents a key aging management question and a central part of the license extension review. . *DCISC is following closely. Close to EMB-3.*	9/22PM 6/23PM 8/23FF#1 12/23FF 2/24PM	1R25 RFO *Close to EMB-3.*
2/23 PM 14	F	Dr. Peterson commented he favors the wider application of Wi-Fi technology in the plant and moving toward electronic procedures as both can objectively improve plant safety and these applications also create opportunities for the plant staff to acquire new skills which are beneficial to them independent of the future of DCPP and he remarked creating these opportunities for plant staff make it more attractive to remain at DCPP.	2/23PM *8/23FF#1 12/23FF*	12/24FF PFP
28	F	Mr. McWhorter reported the DCISC should review the root cause evaluation of a previous [boric acid leak on a 2" vacuum fill line coming off the Loop 1 Reactor Coolant System cold leg] once it is complete. [PG&E to cut the fitting out for further analysis in 2R24.] *Found acceptable at 4/24FF – close.*	2/23PM *8/23FF#1 4/24FF*	~~Awaiting Final RCE After 2R24~~ *Close*
6/23 PM 4	F	He [McWhorter] recommended the DCISC observe another meeting of the CARB in the near future.	6/23PB *5/24FF*	~~2Q24FF~~ *Close to OIL List*
9	F	Dr. Budnitz commented the issue raised by Mr. Severance as to any compromise due to corrosion might be a worthwhile inquiry for the DCISC to assess if it were accounted for in the margin needed.	6/23PM	2/24PM Close?
13	F	In response to Consultant McWhorter's inquiry as to an expected change to the reference temperature, given additional information, and whether the analysis is in the nature of a confirmatory fact analysis, Mr. Soenen stated he would need to review the matter and provide a subsequent response to the Committee.	6/23PM	2/24PM Close?
9/23 PM 8	F	Dr. Peterson remarked there are legal issues that constrain where servers can be located but he believes the question of how artificial intelligence with its ability to both reduce the amount of work and pull additional insights out of information might be applied in the context of OE and in other applications is one the DCISC should follow as it is possible improvements in operational safety may result.	9/23PM	*12/24FF*
2/24 PM 1	*F*	*At Doctor Peterson's suggestion a copy of the 2022 reports reviewed by the Committee together with the August 2023 Fact Finding Report will be sent to Ms. Seeley to seek her recommendations for what additional information should be provided. [Completed – close.)*	*2/24 PM*	*Close*
2	*F*	*Mr. David Weisman representing the Alliance for Nuclear Responsibility was recognized. He stated concerning failure during 1R24 to meet the goal for collective radiation exposure there was reference to emergent issues and he inquired as to a more detailed enumeration of what those emergent issues may have been. Mr. Wardell stated he would review the written report and provide more information to Mr. Weisman later during the meeting, as there is a presentation scheduled during this meeting on the 1R24 refueling outage and that may be an opportune time to address Mr. Weisman's inquiry.*	*2/24 PM*	*Close*
3	*F*	*The FFT concluded 1R24 was successful and the DCISC should follow up on the causes and corrective actions for the pressurizer safety valve leak and on maintenance outage 1X25.*	*2/24 PM*	*TBD*

4	F	The DCISC FFT concluded that this was appropriate follow up and the status of the implementation of FLEX procedures should be reviewed in the future with reference to other procedural changes. [Reviewed 5/24 FF: satisfactory. The DCISC should review additional changes planned for procedure CP M-12, "Stranded Plant," during a future Fact-Finding Meeting later in 2024.]	2/24 PM	3Q24FF
5	F	Mr. McWhorter stated the FFT concluded that the DCISC should review this topic [electronic procedures] following conclusion of the 2R24 refueling outage.	2/24 PM	3Q24FF
6	F	The FFT concluded the Emergency Preparedness Department was performing well overall and the DCISC should plan to observe the emergency preparedness exercise scheduled for July 31, 2024 and Mr. McWhorter reported a fact finding visit has been planned around that date.	2/24 PM	7/24FF
7	F	A cause evaluation will be performed for the [ASW Pump] bearing degradation and Consultant McWhorter reported the FFT recommended the DCISC review the cause evaluation in the future. [May 2024 FF: "A Cause Evaluation is in progress to determine why corrective actions from the 2018 event were ineffective in preventing recurrence, and the DCISC should review the results of that Cause Evaluation following its completion."]	2/24 PM 5/24FF	Awaiting DCPP Cause Evaluation
8	F	Dr. Budnitz suggested that the DCISC's next review of the Emergency Preparedness Program should include asking DCPP about plans to use IPAWS and the rationale for continued use of the present system of notification. [Added to Open Items List.]	2/24 PM	7/24FF
9	F	In response to Dr. Lam's query concerning the complexity of that effort Mr. Soenen replied he would need to look into what alternative evaluations would be necessary if DCPP were not able to use the validation of Capsule B data in the LRA and he stated he would follow up with a response to the Committee on this matter.	2/24 PM	Awaiting DCPP
10	F	Dr. Peterson remarked if there are different reports for the same samples that have different numbers, then it's important for the Committee to determine which of those numbers would be correct and to use that number.	2/24 PM	6/24 PM
11	F	Dr. Peterson replied the Committee would be able to develop some recommendations and he believes, at this point, he has a good understanding of the basic areas of concerns that Mr. Severance is raising and he does not believe it to be possible to cover all of them in the context of this public meeting and a different process will need to be developed to try to make that happen.	2/24 PM	TBD
12	F	Dr. Peterson also observed however, the DCISC has a basis to collect more data going forward and to see if there is any additional information or anomalies identified from Mr. Severance's work. Dr. Peterson suggested the Committee accept and endorse Dr. Kirk's report and direct ongoing investigation into this open area while continuing to engage Dr. Kirk's services to that end. Dr. Peterson remarked gathering more data will reduce uncertainty and he stated he believes the Committee should recommend that Capsule B be removed and the Committee should evaluate the opportunity to do additional testing and he believes the reconstituted Charpy tests may provide the best comparison. The Committee should then revisit this topic at its June 2024 public meeting.	2/24 PM	6/24 PM
13	F	Mr. Wardell remarked it would be useful for Dr. Kirk to complete the USE reanalysis as it could provide additional assurance regarding Unit 1 embrittlement.	2/24 PM	6/24 PM
14	F	Therefore, Dr. Budnitz stated it is not necessary for the Committee to take a position on an extended operational period of twenty years, but Dr. Budnitz stated that with what he knows today from Dr. Kirk's report the vessel is not going to be in an unacceptable condition for embrittlement within the next few years and it can continue to run for the next few years without a compromise to safety from the PTS phenomenon.	2/24 PM	Close

15	*F*	*Dr. Peterson then amended his motion to state the Committee accepts Dr. Kirk's report and will continue to investigate the topic to gain new information from the sources identified as well as others and then return to this topic at the June 2024 public meeting to consider endorsing Dr. Kirk's report. Dr. Peterson then asked that his motion be tabled until tomorrow for a vote and Mr. Rathie confirmed this was appropriate.*	*2/24 PM*	*6/24 PM*
16	*F*	*Dr. Budnitz suggested that a category be added to dose goal for "individual dose goal" that represents the amount of radiation received that no person should exceed. [Mr. Werner commented he appreciated and would take Dr. Budnitz' observation and suggestion into consideration and he reported radiation permits for entry into radiological controlled areas (RCAs) have appropriate dose limits which are well under the federal standards and also under the administrative levels set by the plant. In no case has any individual come close to any threshold, administrative or federal, for dose exposure.]*	*2/24 PM*	*Close*
17	*F*	*Dr. Peterson stated he believes input should be received from the external stakeholders, in particular Mr. Severance and Dr. Macdonald as an open item and Dr. Kirk should be requested to identify an approach to obtain this data and this would be one of the open items to be reviewed at the June 2024 public meeting.*	*2/24 PM*	*Awaiting Macdonal d input*
18	*F*	*Dr. Kadak also stated he recommends the Committee investigate the contents of Capsule A to determine if it contains the weld material and the fluence level as to whether that information would provide information on the condition of the Unit 1 reactor pressure vessel for between forty and sixty years of operation.*	*2/24 PM*	*TBD*
19	*F*	*Dr. Peterson remarked in the past there have been issues with NRC and DCISC public meeting schedules and he wondered if there might be an opportunity to coordinate schedules such that meetings would not be on the same days. Mr. Soenen stated he would take note of Dr. Peterson's comment in the process of scheduling the public meeting on the Environmental Impact Statement.*	*2/24 PM*	*Awaiting NRC*
20	*F*	*Mr. Geesman inquired as to the reference in Mr. Wardell's written fact-finding report to [EDG] GQD panel alarm relay modules being obsolete with no spares in stock and that DCPP will need to procure 15 replacement modules through end of plant life. Mr. Geesman inquired whether the reference to plant life referred to five years or to twenty years. [According to DCPP, it's five years until 2030.]*	*2/24 PM*	*Close*

