

An aerial photograph of the Diablo Canyon nuclear power plant. The plant's containment domes and various buildings are visible on a coastal plain. To the left, the ocean features rocky shorelines and waves crashing against a breakwater. In the background, rolling green hills and mountains rise under a clear sky. The text "Diablo Canyon", "Independent", and "Safety Committee" is overlaid in a large, bold, dark blue font.

**Diablo Canyon**  
**Independent**  
**Safety Committee**

**Public Meeting**  
**June 22 and 23, 2022**

**Avila Lighthouse Suites**



## **Robert Budnitz, Member, and Richard McWhorter, Consultant**

- 1. Refueling Outage 1R23 Safety Plan**
- 2. Post-Shutdown License Amendment Requests**
- 3. Independent Spent Fuel Storage Installation License Renewal Application**
- 4. Attend Notification Review Team Meeting**
- 5. Emergency Preparedness Program**
- 6. Strategic Engineering Department Update**
- 7. Inadvertent Boric Acid Addition Event**
- 8. Integrated Risk Management**
- 9. Benchmarking Program**
- 10. Meet with DCPD Officer**
- 11. Plant Tour**
- 12. Meet with Nuclear Regulatory Commission (NRC) Acting Senior Resident Inspector**
- 13. Quality Verification**
- 14. Direct Current Power Systems**



## **Refueling Outage 1R23 Safety Plan**

- **Plan Ensures Defense-in-Depth of Key Safety Functions During Shutdown Activities**
- **Classifies Shutdown Conditions Green, Yellow, Orange or Red**
- **Plan Contained Six Yellow and No Orange or Red**
- **Also Discussed Reactor Vessel Coupon Removal – All Removals and Testing Complete. Adequate Margin Against Embrittlement Through 2024/2025.**
- **Conclusion – 1R23 Outage Safety Plan and Safety Schedule appeared comprehensive and effective**



## Post-Shutdown License Amendment Requests

- **Active:**
  - **Permanently Defueled Tech Specs**
  - **Post-Shutdown Emergency Plan**
  - **Certified Fuel Handler Training Program**
  - **Post-Shutdown Decommissioning Activities Report**
- **Future:**
  - **Permanently Defueled Emergency Plan**
  - **ISFSI-Only Emergency Plan**
  - **Defueled Safety Analysis Report**
  - **Others**
- **Conclusion – DCCP’s approach to submitting LARs for decommissioning appeared appropriate**



## **ISFSI License Renewal Application**

- **Current License Expires March 2024. Renewal Submitted in March 2022, Requesting 40-Year Renewal. (Approval Typically Takes 24 Months.)**
- **Aging Management Reviews**
  - **Identify SSCs (Systems Structures and Components) in Scope**
  - **Determine Aging Effects and Mechanisms**
  - **Determine Actions Necessary to Ensure Aging Does not Affect Ability of SSCs to Perform Function**
  - **Actions Combined into Aging Management Plan**
- **Conclusion – DCCP appropriately managing the License Renewal process and developing an Aging Management Plan for the ISFSI.**



## **Attend Notification Review Team Meeting**

- **Notifications Are a Part of the Corrective Action Program and Are Electronic Documents Used to Identify and Record Problems and Tracking to Resolution**
- **50–100 Notifications Initiated Daily**
- **Each Notification is Promptly Reviewed by Work Control and the Control Room Shift Manager**
- **Multi-departmental NRT Meets Each Weekday to Review Previous Day's Notifications for Classification, Disposition, Assignment, and Significance**
- **Conclusion – March 23, 2022 NRT meeting was conducted efficiently and effectively .**



## Emergency Preparedness Program

- Recent History of EP Training and Exercise Performance
- Exercise Schedule – Next Evaluated on September 14, 2022
- EP Excellence Plan – IPAWS (FEMA’s Integrated Public Alert and Warning System) Under Consideration
- Noted that SLO County Has New Emergency Services Manager. DCISC Should Plan to Meet with ESM at Future Fact-Finding Meeting.
- Conclusion – DCCP’s Emergency Preparedness Department continues to effectively manage Emergency Preparedness activities



## Strategic Engineering Department

- Staffing – Some Changes but Generally Stable
- Engineering Excellence Plan – Focused on Human Performance, Equipment Reliability, and Resource Management
- System Health –
  - Three Tier 1 Systems ‘Red’ (Both Units’ EDGs and Unit 2 SCCW).
  - Five Tier 2 Systems with Open System Health Action Plans (Unit 1 Containment Ventilation, Both Units’ Non-Safety Related Radiation Monitoring, Both Units’ Offsite Power Supplies)
  - All the Above Previously Reviewed by the DCISC.
- Conclusion – DCP’s Strategic Engineering Group continued to effectively manage the health of systems important to safety



## Inadvertent Boric Acid Dilution Event

- On December 21, 2021, Small (five gallons) Amount of Boric Acid Inadvertently Added to Unit 2 RCS. Resulted in 0.12% Power Decrease.
- Considered a “Level 4” Reactivity Management Event (Scale of 1 to 6)
- Cause – Operators Failed to Recognize That Valve Manipulations During One Procedure Invalidated the Initial Conditions for Performing a Second Procedure.
- Classified as a Department Level Event (Discretionary), Corrective Actions Initiated.
- Conclusion – DCPP’s actions taken in response to an inadvertent addition of boric acid to the Reactor Coolant System appeared appropriate.



## **Integrated Risk Management**

- **Discussed the Results of a Quick Hit Self-Assessment.**
- **Eleven Recommendations and Multiple Enhancements Identified.**
- **Conclusion – QHSA was well performed and identified a number of significant improvements in the way that PG&E manages Integrated Risk Assessment.**



## Benchmarking Program

- Two Categories – Formal and Informal
- COVID Reduced the Numbers in 2020 and 2021
  - Completed 21 in 2021
  - Completed 16 to Date in 2022.
- Ten Benchmarking Reports Received and Reviewed by DCISC December 2021 to February 2022
- All Documented by Notifications (SAPNs)
- Corrective Actions (Deficiencies, Gaps, and Enhancements) Tracked in Corrective Action Program
- Conclusion – DCCP's Benchmarking Program continued to be effectively managed and contributed to the improvement of station performance.



## **Meet with DCPD Officer**

- **Maureen Zawalick, VP Decommissioning and Technical Services**
- **Discussed Items from the Fact-Finding Meeting and Other Subjects of Interest**



## Plant Tour

- **Areas Toured:**
  - **128' Unit 1 Cable Spreading Room**
  - **115' Unit 1 Auxiliary Building (Vital Batteries, Chargers and Inverters 1-1, 1-2, and 1 3; Reactor Trip Breakers; and Control Rod Drive Motor-Generator Sets)**
  - **100' Unit 1 Auxiliary Building ( 'F' Vital 480 VAC Electrical Bus and Hot Shutdown Panel)**
  - **85' Unit 1 Turbine Building (Non-Vital Battery, Charger and Inverter 1-6; and 12kV Electrical Room)**
  - **85' Unit 1 Outside Areas (Main Transformers, Startup Transformers, Transmission Lines, and Temporary Outage Offices)**
- **Conclusion – All Observed Areas Were Clean, Orderly, and Well Lighted with Equipment in Excellent Condition**



Vital Battery 1-2



Non-Vital Battery 1-6  
with Test Leads Installed



## **Meet with Acting NRC Senior Resident Inspector**

- **Discussed Items from the Fact-Finding Meeting, NRC Staffing, and Recent Inspection Results**



## Quality Verification

- Reviewed 2021 and 2022 (to date) Audit Results
- No Audit Findings in Escalation
- Reviewed Upcoming Audit Schedules
- DCPD Completed its Biennial Evaluation by the Nuclear Industry Evaluation Program (NIEP) in February 2022. NIEP Concluded that DCPD's Independent Oversight Functions were Effective.
- Reviewed Assessment Program and Recent Results
- Conclusion – DCPD's Quality Verification Audit Program was being effectively implemented. The assessment activities of the Department provided a valuable independent perspective on station performance.



## Direct Current Power Systems

- System Used to Provide Uninterruptable Power to Both Safety-Related and Non-Safety Related Systems (Critical Instruments and Controls)
- No Major Issues; Both Units' Health Rated as 'Green'
- No Replacements Expected Prior to Cessation of Power Operations
- Toured Unit 1 Equipment
- Conclusion – The health of DCCP's Direct Current Power Systems on both units was rated as Green (Healthy).