DCPP Systems/Components Reviewed Periodically [Yellow = Upcoming FF]
4 kV – July 2022
230 kV & 500 kV – Dec 2022
Aux Feedwater – Mar 2024
Aux Saltwater – Mar 2024 FF (ASWP 2-2 Failure Cause Eval)
Aux Bldg Ventilation – July 2023
Chemical & Volume Control System and High Pressure Injection – Jan 2021
Component Cooling Water – Mar 2023
Compressed Air – Apr 2023
Condensate & Feedwater – Nov 2021
Containment Structure – July 2022
Containment Spray – May 2022
Containment Ventilation and H_2 Purge – July 2023
Control Room Simulator – May 2024
Control Room Ventilation – July 2023
Digital Systems ~~–2021~~ *April 2024*
DC Power – Mar 2022
EDG – Jan 2024
Fire Protection & Detection Systems – Apr 2023
Nuclear Instrumentation & In-core Instrumentation – Sep 2022
Plant Protection System – Mar 2023
Radiation Monitoring – May 2023
Radwaste Processing ~~–2020~~ *Mar 2024*
Reactor Coolant System & Pumps – Apr 2023
Buried Piping & Tanks – May 2023
RCS Process Control System – May 2020

Refueling Equipment – ~~Jan 2022~~ *May 2024*
RHR – Jan 2021
Rod Control & Indication – Aug 2023
Safety Injection Pumps – Jan 2021
Spent Fuel Pool Cooling & HVAC – July 2021
Steam Generators – Aug 2023
Special Protection System – Mar 2020
Turbine-Generator – Jan 2023

DCPP Programs Reviewed Periodically [Yellow = Upcoming FF]
10CFR50.59 Program – July 2021
ALARA – May 2022
Air Operated Valves – Jan 2024
Benchmarking – Mar 2022
Boric Acid Corrosion Control – Aug 2023
Chemistry – Aug 2021
Cranes – Dec 2021
Configuration Management – Apr 2022
Corrective Action – CARB – ~~Apr 2023~~ *May 2024*
Emergency Preparedness– Dec 2023
Employee Concerns Program – Aug 2023
Equipment Environmental Qualification – Dec 2022
Equipment Reliability – ~~May 2023~~ *May 2024*
Fire Doors & Door Life Cycle Mgm't. Plan – Jan 2022
Fire Protection Program (NFPA-805) – Apr 2023
FLEX Program – Jul 2023
Flow Accelerated Corrosion – May 2022
Foreign Material Exclusion – ~~May 2022~~*April 2024*
Greater Than Class C Waste – Aug 2022 PFP
In-service Inspection Program – Jul 2023
Integrated Risk Assessment Program – Mar 2022
Large Motors – Jul 2023
Long-Term Capital Planning Process – May 2023
MIDAS – ~~Dec 2021~~ *May 2024*
Maintenance Rule – Nov 2023
Margin Management Program – ~~May 2020~~ *April 2024*
Motor Operated Valves – Jan 2024
Notification Review Team – Mar 2022
Nuclear Fuel Program – Jan 2024
Nuclear Insurance Programs – May 2024
On-Line Maintenance – May 2022
Operating Experience – Nov 2021 (review biennially)
Operability Assessment Program – Jan 2022
Operational Decision Making – *April 2024*
PRA Programs (non-seismic) – Sep 2022
Performance Improvement – Sep 2023 PM
Performance Review Quarterly Meeting – Apr 2021
Plant Health Committee/Subcommittee – Jul 2023
Plant Health Prioritization Committee – Aug 2023
Reactivity Management – *Apr 2024*
Safety-Security Interface – Dec 2022
Self-Assessment – Jan 2023
Single Point Vulnerabilities – Jan 2022
Seismic PRA – May 2023
Seismically Induced System Interactions – ~~Nov 2020~~ *Mar 2024*
Software QA - Aug 2021
Spent Fuel Management – Aug 2023
System Engineering – Mar 2022
Transformers, Large – July 2023
Troubleshooting – Dec 2022
Tsunami Hazard Analysis – August 2022
Vibration Monitoring – Mar 2021

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE	
AGENDA TRANSMITTAL FORM	
MEETING DATE:	June 21, 2024
AGENDA ITEM:	XXIII
AGENDA TITLE:	Update on Public Outreach, Site Visits and Committee Member Activities and Scheduling of DCISC Activities During 2024-2025.
CONSENT [ ] ACTION [ ] INFORMATION [X]	

Staff Summary: It is expected that the Committee Members will hold a discussion regarding public outreach, Member's activities and will schedule confirm and scheduled future activities of the Committee for 2024 and 2025.

The Actual and Proposed DCISC Fact-Finding and Public Meeting Items, with Key Dates, prepared by Committee Consultant Ferman Wardell is provided for your use in reviewing and planning Committee activities.

RECOMMENDED COMMITTEE ACTION: As appropriate

DCISC Fact-Finding and Public Meeting Agenda Items for 2023-2024

July 26-27, 2023 Fact-finding Meeting (PFP, RDM) (AR Exhibit D.1)
1. Nuclear Safety Oversight Committee Exit Meeting (Remote)
2. Plant Health Subcommittee Meeting
3. Meet with Nuclear Regulatory Commission (NRC) Resident Inspector
4. Meet with DCPP Officer
5. Control Room and Auxiliary Building Ventilation Systems
6. Inservice Inspection Program
7. Large Transformers
8. Post-earthquake Procedures for Plant Access and the Use of FLEX Equipment
9. Review of Equipment Long-Range Planning and Maintenance

August 9-10, 2023 Fact-finding Meeting (PL, RFW) (AR Exhibit D.2)
1. Meet with NRC Senior Resident Inspector
2. Powerblock WiFi and Electronic Work Packages and Procedures
3. Observe Maintenance Work
4. Rod Control and Indication System
5. Employee Concerns Program
6. Nuclear Safety Culture
7. Meet with DCPP Officer, Maureen Zawalick
8. Boric Acid Leak Root Cause Evaluation
9. Comprehensive Review of Equipment Long-Range Planning and Maintenance
10. Radioactive Effluent Release and Environmental Monitoring Reports
11. Reactor Vessel Pressurized Thermal Shock

August 29-30, 2023 Fact-finding Meeting (RJB, RDM) (AR Exhibit D.3)
1. Spent Fuel Management
2. License Renewal
3. Plant Health Prioritization Committee Meeting
4. Meet with DCPP Officer Adam Peck
5. Staffing Following Tier 2 Retention Program Expiration
6. Plant Tour
7. Meet with Nuclear Regulatory Commission (NRC) Senior Resident Inspector
8. Steam Generators
9. Meet with DCPP Officer Maureen Zawalick
10. Seismic and Geosciences Update
11. Refueling Outage 1R24 Scope and Schedule
12. Review of Equipment Long-Range Planning and Maintenance
13. Intake Cove Sediment Issues

September 13-14, 2023 Public Meeting (AR Exhibit B.3)
1. State of the Plant Update: including Key Events, Highlights, Organizational Changes, Preparations for Refueling Outage 1R24
2. Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC Inspection Reports NRC Current Issues, & Current & Future License Amendment Requests
3. Engineering Department Overview, Update on Activities, Staffing, and Excellence Plan