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# DCPP Performance Based on NRC Performance Indicators

Russ Prentice  
Director, Risk and Compliance  
June 22, 2022

## February 2022– June 2022

- This presentation covers approximately 4 months of NRC inspections involving ~2000 hours of inspection time
- DCPP remains in the highest performance category for all NRC Performance Indicators

# NRC Performance Indicators

| Unit<br>1 | Unit<br>2 |                                                                      |
|-----------|-----------|----------------------------------------------------------------------|
| <b>G</b>  | <b>G</b>  | Unplanned Scrams per 7000 Critical Hrs                               |
| <b>G</b>  | <b>G</b>  | Unplanned Power Changes per 7000 Critical Hrs                        |
| <b>G</b>  | <b>G</b>  | Unplanned Scrams with Complications                                  |
| <b>G</b>  | <b>G</b>  | Safety System Functional Failures                                    |
| <b>G</b>  | <b>G</b>  | Mitigating Systems Performance Index, Emergency AC Power System      |
| <b>G</b>  | <b>G</b>  | Mitigating Systems Performance Index, High Pressure Injection System |
| <b>G</b>  | <b>G</b>  | Mitigating Systems Performance Index, Heat Removal System            |
| <b>G</b>  | <b>G</b>  | Mitigating Systems Performance Index, Residual Heat Removal System   |
| <b>G</b>  | <b>G</b>  | Mitigating Systems Performance Index, Cooling Water Systems          |
| <b>G</b>  | <b>G</b>  | Reactor Coolant System Activity                                      |
| <b>G</b>  | <b>G</b>  | Reactor Coolant System Leakage                                       |
| <b>G</b>  | <b>G</b>  | Drill/Exercise Performance                                           |
| <b>G</b>  | <b>G</b>  | ERO Drill Participation                                              |
| <b>G</b>  | <b>G</b>  | Alert & Notification System                                          |
| <b>G</b>  | <b>G</b>  | Occupational Exposure Control Effectiveness                          |
| <b>G</b>  | <b>G</b>  | RETS/ODCM Radiological Effluent                                      |

## February 2022 – June 2022

- **There have been three violations of more than minor significance since the last DCISC update:**
  - **Green (Very Low safety significance) Non-Cited Violation (NCV) –** Moisture and buildup on the ASW pump 1-1 motor internal windings was not promptly corrected, which resulted in a challenge to the operability of the ASW motor.  
(Cross-Cutting Aspect H.6, “Design Margins”)
  - **Green (Very Low safety significance) Non-Cited Violation (NCV) –** The station did not adequately scope maintenance verification testing for tuning of the diesel generator 2-3 fuel system, which resulted in a low steady state frequency during a diesel start.  
(Cross-Cutting Aspect H.5, “Work Management”)
  - **Green (Very Low safety significance) Non-Cited Violation (NCV) -** Procedure for responding to a high water level in a feedwater heater contained guidance that could have led to delays in actions taken by control room personnel in response to an identified feedwater tube leak.  
(No Cross-cutting aspect was assigned to this violation)

# NRC Violations – Cross-Cutting Aspects

## Rolling 4-Quarter Cross-Cutting Aspect Performance

| NRC Cross-Cutting Issue Summary [DCPP]       |                                              |                         |                                 |                      |                                |                            |                                                |                    |                          |                                  |
|----------------------------------------------|----------------------------------------------|-------------------------|---------------------------------|----------------------|--------------------------------|----------------------------|------------------------------------------------|--------------------|--------------------------|----------------------------------|
| (Rolling 4 Quarters)                         |                                              |                         |                                 |                      |                                |                            |                                                |                    |                          |                                  |
| Quarter Ending: 22Q2                         |                                              |                         |                                 |                      |                                |                            |                                                |                    |                          |                                  |
| Prior Assessment Theme: Green                |                                              |                         | Current Assessment Theme: Green |                      |                                |                            | Upcoming Assessment                            |                    |                          |                                  |
| Areas                                        | 4 HU Findings                                |                         |                                 |                      |                                |                            | 0 Problem Identification & Resolution Findings | 0 Safety Conscious |                          |                                  |
| Traits                                       | Leadership Safety Values & Actions           | Personal Accountability | Work Processes                  | Continuous Learning  | Effective Safety Communication | Questioning Attitude       | Decision Making                                | PI&R               | Continuous Learning      | Environment for Raising Concerns |
| Aspects                                      | Resources H.1                                | Teamwork H.4            | Work Management H.5             | Training H.9         | Bases for Decisions H.10       | Challenge the Unknown H.11 | Consistent Process H.13                        | Identification P.1 | Operating Experience P.5 | SCWE Policy S.1                  |
|                                              | 0000<br>0                                    | 0000<br>0               | 0010<br>1                       | 0000<br>0            | 0000<br>0                      | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              | Field Presence H.2                           | Design Margins H.6      | Summary of Findings **          |                      |                                | Avoid Complacency H.12     | Conservative Bias H.14                         | Evaluation P.2     | Self Assessment P.6      | Alternative Process S.2          |
|                                              | 0000<br>0                                    | 0010<br>1               | N,L,S                           | CCA                  | NR,SR                          | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              | Change Management H.3                        | Documentation H.7       | 22Q2                            | 0                    | 0                              | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              | 0200<br>2                                    | 0000<br>0               | 22Q1                            | 3                    | 2                              | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              | Traditional Violations                       | Procedure Adherence H.8 | 21Q4                            | 3                    | 2                              | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              | SL IV: 0<br>SL III: 0<br>SL II: 0<br>SL I: 0 | 0000<br>0               | 21Q3                            | 0                    | 0                              | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              |                                              |                         | Total                           | 6                    | 4                              | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              |                                              |                         | Aspect A.N                      | Cross-Cutting Aspect |                                | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              |                                              |                         | NRC/SR Traditional Violations   |                      | Findings per Quarter           | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              |                                              |                         | Green All SL=0                  |                      | Total Findings, rolling year   | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              |                                              |                         | White IV=1                      |                      |                                | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              |                                              |                         | Yellow IV=2, III=1              |                      |                                | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              |                                              |                         | Red IV>2, III>1, II>0, I>0      |                      |                                | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
|                                              |                                              |                         |                                 |                      |                                | 0000<br>0                  | 0000<br>0                                      | 0000<br>0          | 0000<br>0                | 0000<br>0                        |
| ** Based on Published NRC Inspection Reports |                                              |                         |                                 |                      |                                |                            |                                                |                    |                          |                                  |

\*\* Based on Published NRC Inspection Reports



# Licensee Event Reports

## February 2022 – June 2022

- No Licensee Event Reports have been submitted since the last DCISC meeting.

## February 2022 – June 2022

- DCPP remains in the highest performance category for all NRC Performance Indicators
- Two Inspection Reports were issued by the NRC during the February 2022 and June 2022 timeframe:
  - 4<sup>th</sup> Quarter 2021 Integrated Inspection Report (2021-004, 02/03/2022)
  - 1<sup>st</sup> Quarter 2022 Integrated Inspection Report (2022-001, 05/05/2022)



# Status of License Amendment Requests

## License Amendment Requests approved since the last DCISC update:

- Amendments 240 and 241 were issued on March 23, 2022, to the Unit 1 and Unit 2 Operating Licenses, which revised Technical Specification (TS) 3.8.1, “AC Sources - Operating,” to allow on a one-time basis up to an additional 4 days (7 days total) to perform planned maintenance on the Diesel Generator Fuel Oil Transfer Pumps.

# Thank you

Russ Prentice



# Diesel Generator 2-3 Fuel Leak Cause Evaluation

Russ Prentice, Director Risk & Compliance

June 22, 2022



# Event Summary

- DCPD periodically removes Emergency Diesel Generators from service for testing and maintenance to ensure optimum performance. During one such activity we identified some fuel oil leakage on one of the 18 fuel injector pumps. This leakage posed no immediate safety risk and was fixed prior to placing the Diesel Generator back in service.
- DCPD leveraged our rigorous and robust cause evaluation process to improve our Diesel Generator maintenance strategies and mitigate the risk of future fuel oil leaks.

# Event Summary

- On June 28, 2021, during planned maintenance, DEG 2-3 was operating during a test run to warm up the engine in preparation for governor tuning.
- During the warm-up, a fuel oil leak was observed by plant personnel near the 1R cylinder and DEG 2-3 was immediately shut down.
- Personnel allowed the system to safely depressurize and once de-pressured, the fuel injection pump cover was removed, inspections were performed, and the banjo bolt was found loose.
- Maintenance personnel utilized established procedures to restore the loose connection to its required torque value.
- DG 2-3 was declared operable on June 30, 2022
- Subsequent 3<sup>rd</sup> party analysis concluded that DG 2-3 would have fulfilled its safety function, even with the leakage.

# Diesel Generator Overview

## Safety Function

The six DCPD diesel engine generators provide emergency AC power in the event of a loss of offsite power.

## Fuel Injection System

The fuel injection system for each DEG includes a positive displacement injection pump for each of the diesel engine's 18 cylinders taking suction from the common fuel header.