4. Fact-finding Topic; Comprehensive Review of Equipment Long-Range Planning and Maintenance (PMO++ Program)
5. Quality Verification Organization's Perspective on Plant Performance, Top Issues, Quality Performance Assessment Report
6. Overview and Status of Performance Improvement Programs
7. Consider Approval of a Proposed Third Restatement of the Committee's Charter
8. Status of Staff Retention Program and Update on Staffing in Support of Extended Operations
9. Update on Status of Studies Required Under SB846 for Independent Consultants to Catalog and Evaluate Maintenance Plans and for Conducting an Updated Seismic Assessment

November 14-15, 2023 Fact-finding Meeting (RJB, RFW) (AR Exhibit D.4)

1. Operations Staffing and Retention
2. Unit 1 Reactor Vessel Embrittlement Update
3. Maintenance Rule Update
4. Probabilistic Risk Analysis (Non-seismic) Update
5. Meeting with NRC Resident Inspector
6. Institute of Nuclear Power Operations (INPO) Update
7. Meeting with DCPP Officer
8. Independent Seismic Assessment Update
9. Outage 1R24 Update and Outage Control Center Observation
10. "Deferred" Maintenance
11. Accompany Operator on Unit 2 Rounds
12. Observe Nuclear Safety Oversight Committee Meeting (Remote - November 30, 2023)

December 12-13, 2023 Fact-finding Meeting (PFP, RDM) (AR Exhibit D.5)

1. Refueling Outage 1R24 Results
2. Outage Management Team Meeting
3. Response to DCISC Recommendation on the Use of Earthquake Response Procedures
4. Training Programs for New Engineers
5. Intake Cove Maintenance and Dredging Project Update
6. Unit 1 Reactor Vessel Embrittlement Update Including Efforts to Remove Capsule B
7. Refueling Outage 1R24 License Renewal Inspection Results
8. License Renewal Application Overview
9. Update on the Use of Electronic Procedures
10. Management Observation Programs
11. Emergency Preparedness Department
12. Meet with DCPP Officer
13. Auxiliary Saltwater Pump 2-2 Degradation and Exigent Technical Specification Change
14. Low Temperature Overpressurization Protection System
15. Meet with Nuclear Regulatory Commission (NRC) Senior Resident Inspector

January 24-25, 2024 Fact-finding Meeting (PL, RFW) (AR Exhibit D.6)

1. Observe Plant Health Committee Meeting
2. 2R24 Refueling Outage Plans
3. Meet with NRC Senior Resident Inspector
4. 2023 Operating Plan Results and 2024 Operating Plan
5. Unit 1 Reactor Vessel Embrittlement

6. 2024 Spent Fuel Loading Campaigns
7. 2023 Regulatory Year in Review
8. Post-Outage 1R24 Reactor Physics Tests
9. Intake Dredging Update
10. Observe Reactor Operator Continuing Simulator Training
11. Air- and Motor-Operated Valve Programs
12. Emergency Diesel Generator Update

February 21-22, 2024 Public Meeting (AR Exhibit B.6)

1. Receive PG&E's Response to DCISC 33rd Annual Report on the Safety of Diablo Canyon Operations; July 1, 2022 – June 30, 2023
2. Minutes of September 13-14, 2023, Public Meeting
3. Review of the Open Items List
4. Discussion of New DCISC Initiatives Related to Extended Operations Under SB846, License Renewal, and Changes of Emphasis in Upcoming Fact-Finding Meetings
5. Briefing on Section 4.2 of New License Renewal Application. (Reactor Vessel Neutron Embrittlement Analysis), Including a Briefing on the Recent Attempt to Retrieve Capsule B on Unit 1
6. Results of Studies on Unit 1 Reactor Pressure Vessel Integrity and Comments/Testimonies from Messrs. B. Severance and D. Macdonald by Committee Consultant Dr. Mark Kirk
7. State of the Plant Update including Key Events, Highlights, Maintenance Outage 1X25, Organizational Changes, and Other Station Activities since the DCISC's September 2023 Public Meeting
8. Refueling Outage 1R24 Results (Including Initial License Renewal Inspection Results), and Preparation for Refueling Outage 2R24
9. Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC Inspection Reports, NRC Current Issues, and Current and Future License Amendment Requests
10. Update on Proposed New Staff Retention Incentive Program in Support of Extended Operations; Results of the 2023 Operating Plan and Key Elements of the 2024 Operating Plan
11. Overview of New License Renewal Application Organization, Information Contained and Highlights of Sections with Significant New Information
12. Update on the Status of PG&E Sponsored Study Required Under SB 846 for Conducting an Updated Seismic Assessment
13. Results of Study Required Under SB846 by Independent Consultants to Catalog and Evaluate Any Deferred Maintenance

March 18-20, 2024 Fact-finding Meeting (RJB, RDM) (AR Exhibit D.7)

1. Review of the Updated Seismic Assessment Required by Senate Bill 846
2. Radioactive Waste Management
3. Observe Outage Management Team Meeting
4. Auxiliary Feedwater System Health
5. Cyber Security Program
6. Plant Tour
7. Seismically Induced Systems Interactions Program Update
8. Cause Evaluation for Auxiliary Saltwater Pump 2-2 Failure

9. Maintenance Department
10. Meet with DCPP Officer
11. Refueling Outage 2R24 Preparations and Outage Safety Plan
12. Meet with Nuclear Regulatory Commission (NRC) Senior Resident Inspector

April 17-18, 2024 Fact-finding Meeting (PL, RFW) (AR Exhibit D.8)Plant
1. As Low As Reasonably Achievable (ALARA) Committee Meeting
2. Reactivity Management Update
3. NRC Senior Resident Inspector
4. Digital Systems Update
5. Observe Maintenance Activity
6. Outage 2R24 Safety Plan and Outage Status
7. Operations Update and Operational Decision-Making (ODM) Process
8. Emergency Diesel Generator 2-2 Maintenance Outage Window
9. Meet with DCPP Officer Maureen Zawalick
10. Margin Management Update
11. Reactor Coolant System Boric Acid Leak Root Cause Evaluation
12. Intake Cove Dredging Update

May 8-9, 2024 Fact-finding Meeting (PFP, RDM) (AR Exhibit D.9)
1. Meet with Nuclear Regulatory Commission (NRC) Senior Resident Inspector
2. Response to DCISC Recommendation on the Use of Earthquake Response Procedures
3. Observe Outage Scope Review Team and Daily Notification Review Team Meeting
4. Human Performance and Plant Status Control
5. Nuclear Insurance Programs
6. Meteorological Information and Dose Assessment System
7. Cause Evaluation for Auxiliary Saltwater Pump 2-2 Failure
8. Learning Services Department
9. Inspection and Maintenance Programs for Major Equipment Supports
10. Plant Tour
11. Refueling Equipment
12. Observe Corrective Action Review Board
13. Meet with DCPP Officer
14. Equipment Reliability Program

May 30, 2024 Fact-finding Meeting (RJB, RDM/RFW) (AR Exhibit D.10)
1. Independent Peer Review Panel Meeting on May 30, 2024
2. Update to the June 2023 Comprehensive Seismic Safety Update

June 20-21, 2024 Public Meeting (AR Exhibit B.9)
1. Update on the Status of NRC Performance Indicators, Licensee Event Reports, NRC Inspection Reports and Notices of Violation, Issues Raised by NRC Resident Inspectors, Open Compliance Issues, Current and Future License Amendment Requests, and Other Significant Regulatory Issues/Requests.
2. Refueling Outage 2R24 Results (Including Initial License Renewal Inspection Results).

3. State of the Plant Update including Key Events, Highlights, Organizational Changes, Circumstances Around the March Exigent Technical Specification Change from the NRC, and Other Station Activities since the DCISC's February 2024 Public Meeting.
4. Update on Major Project Planning – Projects Completed in Refueling Outages 1R24 and 2R24, Including Intake Cove Dredging; Future Plans for Plant Improvements, Including Projects Planned for Refueling Outages 1R25 and 2R25.
5. Update on Spent Fuel Management – Planning and Scheduling for Upcoming Movements of Spent Fuel from Wet to Dry Storage; Update on the Procurement of a New Spent Fuel Storage System from Orano.
6. Update on Obtaining State and Local Approvals and Permits Necessary to Support Extended Operations.
7. Status of Governmental Agency Interactions, Responses to SB846 Directives, Review and Consider Approval of Revised Committee Policies, Administrative Matters (including ratification of Amendment No. 3 to Consulting Agreement with Dr. Mark Kirk), Financial and Future Funding, and Other Committee Discussions.
8. Consider Request from PG&E and the Decommissioning Engagement Panel for a DCISC Member to Participate as an *ex-officio* Member of the Decommissioning Engagement Panel.