# Diesel Generator Overview

## Fuel Injection System (continued)

Each Fuel Injection Pump Assembly is supplied from the fuel header through a fuel injection pump inlet pipe (ie. banjo fitting) (Image 2) and an inlet to pump retaining screw (ie. banjo bolt) (Image 3).

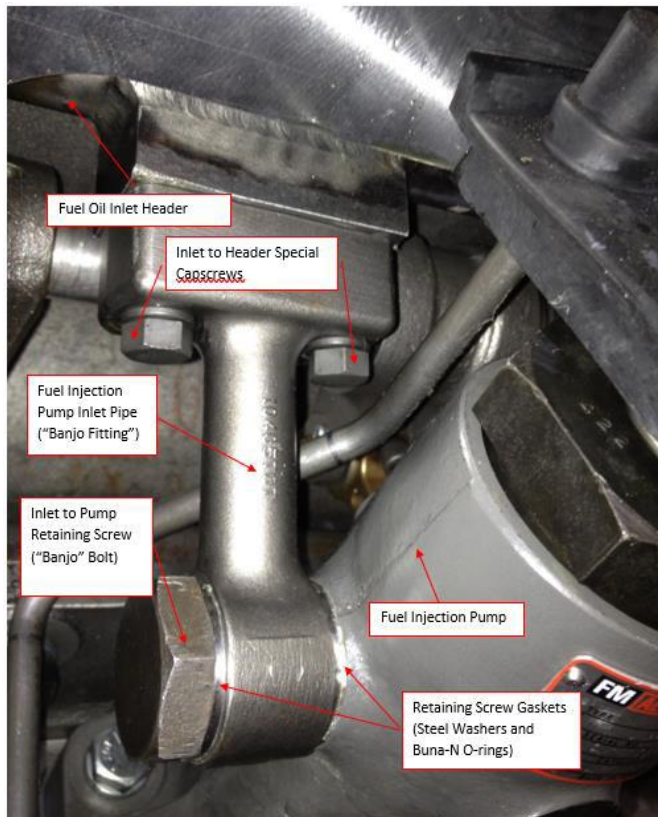


Image 1: Fuel Injection Pump Inlet Assembly



Image 2: Fuel Injection Pump Inlet Pipe (Banjo Fitting)

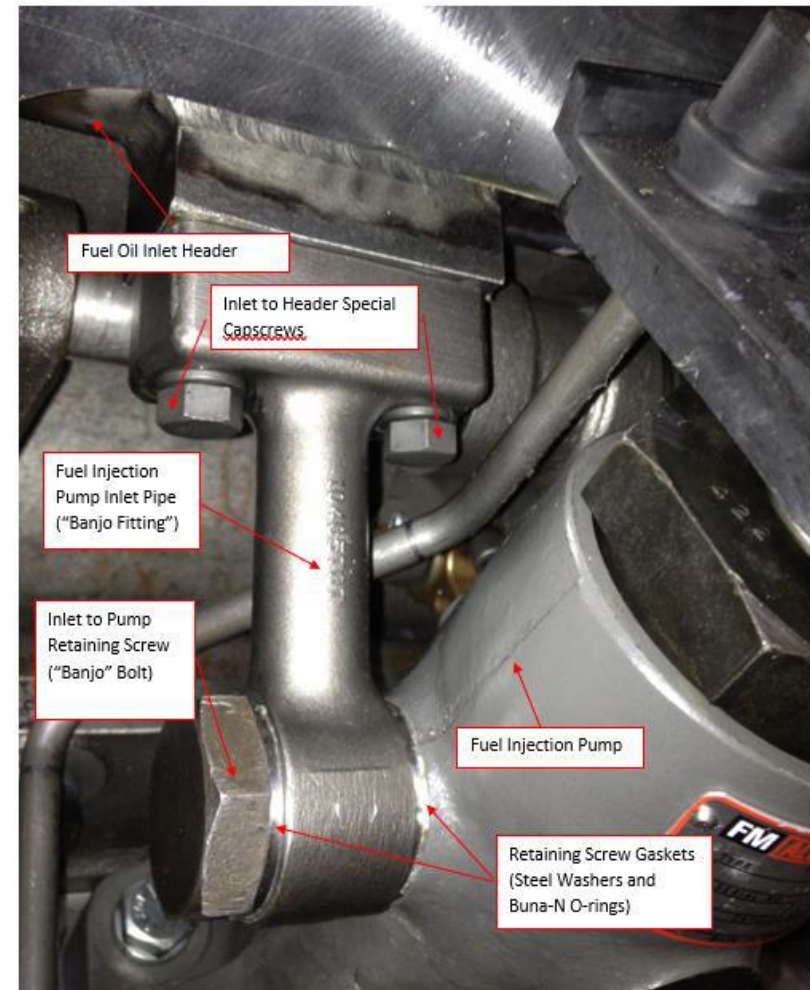


Image 3: Banjo Bolt showing radial through-hole and hollow shank. (Red arrows indicate where steel washers w/ O-ring fit.)

## Fuel Injection System (continued)

The banjo bolt connects the banjo fitting to the injection pump suction providing a right-angle, hard pipe connection.

The banjo bolt has a hollow shank with a radial through-hole in the narrow, unthreaded portion of the shank below the bolt head to allow fuel to pass through the bolt shank while the bolt head and threads provide part of the system pressure boundary.



# Results of Cause Evaluation

**We followed our rigorous and robust cause evaluation process**

## **Direct Cause**

The direct cause of the DEG 2-3 diesel fuel oil leak was a loose banjo bolt at cylinder 1R. The banjo bolt was found loose with no residual torque to compress the banjo bolt O-rings to prevent a leak.

## **Probable Cause 1**

The sequence of steps in the applicable procedure may have resulted in misalignment of the banjo fitting to the fuel injection pump, allowing the banjo bolt to loosen during normal engine operation, causing a leak at the joint.

## **Probable Cause 2**

A dual-action step in the applicable maintenance procedure may have resulted in inadequate torquing allowing the banjo bolt to loosen during normal engine operation, causing a leak at the joint.

# Extent of Condition

Per DCP's cause evaluation process, a thorough extent of condition was performed on all diesel generators.

No leaks were found on any of the other 107 banjo bolts.

Some banjo bolts were found below the desired torque, and were re-torqued to the torque specification.

A Preventive Maintenance plan was put in place to periodically perform torque verifications on these joints.

# Corrective Actions

## Corrective Actions

**Immediate Action** - Once the leak rate subsided following shut down of the engine, the fuel injection pump cover for cylinder 1R was removed, and the joint at the banjo bolt was found leaking. The joint was reassembled per procedure, passed all verification tests and Diesel Generator 2-3 was declared Operable.

## Corrective Actions

- 1** - Revise the applicable maintenance procedure to provide steps to ensure proper alignment between the banjo fitting and fuel injection pump and prevent movement of the fuel injection pump after initial fit-up/alignment.
- 2** - Develop and implement Preventive Maintenance strategy for phased periodic torque verification and perform quarterly banjo bolt torque verification. IF as-found torque is 95 ftlbs or greater, on all cylinders, for at least three consecutive quarters, THEN extend periodicity to once per cycle.
- 3** - Revise the applicable maintenance procedure to include performer and verifier signoffs for banjo bolt and fuel injection pump hold down bolt torquing steps for each cylinder worked.

**Thank You**



# Diablo Canyon Independent Spent Fuel Storage Installation

## License Renewal Application Overview

Presented by:

Philippe Soenen – Decommissioning Environmental and Licensing Manager

June 22, 2022



# Overview of DC ISFSI and License

- **Site-specific 10 CFR Part 72 license SNM-2511 issued in March 2004**
  - License expires in March 2024
  - Storage of spent fuel, including high-burnup fuel (no greater than Class C waste)
  - Accommodates all spent fuel generated through the end of the DCCP operating licenses
- **DC ISFSI consists of:**
  - HI-STORM 100 System
  - Storage pads and anchorage
  - Cask Transfer Facility (CTF)
  - Cask Transporter, Transfer Cask, Low-Profile Transporter (LPT)
- **Current status:**
  - 7 completed loading campaigns
  - 1,856 fuel assemblies stored in 58 casks
- **License Renewal Application (LRA) submitted Mar 2022**



# Requirements, Guidance, and Precedent

- **10 CFR 72.42(a): high-level requirements**
- **NUREG-1927, the Standard Review Plan (SRP) for ISFSI renewal**
- **NUREG-2214, Managing Aging Processes in Storage (MAPS)**
  - A technical basis document for how to address aging of ISFSI systems
- **NEI 14-03, Guidance for Aging Management of Dry Cask Storage**
  - Portions endorsed by NRC in Regulatory Guide 3.76
  - Contains guidance on format and content of LRA
- **Recent Precedent**
  - Humboldt Bay      – HI-STORM 100 Certificate of Compliance
  - Rancho Seco      – HI-STAR 100 Certificate of Compliance
  - Trojan



# DC ISFSI License Renewal Application Contents

- Chapter 1, General Information
- Chapter 2, Scoping Evaluation
- Chapter 3, Aging Management Review (AMR)
- Chapter 4, Time-Limited Aging Analyses (TLAAs)
- Appendix A, Aging Management Programs (AMPs)
- Appendix B, Granted Exemptions
- Appendix C, Proposed License Changes
- Appendix D, Final Safety Analysis Report (FSAR) Supplement
- Appendix E, Pre-Application Inspection Report
- Appendix F, Environmental Report Supplement
- Appendix G, Decommissioning Funding Plan



# DC ISFSI Scoping Results

Important to Safety (ITS) to ensure quality and purity; credited for long-term environment used to determine aging

FSAR specifically discusses why failure of these does not impact ITS function

| Structures/Components                              | Criterion 1 | Criterion 2 | In-Scope |
|----------------------------------------------------|-------------|-------------|----------|
| Spent Fuel Assemblies                              | Yes         | N/A         | Yes      |
| Multi-Purpose Canister (MPC)                       | Yes         | N/A         | Yes      |
| HI-TRAC 125D Transfer Cask                         | Yes         | N/A         | Yes      |
| HI-STORM 100SA Overpack                            | Yes         | N/A         | Yes      |
| Cask Transportation System (including transporter) | Yes         | N/A         | Yes      |
| ISFSI Storage Pads                                 | Yes         | N/A         | Yes      |
| Cask Transfer Facility                             | Yes         | N/A         | Yes      |
| Helium Fill Gas                                    | Yes         | N/A         | No       |
| Fuel Debris (within MPCs)                          | No          | No          | No       |
| Security Systems, Fencing, Lighting                | No          | No          | No       |
| Electrical Power, Communications Systems           | No          | No          | No       |
| Automated Welding System                           | No          | No          | No       |
| MPC Helium Backfill System                         | No          | No          | No       |
| MPC Forced Helium Dehydration System               | No          | No          | No       |
| Rockfall Fence, Rock-Bolted Cut-slope              | No          | No          | No       |
| Supplemental Cooling System                        | No          | No          | No       |

# Aging Management Review

- **Component descriptions and long-term environments**
- **Table breakdowns of each in scope component**
  - Material
  - Environment
  - Aging Effect/Mechanism
- **Determines if aging management is required**

| Sub-component                    | Intended Function                                        | Material                 | Environment          | Aging Effect     | Aging Mechanism               | AMP                                      |
|----------------------------------|----------------------------------------------------------|--------------------------|----------------------|------------------|-------------------------------|------------------------------------------|
| Multi-Purpose Canister (MPC) Lid | Confinement, Shielding, Structural Support, Heat Removal | Stainless Steel (welded) | (Internal) Helium    | Cracking         | Fatigue                       | None – no fatigue analysis was performed |
|                                  |                                                          |                          | (External) Sheltered | Cracking         | Fatigue                       | None – no fatigue analysis was performed |
|                                  |                                                          |                          |                      |                  | Stress corrosion cracking     | MPC Aging Management Program             |
|                                  |                                                          |                          |                      | Loss of material | Pitting and crevice corrosion |                                          |
| Storage Pads                     | Structural Support                                       | Concrete (reinforced)    | Soil                 | Cracking         | Differential Settlement       | None <sup>(1)</sup>                      |

(1) This line is not consistent with the MAPS Report for considering differential settlement as an applicable aging mechanism for the concrete storage pads....

# App. A, Aging Management Programs

- **PG&E proposed six AMPs to manage aging effects requiring management**
- **An AMP has ten elements that need to be addressed:**
  1. Scope of program
  2. Preventive actions
  3. Parameters monitored or inspected
  4. Detection of aging effects
  5. Monitoring and trending
  6. Acceptance criteria
  7. Corrective actions
  8. Confirmation process
  9. Administrative controls
  10. Operating experience

In short, the program states how PG&E will inspect and maintain the SSCs to ensure there is no loss of intended function

# Aging Management Programs

## 1. High Burnup Fuel AMP

- Relies on the joint EPRI and Department of Energy High Burnup Dry Cask Storage Research and Development Project (HDRP).
- Describes how the demonstration program applies to DCPP fuel
- 3 formal evaluations will occur as follows:
  1. Prior to March 2024 (end of the initial license)
  2. March 2034 (10 years after first assessment)
  3. March 2044 (10 years after second assessment)

# Aging Management Programs

## 2. MPC AMP

- Consistent with American Society of Mechanical Engineers (ASME\*) Code Case N-860
  - Determines the site and MPC susceptibility to stress corrosion cracking
  - Performs screening exam, assessment exam (if required), and supplemental exam or analysis (if required)
  - Sets scope and inspection frequency based on results and susceptibility

## 3. Transfer Cask AMP

- Prior to use; inspections are valid for five years
  - Visual Testing (VT)-3 100% of normally accessible surfaces (exterior, interior cavity, lid surfaces, bottom)
  - VT-2 of water jacket
- Acceptance criteria is consistent with MAPS Report

\*ASME is a not-for-profit membership organization that is known for setting codes and standards for mechanical applications. ASME conducts one of the world's largest technical publishing operations and holds numerous technical conferences and hundreds of professional development courses each year.

## 4. Overpack AMP

- Every five years
  - VT-3 100% of normally accessible surfaces (outside of overpack, anchorages); applies to all loaded overpacks
  - Visual inspection of concrete adjacent to overpack; evidence of degradation (staining, rust)
  - VT-3 anchor stud sampling plan
- During remote inspections of MPCs
  - VT-3 100% of the metallic surfaces made accessible by the MPC inspections (i.e., inside of overpacks; number of overpacks inspected would be consistent with number of MPCs inspected)
- Acceptance criteria is consistent with MAPS Report

## 5. Reinforced Concrete Structures AMP

- Every five years
  - American Concrete Institute (ACI) 349.3R inspection of 100% of above-grade storage pads and CTF structural concrete
  - Soil testing in vicinity of ISFSI to determine whether soil is aggressive
  - Shielding concrete (un-reinforced) effectiveness survey on those overpacks inspected by remote means
- Opportunistic
  - ACI 349.3R inspection of below-grade concrete exposed for any reason
- Acceptance criteria is consistent with
  - ACI 349.3R (concrete inspections)
  - NUREG-1801, Rev. 2, Sections IX.D and IX.F (soil chemistry)
  - Calculated dose rates in the DC ISFSI Updated Final Safety Analysis Report

## 6. Cask Transportation AMP

- Transporter: because it is shared with the Humboldt Bay ISFSI, the following proposed AMP inspections are the same as those approved by the NRC for Humboldt Bay
  - VT-3 100% of accessible portions of structural members, restraint system, MPC downloader, wedge lock assembly
  - Torque check for 100% accessible bolting
  - Visual and tactile inspection of 100% seismic restraint (sling)
  - Periodic replacement of polymer adjustable bumpers
- Transfer Equipment: prior to use; inspections are valid for five yrs
  - VT-3 100% of the following accessible surfaces: lift links, lift cleats, lift brackets, connector pins, CTF liner and lateral restraints, mating device, LPT
- Acceptance criteria are consistent with
  - Previously-approved acceptance criteria from the Humboldt Bay LRA
  - MAPS Report





# LRA Appendices B, C, D, G

## **B, Granted Exemptions**

- Identified exemptions granted by the NRC for the DC ISFSI license and addresses whether there is any implication to aging management

## **C, Proposed License Changes**

- Identified new or revised license conditions to invoke license renewal requirements

## **D, Proposed Updated Final Safety Analysis Report (UFSAR) Changes**

- Identified changes to invoke license renewal (e.g., # of years)
- Added new section to document license renewal process and the DC ISFSI AMPs

## **G, Decommissioning Funding Report**

- Provided same information required in the triennial NRC ISFSI decommissioning funding plan
- Required to be submitted with LRA



# Appendix E, Pre-Application Inspections

## **PG&E conducted pre-application inspections in 2021 to inform the LRA**

- Confirmed no unique aging effects for the DC ISFSI site
- Gave confidence that the NRC's guidance is appropriate to use and that the LRA is bounding and robust
- Provided an opportunity to trend results from previous inspections and use those results to inform LR inspection frequencies
- PG&E invited NRC, California Energy Commission, Diablo Canyon Independent Safety Committee, Diablo Canyon Decommissioning Engagement Panel members, and industry peers to observe the inspections