July 31-August 1, 2024 Fact-finding Meeting (PFP, RFW) (AR Exhibit D.1) (Emerg. Exercise)

August 21-22, 2024 Fact-finding Meeting (RJB, RDM) (AR Exhibit D.2)

September 24-25, 2024 Fact-finding Meeting (RJB, RFW) (AR Exhibit D.3)

October 9-10, 2024 Public Meeting (AR Exhibit B.3)

November 20-21, 2024 Fact-finding Meeting (RJB, RDM) (AR Exhibit D.4)

December 11-12, 2024 Fact-finding Meeting (PFP, RFW) (AR Exhibit D.5)

January 21-22, 2025 Fact-finding Meeting (*, RDM) (AR Exhibit D.6)

February 19-20, 2025 Public Meeting (AR Exhibit B.6)

March 18-19, 2025 Fact-finding Meeting (RJB, RFW) (AR Exhibit D.7)

April 8-9, 2025 Fact-finding Meeting (*, RDM) (AR Exhibit D.8)

May 7-8, 2025 Fact-finding Meeting (PFP, RFW) (AR Exhibit D.9)

June 11-12, 2025 Public Meeting (AR Exhibit B.9)

* Replacement Appointee

DCPP 2024 Key Dates

NSOC Meetings (DCISC invited only to the 2-hour exit meeting on the final days below)

- June 17, 2024
- October 21, 2024

Refueling Outages

- 2R24 Spring 2024
- 1R25 Spring 2025

Emergency Preparedness Exercise

- July 31, 2024

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE	
AGENDA TRANSMITTAL FORM	
MEETING DATE:	June 21, 2024
AGENDA ITEM:	XIII-D
AGENDA TITLE:	Documents Provided to the Committee
CONSENT [ ] ACTION [X] INFORMATION [X]	

Staff Summary: Attached for your information are copies of the transmittal memoranda which list the various documents provided to the Committee by PG&E since your last public meeting in February 2024.

RECOMMENDED COMMITTEE ACTION: None, information item only.

January 2024
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
		There are no LBIEs for this month.

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
1/15/2024	DCL-24-004	Supplement to LAR 23-01, Revision to Tech Spec to Adopt Risk-Informed Completion Times TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b"
1/16/2024	DCL-24-006	4Q2023 - PI Data - Quarterly Submittal
1/17/2024	DCL-24-008	Schedule Considerations for Review of the DCPP License Renewal Application
1/17/2024	DCL-24-009	DCL-24-009 CL, Shipments 3n4
1/29/2024	DCL-24-010	DCL-24-010 CL, Shipments 5n6

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
1/8/2024	DCPP U1 and 2 - LRA Online Reference Portal
1/12/2024	DIABLO CANYON POWER PLANT, UNIT 1 – NRC INSPECTION REPORT 05000275/2023011
1/24/2024	DCPP, U1 AND 2 - NOTICE OF INTENT TO PREPARE AN ENVIRONMENTAL IMPACT STATEMENT AND CONDUCT SCOPING PROCESS - EPID NUMBER L-2023-LNE-0004
1/26/2024	DCPP, U1 AND 2 – LRA Review Schedule Letter

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title

E. CAP Documents (RCAs, WGEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
1 WGE	SAPN	
2 WGE	51220687	DA-480V Bus F Ground on E-103
2 WGE	51197101	DA-CWP 1-1 Excessive Shaft Seal Leakage
2 WGE	51204722	DA-QAAF: SCP instructions / inconsistenc
Eff. Eval	51157404	RCE Effect Eval
12/31/2023		Significance Level 1 and 2 Work Group Evaluations Created 12-01-02023 – 12/31/2023
1/31/2024		List of DN 5.1 and 5.2 Created 01/01/24 - 1/31/24

1/31/2024		DCPP 1 WGE and 2 WGE Notifications Completed 01-01-24 – 01-31-24
01/02/2024		Open LTCA DA Notifications Station Significance 3 as of 01/02/2024
01/02/2024		20 Oldest Non-LTCA DA Notifications as of 01/02/2024
01/02/2024		DCPP CAP Station Index
01/02/2024		Open RCEs as of 12042023
01/02/2024		Open LTCA DA Notifications Station Significance 1 & 2 as of 01/02/2024
01/18/2024	51193383	INPO IER
02/06/2024	51206375	CE – FWH 1-5A

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
01/17/2024		Quality Digest, January Edition 2024
01/18/2024		Quality Performance Assessment Report 2023
01/22/2024	2024-AS-1	Assessment to Determine Emergency Preparedness Audit Frequency

G. Nuclear Safety Culture Monitoring Panel Reports

Date	Doc. No.	Title
		There is no Nuclear Safety Culture Monitoring Panel Report for this month.

H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
02/08/2024	51179615	RP ALARA Conference Benchmark
02/08/2024	51174688	Safety Champion Benchmark
02/08/2024	51061656	Chubu Shadow Visit Benchmark 12/19
02/08/2024	51195792	Environmental Symposium Benchmarking
02/08/2024	51189360	Benchmark INPO RPM/RSTF meeting
02/08/2024	51218216	PVNGS BENCHMARKING TRIP REPORT
02/08/2024	51196935	EPRI/NUCC Benchmarking
02/08/2024	51197739	Engr Benchmark - Training
02/08/2024	51221297	Benchmarking: FP - Wolf Creek
02/08/2024	51107569	FSA: Chem & Rad Protection Training 3Q23
02/08/2024	51205484	DCPP Primary Chemistry Self-Assessment
02/08/2024	51206049	Benchmark Fall INPO RPM & RSTF Meetings
02/08/2024	51167286	2023 Nuc Gen CMM QHSA

I. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title

1/31/2022		Generation Operating Plan 2021 – 2025, No new updates this month.
01/02/2024		January 2024 PI Status Summary
01/11/2024		January 2024 Industrial Safety Performance Improvement Dashboard
01/16/2024		January 2024 Operations Services Performance Improvement Dashboard
01/16/2024		January 2024 Maintenance PI Dashboard
01/16/2024		January 2024 Engineering Services Performance Improvement Dashboard
01/17/2024		January 2024 Security & Emergency Services Performance Improvement Dashboard
01/09/2024		January 2024 Learning Services PI Dashboard
Station Initiative		There are no new Station Initiatives for this month.

J. INPO

Date	Doc. No.	Title
		There are no INPO documents for this month.

K. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
		There are no ODMs for this month.
POA		There are no new POAs for this month.

L. Safety Limit Violation Report

Date	Doc. No.	Title
		There are no Safety Limit Violation Reports for this month.

M. Significance Determination Process Calculations

Date	Doc. No.	Title
		There are no Significance Determination Process Calculations for this month.

N. Miscellaneous

Date	Title
	There are no miscellaneous documents for this month.

O. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 202349	T+1 Performance Critique

January 2024
List of Documents Transmitted Electronically

	Week 202350	T+1 Performance Critique
	Week 202351	T+1 Performance Critique
	Week 202352	T+1 Performance Critique
	Week 202401	T+1 Performance Critique
	Week 202402	T+1 Performance Critique
	Week 202403	T+1 Performance Critique
	Week 202404	T+1 Performance Critique
	December	T+1 Monthly Performance Critique 2349-2352
	January	T+1 Monthly Performance Critique 2401-2404

February 2024
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
		There are no LBIEs for this month.

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
2/72024	DCL-24-013	Nuclear Material Transaction Report for New Fuel, Shipments 7n8
2/12/2024	DCL-24-014	Owner's Activity Report for Unit 1 Twenty-Fourth Refueling Outage
2/14/2024	DIL-24-001	Biennial Submittal of Changes to Diablo Canyon Independent Spent Fuel Storage Installation Technical Specification Bases
2/15/2024	DCL-24-017, DIL-24-002	DCPP Physical Security Plan, Rev 19
2/21/2024	DCL-24-020	Nuclear Material Transaction Report for New Fuel, Shipment 9
2/27/2024	DIL-24-003	Annual Radioactive Effluent Release Report for 2023
2/28/2024	DCL-24-018	LAR 24-01

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
01/29/2024	DCPP, U1 AND 2 – AGING MANAGEMENT AUDIT PLAN REGARDING THE LRA REVIEW
02/09/2024	DIABLO CANYON POWER PLANT, UNITS 1 AND 2 – INTEGRATED INSPECTION REPORT 05000275/2023004 AND 05000323/2023004
02/14/2024	DIABLO CANYON NUCLEAR POWER PLANT, UNITS 1 AND 2 – EXEMPTION FROM SELECT REQUIREMENTS OF 10 CFR PART 73 (EPID L-2023-LLE-0084 [SECURITY NOTIFICATIONS, REPORTS, AND RECORDKEEPING AND SUSPICIOUS ACTIVITY REPORTING])
02/28/2024	ANNUAL ASSESSMENT LETTER FOR DIABLO CANYON POWER PLANT, UNITS 1 AND 2 (REPORT 05000275/2023006 AND 05000323/2023006)

D. NSOC/PSRC Documents (NSOC/PSRC Minutes)

Date	Doc. No.	Title
2/13/2024		Response to Site Visit Report, November 27 – November 30, 2023
2/20/2024		Plant Staff Review Committee Members/Alternates
2/13/2024	2024-001	• STRIDE for STP M-1, "Air Test of Containment Spary Nozzles," Revision 14 • DCL-13-123, Licensee Event Report 2023-01-00, Unit 1 Manual Reactor Trip at Low Power
2/27/2024	2024-002	• DCL-24-018, License Amendment Request 24-01, "Revision to Technical Specification 5.6.6, "Reactor

		Coolant System (RCS) Pressure and Temperature Limits Report (PTLR)"

E. CAP Documents (RCAs, WGEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
1 WGE	SAPN	
2 WGE	51212586	DA-HVBT Tape on Circuit w/o dedication
2 WGE	51223066	DA-Fire Department Ankle Injury
2 WGE	51201199	DA-Exam security near hit
2 WGE	51216912	DA-Missed DEP-PI Opportunity
2 WGE	51209708	DA-QAAF: Vision exams not located in RMS
2WGE	51213198	DA-QAAF- Order-opers not sent for QV rev
2 WGE	51205659	DA-Trend: Inaccurate Initial ENFs
Eff. Eval	51179877	Effectiveness Evaluation for 51179877 NLO FSA
CE	51206844	DA-Bus G 4kV Loads Failed to Re Sequence
01/31/2024		Significance Level 1 and 2 Work Group Evaluations Created 01/01/2024 - 01/31/2024
02/29/2024		List of DN 5.1 and 5.2 Created 02-01-2024 – 2-29-2024
02/29/2024		DCPP 1 WGE and 2 WGE Notifications Completed 02/01/2024 - 02/29/2024
02/13/2024		Open LTCA DA Notifications Station Significance 3 as of 02/13/2024
02/13/2024		20 Oldest Non-LTCA DA Notifications as of 02/13/2024
02/13/2024		DCPP CAP Station Index
02/13/2024		Open RCEs as of 02/13/2024
02/13/2024		Open LTCA DA Notifications Station Significance 1 & 2 as of 02/13/2024

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
02/07/2024		Quality Digest, February Edition 2024
02/26/2024	2024-AS-5	QV Review of Intake Dredging Project
02/28/2024	2024-AS-08	Assessment of Selected Criteria of the Applied Technology Services (ATS) Quality Program Implementation

G. Nuclear Safety Culture Monitoring Panel Reports

Date	Doc. No.	Title
		There is no Nuclear Safety Culture Monitoring Panel Report for this month.

H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title

01/09/2024	51221330	Benchmark: ERIM RS Development
01/09/2024	51221265	RP ALARA Conference Benchmark
02/29/2024	51199739	Formal Self-Assessment: IER 21-4
02/10/2024	51163417	OE Program QHSA - 2023
02/02/2024	51203475	INPO Assist: Streamline QP Approvals
02/05/2024	51214602	EPRI WPUG benchmark Report 2023
02/29/2024	51201014	Chem Benchmark at VC Sumner
02/29/2024	51162114	Self-Assessment: NEI GPI 2023

I. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title
1/31/2022		Generation Operating Plan 2021 – 2025, No new updates this month.
02/2024		February 2024 – Station Excellence Plan
02/15/2024		February 2024 Industrial Safety PI Dashboard
02/12/2024		February 2024 Operations Services Performance Improvement Dashboard
02/15/2024		February 2024 Maintenance PI Dashboard
02/29/2024		February 2024 DCPP Projects Services PI Dashboard
02/15/2024		February 2024 Engineering Services Performance Improvement Dashboard
02/15/2024		February 2024 Security & Emergency Services Performance Improvement Dashboard
01/31/2024		February 2024 PI Status Summary DRAFT
Station Initiative		There are no new Station Initiatives for this month.

J. INPO

Date	Doc. No.	Title
		There are no INPO documents for this month.

K. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
		There are no ODMs for this month.
POA		There are no new POAs for this month.

L. Safety Limit Violation Report

Date	Doc. No.	Title
		There are no Safety Limit Violation Reports for this month.

M. Significance Determination Process Calculations

Date	Doc. No.	Title
		There are no Significance Determination Process Calculations for this month.

N. Miscellaneous

Date	Title
	There are no miscellaneous documents for this month.

O. Functional Area Documents

Subcommittee	Date/Doc	Title
Maintenance	Week 2022	T+1 Performance Critique
	Week 2022	T+1 Performance Critique
	Week 2022	T+1 Performance Critique
	Week 2022	T+1 Performance Critique
	July	T+1 Monthly Performance Critique 2126-2130

March 2024
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
		There are no LBIEs for this month.

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
03/07/2024	DCL-24-024	DCL-24-024, Invitation to Participate in Diablo Canyon Decommissioning Engagement Panel
3/21/2024	DCL-24-028	Request for Enforcement Discretion Regarding Compliance with Technical Specification 3.0.3, "Limiting Condition for Operation Applicability"
3/26/2024	DCL-24-029	County / 2023 Diablo Canyon Power Plant 10 CFR 50.54(t) Assessment
3/26/2024	DCL-24-030	State / 2023 Diablo Canyon Power Plant 10 CFR 50.54(t) Assessment
3/27/2024	DCL-24-032	2024 Annual Statement of Insurance for Pacific Gas and Electric Company's Diablo Canyon Power Plant

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
3/4/2024	DIABLO CANYON POWER PLANT, UNIT 2 – NOTIFICATION OF SITE INSPECTION FOR LICENSE RENEWAL AND REQUEST FOR INFORMATION INSPECTION (05000323/2024011)
3/10/2024	DIABLO CANYON POWER PLANT CYBER SECURITY INSPECTION REPORT 05000275 2024403 AND 05000323 2024403 (COVER LETTER
3/22/2024	DCPP, U1 AND 2 – AUDIT SUMMARY IN SUPPORT OF LAR TO ADOPT TSTF-505 REV 2 _PROVIDE RISK-INFORMED EXTENDED COMPLETION TIMES- RITSTF INITIATIVE 4b
3/22/2024	SUMMARY OF MARCH 7, 2024, CLOSED PRESUBMITTAL MEETING WITH PGE REGARDING ALTERNATIVE SECURITY MEASURES FOR EWS LAR AND LER FOR DCPP
3/25/2024	NOTICE OF ENFORCEMENT DISCRETION FOR DIABLO CANYON POWER PLANT, UNIT 2 (EPID: L-2024-LLD-0002) - ML24082A259

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
3/26/2024	2024-003	2R24 Outage Safety Plan