## **Conclusions (publicly-available – see slide 16)**

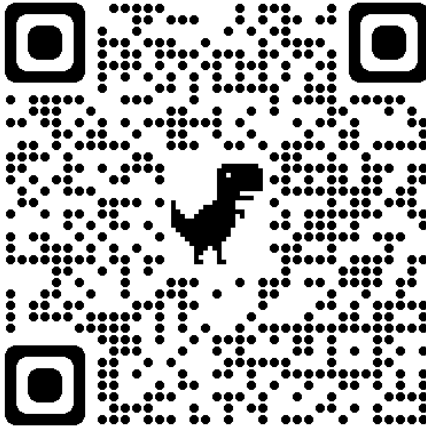
- No impacts to safety or intended functions
- Degradation rates versus margins indicate no need to shorten AMP inspection frequency

# Appendix F, Environmental Report

## Update to the original environmental report (ER) submitted with the initial ISFSI license application

- Incorporated the original DC ISFSI license application ER by reference
- Addressed the generic findings described in NUREG-2157 for Continued Storage of Spent Nuclear Fuel
- Included additional, newer information from state and local environmental reviews:
  - e.g., California Energy Commission Staff Report from initial permitting (note that the Staff Report assumed the ISFSI would "remain in perpetuity")

# LRA Review Status

- **NRC is performing the acceptance review to determine if the LRA is complete and meets requirements**
    - Publicly-available here:
- 
- **NRC will issue a letter documenting their acceptance of the LRA**
    - Contains estimated review schedule

# Thank You

**Philippe Soenen**

Decommissioning Environmental and Licensing Manager

[Philippe.Soenen@pge.com](mailto:Philippe.Soenen@pge.com)



# NUHOMS EOS

Orano's Premier Dry Storage System for  
Used Nuclear Fuel and GTCC Waste

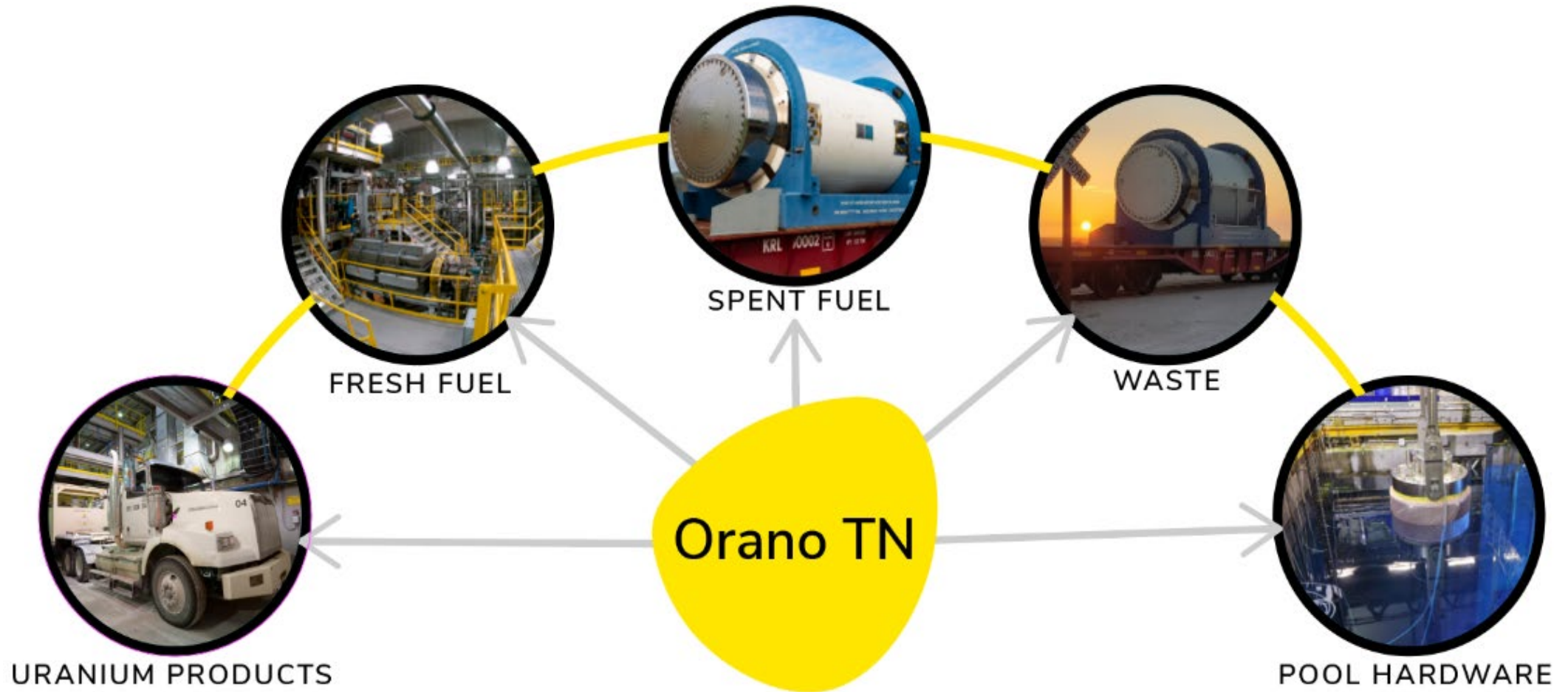
June 22, 2022



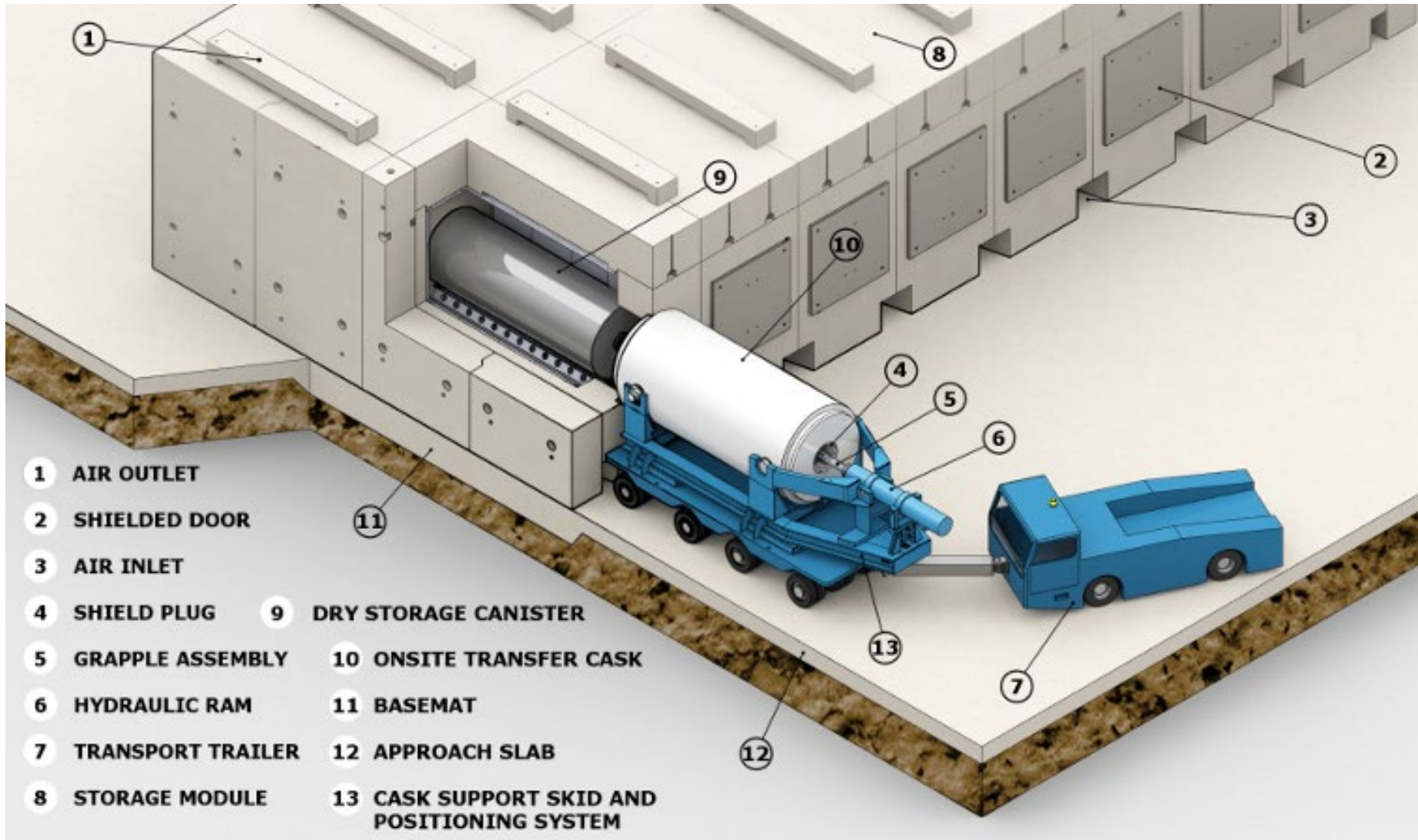
**orano**

# TN Americas Provides Full Portfolio with Global Resources

End-to-end provider of safe and secure packaging, transportation, and storage solutions for nuclear and radioactive materials



# Overview: NUHOMS EOS System Components



**No suspended drop risks; horizontal transfer process always supports canister from below**

**Gap-free, side-by-side arrangement of massive concrete storage modules achieves high-performance self-shielding, stability, and protection**

**Highest seismically qualified dry fuel storage system in the world**

**Horizontal orientation enables efficient and timely loading and unloading process**

# Efficient NUHOMS Loading Process

As shown in video of full pool offload into NUHOMS dry storage at Duane Arnold

**Day 1:** Load used fuel assemblies into canister (made in Kernersville, NC) underwater inside transfer cask, Each assembly's heat load determines calculated placement within the canister basket to ensure heat load requirements fulfilled  
Remove canister from pool inside transfer cask, cask decontaminated as it's removed from pool

**Day 2 & 3:** Weld two lids, dewater (not pressurized like prior system), tested and verified, last time this canister will be vertical

Canister laid down on trailer, loaded canister always supported, no unsupported lifts during transfer or loading

**Day 4:** Transfer canister on tow path to onsite interim storage, note transfer trailer seismic braces, precisely back up trailer to NUHOMS EOS module opening

# Efficient NUHOMS Loading Process

## Day 4 cont'd

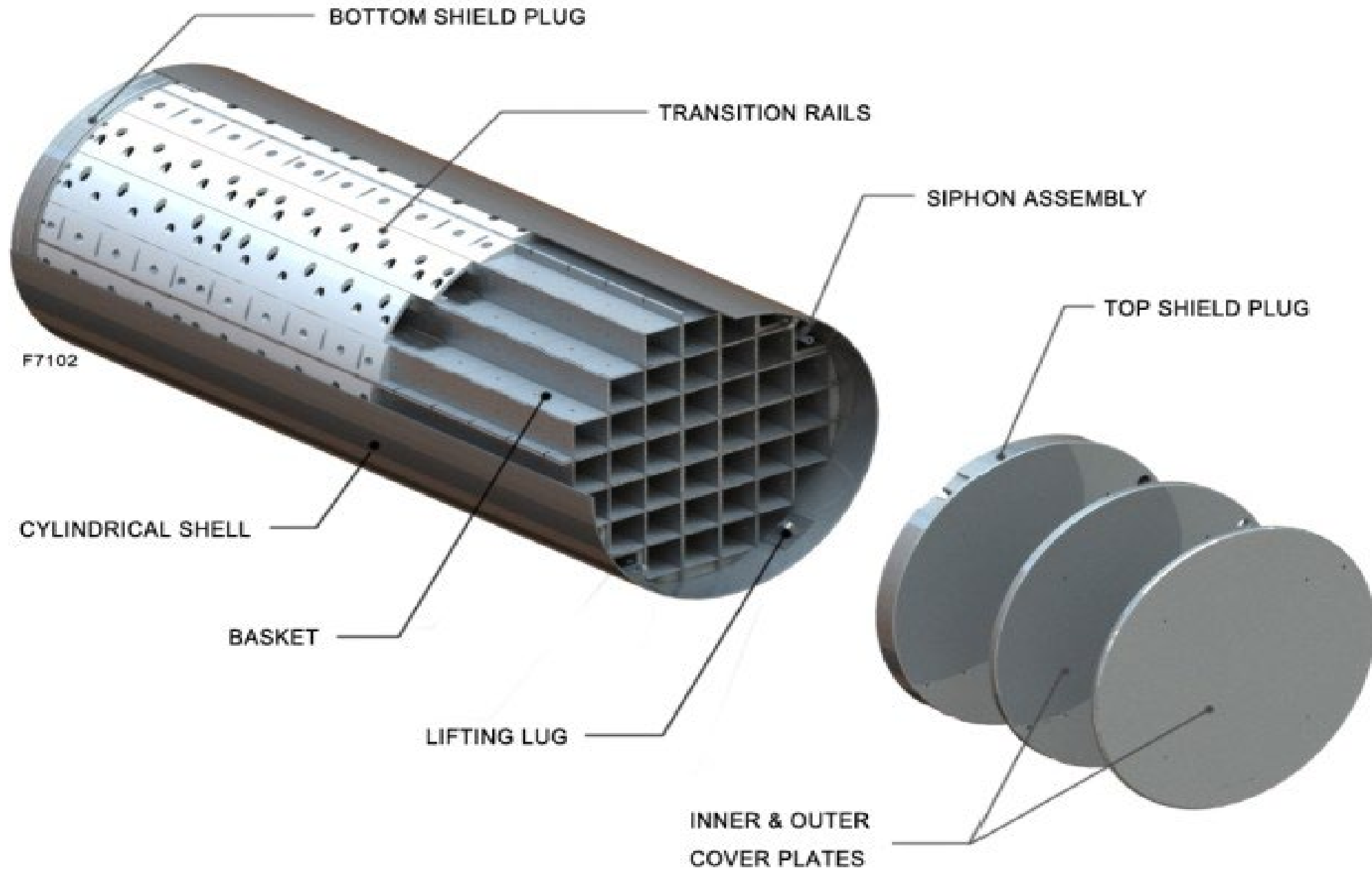
Canister pushed into module on slick rails, any potential scoring is already calculated and evaluated within the NRC licensing process to not affect canister safety performance, interior concrete design naturally supports canister, no way for canister to fall or drop inside

Module door bolted onto front, return transfer cask for next canister transport

**When offsite storage is available, the removal process is the same as loading: pull stored canister directly from module into a transport cask for offsite shipment**

# Duane Arnold Offload Video





# Overview: NUHOMS EOS Canister Components

Several design features enable Orano's NUHOMS EOS Dry Shielded Canister (DSC) to safely load hot fuel assemblies, including:

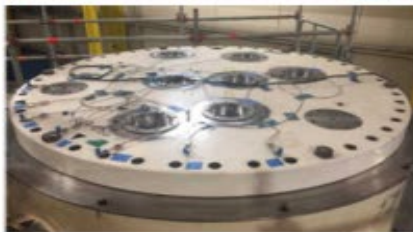
- Basket material treatments and coatings allow optimum heat conduction from the fuel assemblies to the canister shell
- Horizontal posture helps passively cool the DSC in the middle – where the fuel heat is hottest – with strong air flow convection

In the very unlikely event that a DSC should fail (which has never happened), the NUHOMS DSCs are designed to be unloaded and contents can be transferred. A dry run lid-removal demonstration is regularly witnessed and evaluated by the NRC.

# Temperature Versus Heat Load – Significant Margins

## Thermal Profiles:

### *Round Robin Analysis Comparison with Measured Data*



- Steady state PCTs from all models and measurements significantly lower than the design licensing basis:

| Parameter           | FSAR    | LAR      | Best-Estimate | HBU Cask Measurements |
|---------------------|---------|----------|---------------|-----------------------|
| PCT (model vs data) | 348°C   | 318°C    | 254-288°C     | 229°C                 |
| Heat Loadouts       | 36.96kW | 32.934kW | 30.456kW      | 30.456kW              |
| Ambient Temperature | 100°F   | 93.5°F   | 75°F          | 75°F                  |
| Design Specifics    | Gaps    | Gaps     | Gaps          | No Gaps?              |

FSAR: Final Safety Analysis Report

LAR: License Amendment Report (submitted after refinement of model inputs to FSAR)