E. CAP Documents (RCAs, WGEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
1 WGE	SAPN	

2 WGE	51205404	DA-NRC Idnt: D/G 2-3 Maint Postings
2 WGE	51217332	DA-Steam leak at Unit 1 FW-1-98
2 WGE	51162646	DA-EDG LO Heater Circuit Adverse Trend
Eff. Eval		
02/29/2024		Significance Level 1 and 2 Work Group Evaluations Created 02/01/2024 - 02/29/2024
03/31/2024		List of DN 5.1 and 5.2 Created 3/01/2024 - 3/31/2024
03/31/2024		DCPP 1 WGE and 2 WGE Notifications Completed 03/01/2024 - 03/31/2024
03/05/2024		Open LTCA DA Notifications Station Significance 3 as of 03-05-2024
03/05/2024		20 Oldest Non-LTCA DA Notifications as of 03-05-2024
03/05/2024		DCPP CAP Station Index
03/05/2024		Open RCEs as of 03/05/2024
03/05/2024		Open LTCA DA Notifications Station Significance 1 & 2 as of 03/05/2024

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
3/6/2024		Quality Digest, March Edition 2024
3/4/2024	2024-AS-07	Equipment Important to Emergency Response EITER
3/4/2024	2024-AS-03	Maintenance Procedure Guidance
2/15/2024	2024-AS-4	Closure Documentation of DA Notifications
3/7/2024	2024-AS-10	Emergency Preparedness Assessment
3/14/2024	2024-AS-06	Dust Mitigation Guidance
2/12/24	2024-AS-2	Maintenance Closure of DA Notifications

G. Nuclear Safety Culture Monitoring Panel Reports

Date	Doc. No.	Title
		There is no Nuclear Safety Culture Monitoring Panel Report for this month.

H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title

I. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title

1/31/2022		Generation Operating Plan 2021 – 2025, No new updates this month.
02/29/2024		March 2024 PI Status Summary
03/21/2024		March 2024 Industrial Safety Performance Improvement Dashboard
03/26/2024		March 2024 Projects Performance Improvement Dashboard
02/29/2024		March 2024 Learning Services Performance Improvement Dashboard
03/14/2024		March 2024 Operations Services Performance Improvement Dashboard
02/15/2024		March 2024 Maintenance PI Dashboard
03/13/2024		March 2024 Engineering Services Performance Improvement Dashboard
03/12/2024		March 2024 Security & Emergency Services Performance Improvement Dashboard
Station Initiative		There are no new Station Initiatives for this month.

J. INPO

Date	Doc. No.	Title
		There are no INPO documents for this month.

K. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
		There are no ODMs for this month.
POA		There are no new POAs for this month.

L. Safety Limit Violation Report

Date	Doc. No.	Title
		There are no Safety Limit Violation Reports for this month.

M. Significance Determination Process Calculations

Date	Doc. No.	Title
		There are no Significance Determination Process Calculations for this month.

N. Miscellaneous

Date	Title
	There are no miscellaneous documents for this month.

O. Functional Area Documents

March 2024
List of Documents Transmitted Electronically

Subcommittee	Date/Doc	Title
Maintenance	Week 202405	T+1 Performance Critique
	Week 202406	T+1 Performance Critique
	Week 202407	T+1 Performance Critique
	Week 202408	T+1 Performance Critique
	Week 202409	T+1 Performance Critique
	February	T+1 Monthly Performance Critique 2405-2408

April 2024
List of Documents Transmitted Electronically

A. Licensing Basis Impact Evaluations

Date	LBIE No.	Title
		There are no LBIEs for this month.

B. NRC Outgoing Correspondence (incl. LERs, LARs, etc.)

Date	Letter No.	Title
4/2/2024	DCL-24-022	Notification of Changes to Decommissioning Schedule for Diablo Canyon Power Plant, Units 1 and 2
4/2/2024	DCL-24-023	Revised Certification of Permanent Cessation of Power Operations
4/3/2024	DCL-24-033	10 CFR Part 21 Interim Report
4/14/2024	DCL-24-039	Diablo Canyon Units 1 and 2 - 1Q2024 - PI Data Elements (QR)
4/24/2024	DCL-24-045	Annual Report of Occupational Radiation Exposure for 2023
4/30/2024	DIL-24-004	Responses to NRC Requests for Additional Information on the Diablo Canyon Independent Spent Fuel Storage Installation License Renewal Application (CAC/EPID NOS. 001028/L-2022-RNW-0007)
4/28/2024	DCL-24-027	2023 Annual Radioactive Effluent Release Report
4/30/2024	DCL-24-048, DIL-24-005	10 CFR 50.59 and 10 CFR 72.48 Summary Report for the Period of January 1, 2022, through December 31, 2023

C. NRC Incoming Correspondence (including Inspection Reports)

Date	Title
04/04/2024	Acceptance Review: Diablo Canyon request to revise Technical Specification 5.6.6 for pressure and temperature limits report (EPID: L-2024-LLA-0021)
04/23/2024	DIABLO CANYON POWER PLANT, UNITS 1 AND 2 INTEGRATED INSPECTION REPORT 05000275 2024001 AND 05000323 2024001

D. PSRC Documents (PSRC Minutes)

Date	Doc. No.	Title
4/24/2024		Plant Staff Review Committee Members/Alternates

E. CAP Documents (RCAs, WGEs, CAP Effectiveness Evaluations)

Type	Doc. No.	Title
1 WGE	SAPN	
2 WGE	51208725	DA-3Q23 Violation UHS Procedure
2 WGE	51227361	DA-ECG 4.4 Revision Discrepancy
2 WGE	51229691	DA-U-2 Sys 23C1 HVAC Actuator Goalsettin
2 WGE	51223066	DA-Fire Department Ankle Injury
2 WGE	51227814	DA-Green NCV - 10 CFR 73.55(i)(4)(ii)(F)

2 WGE	50817479	DA-Range Training Incident
2 WGE	51225523	DA-4Q23 GNCV SISIP Transient Equip
Eff. Eval		
03/31/2024		Significance Level 1 and 2 Work Group Evaluations Created 03/01/2024 - 3/31/2024
04/30/2024		List of DN 5.1 and 5.2 Created 04/01/2024 - 04/30/2024
04/30/2024		DCPP 1 WGE and 2 WGE Notifications Completed 04/01/2024 - 4/30/2024
04/01/2024		Open LTCA DA Notifications Station Significance 3 as of 04/01/2024
04/01/2024		20 Oldest Non-LTCA DA Notifications as of 04/01/2024
04/01/2024		DCPP CAP Station Index
04/01/2024		DCPP CAP Station Index Legend
04/01/2024		Open RCEs as of 04/01/2024
04/01/2024		Open LTCA DA Notifications Station Significance 1 & 2

F. QV Documents (QPAR, Audit Reports, Audit Schedule, Assessments)

Date	Doc. No.	Title
04/03/2024		Nuclear Quality Digest
04/03/2024		DCPP NIEP Report

G. Nuclear Safety Culture Monitoring Panel Reports

Date	Doc. No.	Title
		There is no Nuclear Safety Culture Monitoring Panel Report for this month.

H. Self Assessment/Benchmarking (SA/BM Reports/Schedules)

Date	Doc. No.	Title
3/18/2024	BNHI -51229385	Benchmark: McGuire Messaging
1/23/2024	BNHI-51222925	TSTF-505 Benchmarking - SNOC
1/26/2024	BNHI-51223252	Turkey Point Benchmark
4/16/2024	BNHI-51233747	Sec - Benchmark Patrol Rifle Course
4/13/2022	BNHI-51149811	Biennial Target Set SA 2024
2/25/2024	BNHI-51226783	Sec Trng 71130.07 Self/Peer Assessment
2/8/2024	BNHI-51224925	QHSA Confined Space Paperwork Cmpletion
4/16/2024	BNHI-51233873	Sec- Benchmark FBI Instructor Course
9/27/2023	BNHI-51205774	Industry PRA benchmarking
11/13/2023	BNHI-51214548	BNHI: Exam security procedures

I. Performance Information (PPIR, Operating Plan, Station Initiatives)

Date	Doc. No.	Title

1/31/2022		Generation Operating Plan 2021 – 2025, No new updates this month.
3/31/2024		April 2024 Station Excellence Plan
20244/18/2024		April 2024 Industrial Safety PI Status Summary
04/17/2024		April 2024 Operations Services Performance Improvement Dashboard
4/17/2024		April 2024 Maintenance PI Dashboard
4/15/2024		April 2024 Engineering Services Performance Improvement Dashboard
4/17/2024		April 2024 Security & Emergency Services Performance Improvement Dashboard
3/28/2024		April 2024 PI Status Summary
4/5/2024		April 2024 Learning Services PI Dashboard
Station Initiative		There are no new Station Initiatives for this month.

J. INPO

Date	Doc. No.	Title
		There are no INPO documents for this month.

K. Operational Documents (ODM Minutes, POAs)

Date	Doc. No.	Title
		There are no ODMs for this month.
POA		There are no new POAs for this month.

L. Safety Limit Violation Report

Date	Doc. No.	Title
		There are no Safety Limit Violation Reports for this month.

M. Significance Determination Process Calculations

Date	Doc. No.	Title
		There are no Significance Determination Process Calculations for this month.

N. Miscellaneous

Date	Title
	There are no miscellaneous documents for this month.

O. Functional Area Documents

April 2024
List of Documents Transmitted Electronically

Subcommittee	Date/Doc	Title
Maintenance	Week 202410	T+1 Performance Critique
	Week 202411	T+1 Performance Critique
	Week 202412	T+1 Performance Critique
	Week 202413	T+1 Performance Critique
	Week 202414	T+1 Performance Critique
	Week 202415	T+1 Performance Critique
	March	T+1 Monthly Performance Critique 2409-2413

DIABLO CANYON INDEPENDENT SAFETY COMMITTEE	
AGENDA TRANSMITTAL FORM	
MEETING DATE:	June 21, 2024
AGENDA ITEM:	XXIV-B
AGENDA TITLE:	Receive Report on May 30, 2024 Fact Finding Report - a Further Update of the May 5, 2023 DCISC Comprehensive Seismic Safety Update - and Review of PG&E-Sponsored SB846 Updated Seismic Assessment; Approve March 18-20 and May 30, 2024 Fact Finding Reports.
CONSENT [ ] ACTION [X] INFORMATION [X]	

Staff Summary:

The activities of the Fact-Finding Team (FFT) consisted of (a) participating in an open and public meeting of the Independent Peer Review Panel (IPRP) and then of (b) accounting for IPRP comments and for other recent seismic-safety information since May 2023 to develop a comprehensive DCISC update on the topic of seismic safety. The subjects include the Independent Peer Review Panel Meeting on May 30, 2024 and an update to the May 5, 2023, Comprehensive Seismic Safety Update.

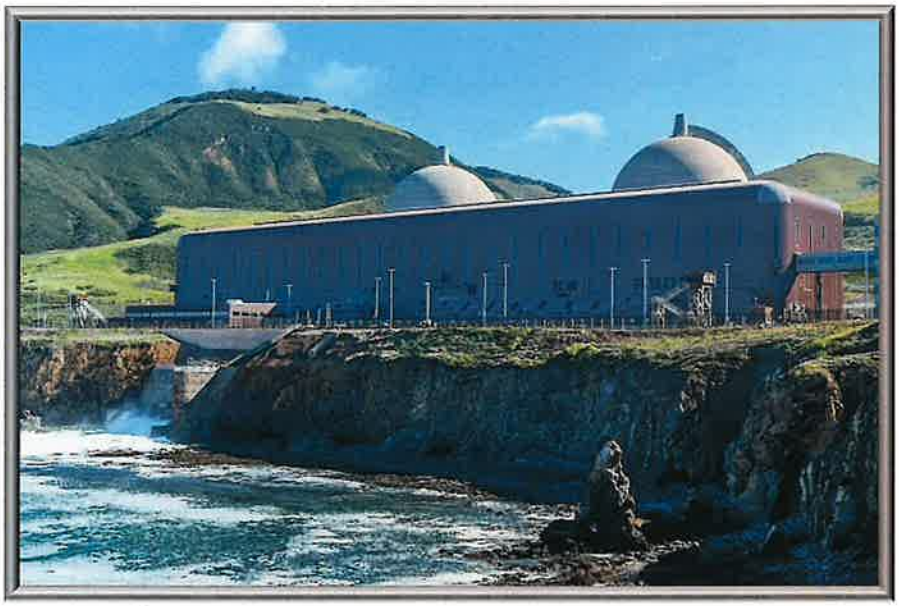
PG&E supported a new Diablo Canyon Updated Seismic Assessment in response to a requirement in SB846. This assessment contains important information in the form of an analysis of new technical information that has arisen in the period since PG&E completed their last comprehensive seismic-safety studies in 2015 and 2018. The DCISC's review was to review the PG&E Updated Seismic Assessment and ascertain whether important information relevant to seismic safety is contained therein.

The May 30, 2024 Fact Finding Report was posted to the Committee's website prior to the public meeting and upon approval the Report will be a part of the Committee's 34th Annual report.

RECOMMENDED COMMITTEE ACTION: Approve Resolution 2024-04 and March 18-20, 2024, Fact Finding Report and Resolution 2024-07 and May 30, 2024, Fact Finding Report and authorize transmittal of both reports to PG&E.

DIABLO CANYON UPDATED SEISMIC ASSESSMENT

Response to Senate Bill 846



6 March 2024

PG&E
Pacific Gas and Electric Company

EXECUTIVE SUMMARY

This document presents the results of a seismic hazard evaluation and analysis update for the Pacific Gas & Electric Company (PG&E) Diablo Canyon Power Plant (DCPP). The seismic update was performed in response to Senate Bill 846, which was passed in September 2022 to extend operation of the power plant and included a covenant to perform a seismic analysis update.

The starting seismic hazard model for the update was developed in 2015 and was based on new information from two programs. The first program involved extensive new seismological, geophysical, and geological data collection at and near the DCPP site under PG&E's Long Term Seismic Program (LTSP) and California Assembly Bill 1632. This program of extensive new data collection supplemented ongoing seismic data collection and research conducted under the LTSP, including continuous earthquake monitoring by the PG&E Central Coast Seismic Network (CCSN). The second program involved developing new models for probabilistic seismic hazard analysis (PSHA) under the Senior Seismic Hazard Analysis Committee (SSHAC) Level 3 process in response to a request from the U.S. Nuclear Regulatory Commission (NRC) following the Fukushima Dai-Ichi accident in Japan. The SSHAC Level 3 studies examined new information and technically defensible data, models, and methods that could impact seismic hazard or represent a significant change in seismic risk.

Even though the 2015 SSHAC Level 3 PSHA model was used as a starting basis for the seismic update, considerable effort was spent to critically review the existing model and integrate any new significant information or updates to approaches.

The 2023 seismic update was conducted from June 2023 to January 2024. The update was organized following best practices of a SSHAC Level 1 study, which includes defining Technical Integration (TI) teams of subject matter experts to conduct the work and a Participatory Peer Review Panel (PPRP) to review the process of data and model evaluation, development, and documentation by the TI teams. The participants in the update are topical experts in the areas of seismic geology, seismology, earthquake engineering and seismic risk, have considerable experience performing nuclear seismic SSHAC studies, and were involved with the 2015 SSHAC studies for DCPP. In accordance with the SSHAC process, the TI teams were responsible for evaluating the data, models, and methods, integrating the data into updates to the hazard models, and developing documentation. Participatory review occurred at two levels. The first level was the PPRP, a standard element for a SSHAC study. Additionally, a team of external reviewers from the University of California (UC) Los Angeles Garrick Risk Institute and UC Santa Barbara provided a second level of external review that focused on the evaluation process. The project was planned and executed with oversight from the Diablo Canyon Independent Safety Committee (DCISC) and the California Department of Water Resources (DWR), which managed the project for the State of California. The DCISC and DWR participated in technical workshops addressing review of previous studies, new information and models, impact evaluation and analyses results.