Courtesy of Al Csontos, Co-chair of EPRI ESCP Thermal Subcommittee

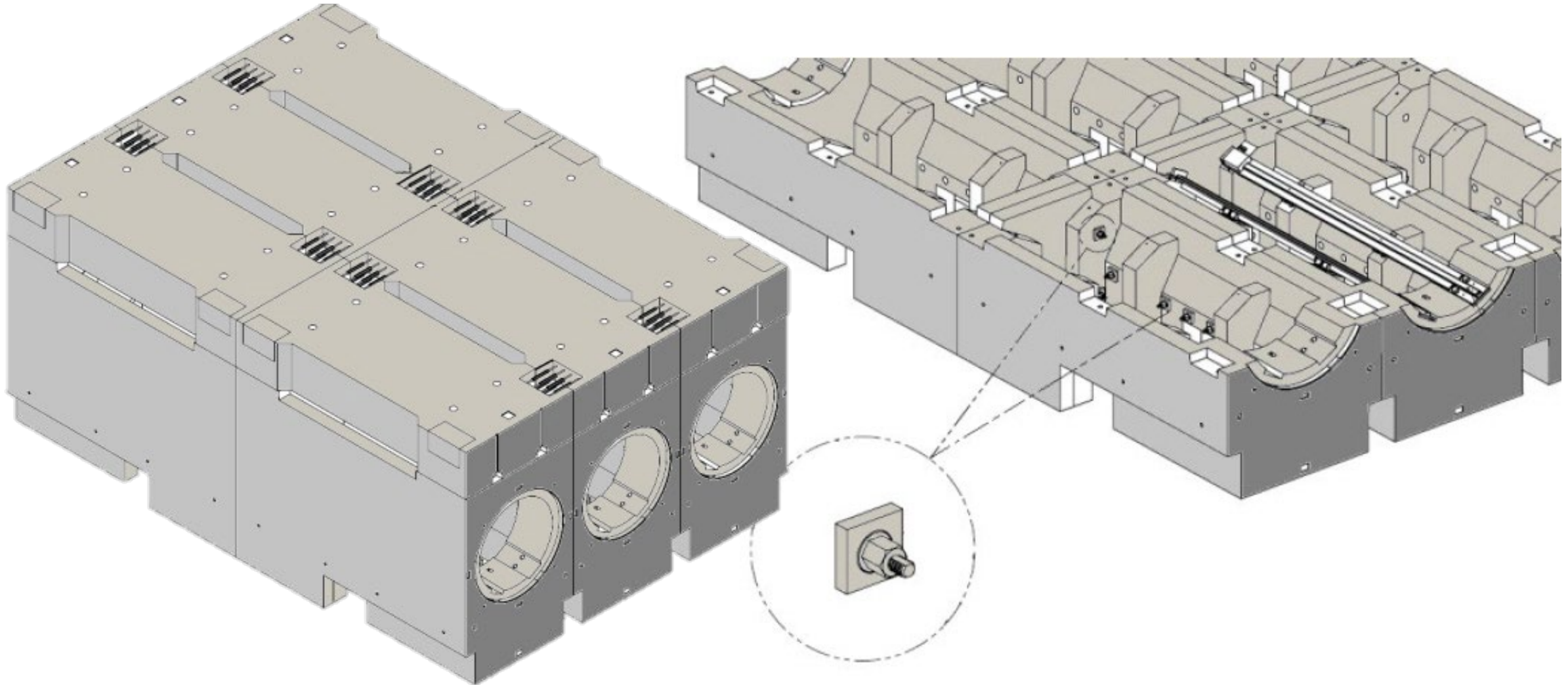
The aluminum basket expands and closes the gaps, but we don't know by how much.

Current Work is focused on identifying biases and conservatisms that overestimate thermal environment.

## Overview: Heat Versus Heat Load – Significant Margins

- As seen on the previous slide, the licensing basis evaluation initially considered 36.96 kW heat loads resulting in a peak cladding temperature (PCT) of 348°C.
- As the project progressed, the same fuel assemblies were re-evaluated using improved methods that resulted in the heat load being reduced to 32.934 kW and the resulting PCT from analysis was 318°C.
- In contrast the measured temperature was 229°C which is significantly lower than the PCT calculated from analysis and is also significantly lower than the limit of 400°C established by USNRC
- This demonstrates the conservatism inherent in the methodologies that go into designing and licensing the used fuel storage/transportation systems

# Robust EOS System Seismic Design



# Robust EOS System Seismic Design

- Amendment 0 of the NUHOMS EOS System approved by the NRC includes provisions to employ the methodologies documented in the Advanced NUHOMS System UFSAR (implemented at SONGS) for seismic stability. The added seismic resilience is based on bolting the individual NUHOMS modules together into groups using high-strength, robust steel rods, as was employed at SONGS ISFSI
- NUHOMS center of gravity-to-base ratio is extremely low, such that the systems will not tip over. Therefore, anchoring is not needed
- NUHOMS systems designed to minimally shift to help absorb extreme seismic energy. Extensive analyses by Sandia Labs evaluating horizontal and vertical dry storage systems showed that rectangular horizontal systems will not tip over or significantly shift during extreme seismic events.

## Amendment 3: Status of Current Licensing

**The scope of Amendment 3 for BWR fuel assemblies applies to Amendment 4 scope for PWR fuel at Diablo Canyon**

EOS System is certified by the NRC for storage with a maximum heat load of 50 kW/DSC. Amendment 3 is currently under review by the NRC

An important scope item for Amendment 3 is approval of a Maximum Heat Load Zoning Configuration (MHLC) for BWR Fuel

Heat Load per DSC increased from 43.6 kW to 48.2 kW

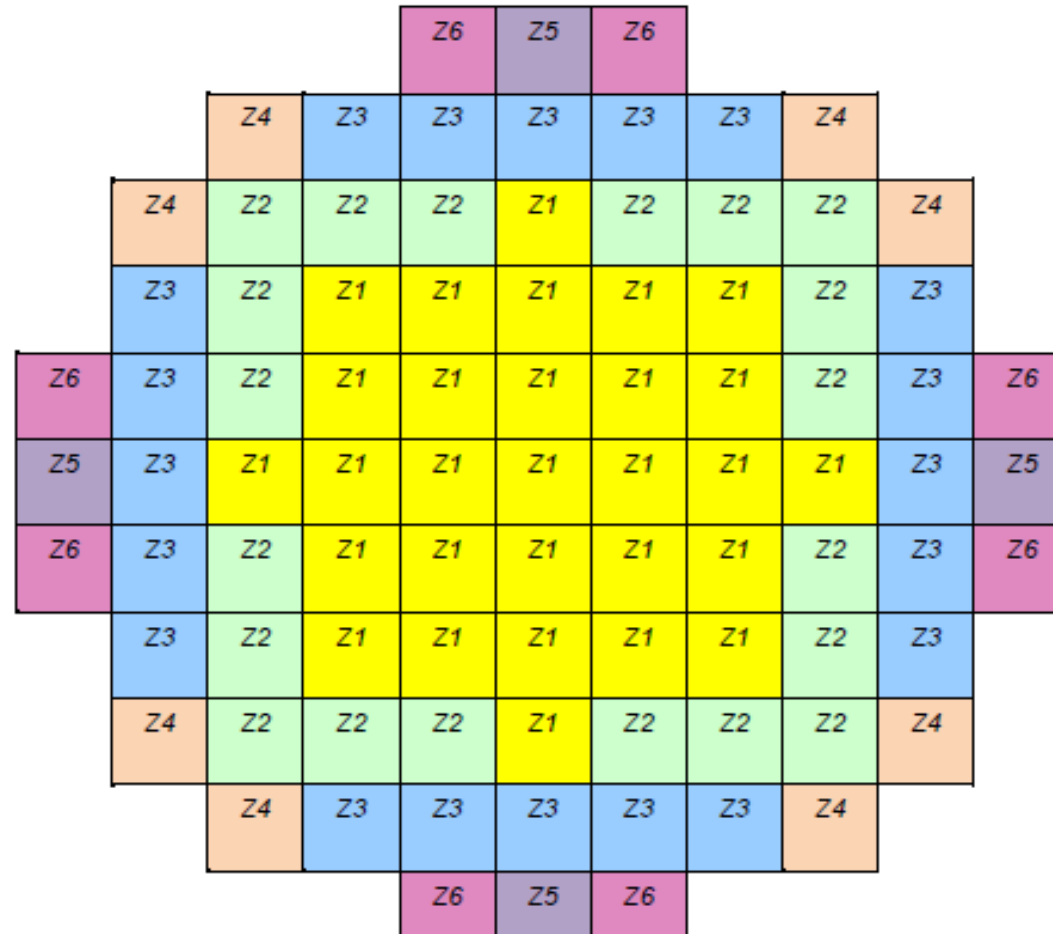
Heat Load per Fuel Assembly increased from 0.6 kW to 1.7 kW

Allows the flexibility to load fuel in multiple loading patterns that are enveloped by the MHLC – very important for full pool offload

NRC technical review is complete

Upon approval, this will minimize or even eliminate the need for further amendments associated with BWR heat load zoning

## Amendment 3: Status of Current Licensing



| Zone No.                     | Z1                                           | Z2   | Z3   | Z4   | Z5   | Z6   |
|------------------------------|----------------------------------------------|------|------|------|------|------|
| Max. Decay Heat per SFA (kW) | 0.40                                         | 0.60 | 1.30 | 1.70 | 1.30 | 1.70 |
| No. of Fuel Assemblies       | 29                                           | 20   | 20   | 8    | 4    | 8    |
| Heat Load Per Zone           | 11.6                                         | 12.0 | 26.0 | 13.6 | 5.2  | 13.6 |
| Max. Decay Heat per DSC (kW) | See Note 1 for EOS-HSM and Note 2 for HSM-MX |      |      |      |      |      |

## Amendment 4: Increased Assembly Heat Load for PWR

No change to the maximum heat load per DSC of 50 kW. Increase per assembly heat load from 3.5 kW to 4.5 kW (proposed)

Amendment 4 will allow for the earlier offload of the hottest fuel assemblies at Diablo Canyon. The maximum per assembly heat load is 4.2 kW