In PSHA, the seismic source characterization (SSC) defines the sources of earthquakes that can produce ground motions of engineering significance and the magnitudes and rates of those

earthquakes. In site-specific PSHA, the SSC modelling approach includes a screening process to evaluate the most significant sources and focuses effort on those seismic sources that contribute most to the annual hazard at the site at the hazard levels and spectral frequencies that are the most important to seismic safety. The sources from the 2015 SSC model (that was developed under the 2015 SSC SSHAC study) that contribute most to this hazard are the Hosgri, Los Osos, Shoreline, and San Luis fault sources and the local background seismic source zone.

For the SSC model component of the 2023 seismic update, a review of recently published data, models, and methods found that most new information is consistent with information available to the 2015 SSC SSHAC TI team, and no new information, including proponent models offered through public testimony, warrants changes to the model. The exception to this general finding is new information from several publications concerning the Hosgri and Los Osos fault slip rates. Based on new research on the origin, stratigraphic development, and age of a sea-floor feature that crosses the Hosgri fault north of DCPP (offshore Point Estero), the estimated geologic slip rate at this site is interpreted to be more reliable than it was during the 2015 SSC studies. As a consequence of this new information, the geologic slip rate of the Hosgri fault near DCPP has been recalculated in this update, and the weighted-mean slip rate of the Hosgri fault source is 26% higher than in the 2015 SSC model (2.14 mm/yr weighted-mean slip rate compared to 1.70 mm/yr in the 2015 SSC model). This increase in mean slip rate has resulted in a change in another SSC model element called the equivalent Poisson hazard ratio (EPHR) that captures uncertainty related to time-dependent earthquake recurrence behavior. The change in mean EPHR for the Hosgri fault source due to the increase in mean slip rate is an increase of approximately 3%, from an EPHR of 1.20 in the 2015 SSC model to 1.24. In addition to the revision to the Hosgri fault source slip rate, the slip rate of the Los Osos fault source has been revised in this seismic update. The change in Los Osos fault slip rate is based on a new model of tectonic uplift rates along the central California coast as recorded by marine terraces. This new model provides more refined estimates of paleosea levels at the time of marine terrace formation based on the incorporation of local glacio-isostatic adjustment effects. Including the new uplift rate model in the Los Osos fault source slip rate calculations results in a decrease in mean slip rate compared to the 2015 SSC model of about 9% to 15%. The magnitudes of the changes in mean slip rate for the Los Osos fault source range between 0.02 and 0.04 mm/yr, which are an order of magnitude less than the 0.44 mm/yr change in mean slip rate for the Hosgri fault source. No changes to the mean EPHR for the Los Osos fault source were warranted.

A review of proponent models, methods and interpretations presented in public testimony for consideration in an update to the SSC model were reviewed as part of this assessment. The review found that while some models or model elements are used in regional seismic hazard assessments, they are not appropriate for direct input into the SSC model for site-specific seismic hazard analysis of a critical facility. Proponent interpretations of tectonic rates, fault geometries, and fault slip rates beneath DCPP were found to be either considered in the 2015 SSC model, inconsistent with available information, or technically incorrect.

In PSHA, the ground-motion characterization (GMC) quantifies the ground shaking associated with seismic sources. The GMC model defines the median, aleatory variability, and epistemic uncertainty of ground motion. The ground-motion characterization for the 2015 study for DCPP followed a partially non-ergodic approach as part of the 2015 Southwest United States (SWUS) model. In this current project, the median ground-motion model was evaluated in terms of (1) approach, (2) treatment of features such as location relative to the hanging wall, directivity, splay

ruptures, and complex ruptures, and (3) performance compared to recent preliminary empirical ground-motion data. Based on this evaluation, the median ground-motion predictions from the SWUS ground-motion model were found to be generally consistent with new empirical data, and comparisons of the median predictions from the DCPP model to available non-ergodic ground-motion models also indicated consistent results. The aleatory variability model developed as part of the SWUS study was also evaluated. It was determined that the newly developed preliminary datasets are not sufficiently complete in terms of the metadata to be used to calculate updated components of aleatory variability for the large-magnitude and short-distance ranges of interest for DCPP (e.g., $M > 5$ and $R_{RUP} < 50$ km). Furthermore, components of the DCPP aleatory variability model were compared to more recent studies. The model was found to be consistent in the approach, elements of the logic tree, and results in the magnitude and distance ranges of interest. Based on these conclusions, no changes are warranted for the median and aleatory variability models of GMC.

In 2015, site-specific adjustment factors were developed to adjust the SWUS GMC model to site-specific conditions at DCPP. These site-specific adjustments were developed using analytical site-response analysis, as well as an empirical approach based on recordings at the plant. No new ground-motion data were recorded at the plant since the conclusion of the 2015 study. The site-adjustment approaches were reviewed, and no changes are warranted. A preliminary non-ergodic ground-motion modeling approach was applied to estimate the empirical site term at DCPP and its regional and uncorrelated components. Results from the non-ergodic analysis indicate that the regional site term in the vicinity of DCPP shows a below-average trend in ground motion consistent with that observed in the 2015 empirical site term at frequencies greater than 1 Hz. This consistency in the trends between the regional and the site-specific empirical terms supports and explains the 2015 site terms. The site term from the non-ergodic analysis was not adopted due to the preliminary nature of the dataset used and the preliminary nature of the analysis performed.

Probabilistic seismic hazard analysis computes the rate of ground-motion exceedance based on the rate of earthquakes and the probability distribution of ground shaking. It permits consideration of all potential events, event-to-event variability, and uncertainties in the ground-motion modeling calculations. The findings from the evaluation of the 2015 SSC and GMC models guided the approach taken to perform the seismic hazard update. The SSC model evaluation resulted in changes to the slip rates associated with the Hosgri and Los Osos fault sources, and a change to the EPHR for the Hosgri fault source. No changes to the median and the aleatory variability of the SWUS ground-motion model were recommended. Because the recommended changes to the models are limited to SSC parameters that affect the rate of earthquakes from specific seismic sources, the updated hazard can be captured through scaling the 2015 PSHA hazard results. The same scaling approach is justified for the recommended adjustment of the EPHR for the Hosgri fault. This scaling process was performed for 17 spectral frequencies from 100 Hz to 0.333 Hz. Scaled updated mean hazard curves for each spectral frequency for the reference rock horizon were computed, and the resulting uniform hazard spectra and ground-motion response spectrum (GMRS) were estimated. A comparison of these results with the previous 2015 UHS results shows an increase in ground motions of about 5–7% in the lowest frequencies range and about 3–4% in the intermediate to high-frequency ranges.

The probabilistic risk analysis (PRA) is based on the control-point horizon's hazard curves and ground motions. For DCPP, the hazard curve for the 5 Hz spectral frequency is used as the input

into the PRA. Hazard curves for the control-point horizon were estimated based on the hazard-curve ratio factors developed from the reference rock horizon scaling results given that the original site adjustment factors were found to be applicable for this evaluation. As a result, hazard-curve ratio factors based on the reference-rock hazard curves were directly applied to the control-point hazard curves from the 2015 study. Scale factors for the hazard values (i.e., hazard value ratio of the scaled results divided by the original 2015 results) were selected based on the evaluation of scale factors at seven select frequencies at the 10^{-5} hazard level.

Impacts of the changes in scaled hazard for plant risk were evaluated utilizing the current Diablo Canyon PRA model of record, a full-scope model including internal events, internal flooding, internal fire, and seismic hazards. This model was recently updated in August of 2023 and includes updates to equipment reliability data and resolutions to industry peer-review comments. The results of this assessment indicate that the total core damage frequency (CDF) and large early release frequency (LERF) for DCPP remain below region II risk criteria from Regulatory Guide 1.174 Revision 3 (total CDF and LERF are less than 10^{-4} yr^{-1} and 10^{-5} yr^{-1}, respectively) for all the hazard scaling factors used in this assessment.

In summary, the 2023 seismic update found that continued research since 2015 has identified minor changes in the seismic source characterization of hazard-significant seismic sources. Those changes were included in the updated seismic hazard and risk. The risk assessment indicates that total core damage frequency (CDF) and large early release frequency (LERF) for DCPP remain below region II risk criteria from the US Nuclear Regulatory Commission Regulatory Guide 1.174 Revision 3.

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