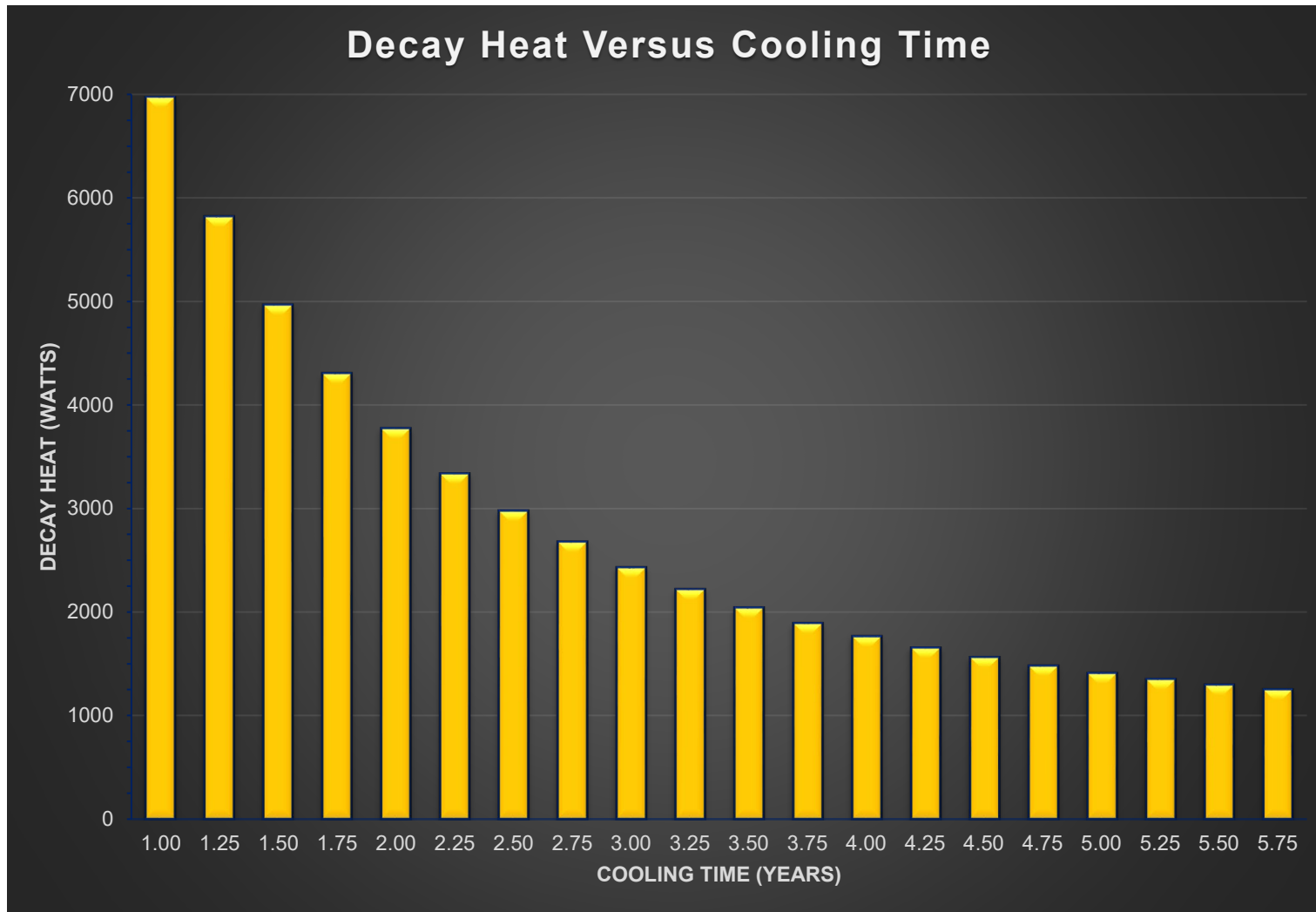
The basket aluminum plates will be anodized to provide additional margins

The scope of Amendment 4 NRC review is covered by Amendment 3 (similar changes to CoC 1004, Amendment 17 used for Duane Arnold)

Orano will employ one or two MHLCs similar to Amendment 3. Preliminary thermal and shielding analysis results are bounded by existing results in the Safety Analysis Report (SAR) or Amendment 3 analyses

The highest anticipated heat load per system at the Diablo Canyon ISFSI will be approximately 46 kW. The average heat load for the entire project is anticipated to be less than 43 kW with significant margin

# Rapid Reduction of PWR Fuel Decay Heat – Managing Margins



**Decay Heat rapidly reduces during first 6 years**

300 W/month @ 1.25 Years

200 W/month @ 1.75 Years

150 W/month @ 2.25 Years

100 W/month @ 2.75 Years

~25 W/month @ 5.00 Years

Long term ~ 50% in 20 Years

Small margins in cooling time greatly enhance overall decay heat margins

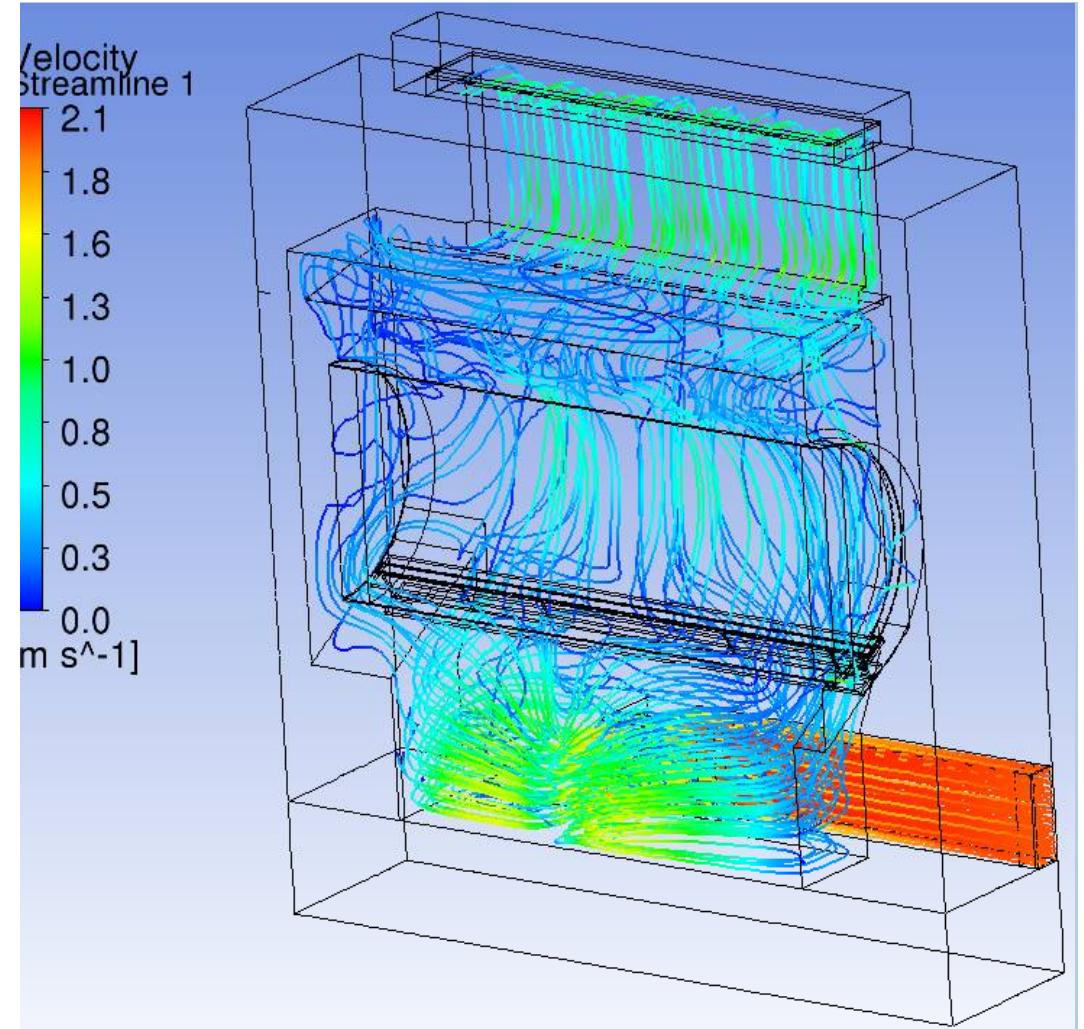
# Horizontal NUHOMS Provides Best Cooling Performance

## Maximized cooling air flow

Passive, enhanced natural convection efficiently carries heat away with air entering at the bottom and exiting out the top

Cooling air flows all around the horizontal dry storage canister = Uniform cooling

Highest thermal capability includes built-in safety margins in multiple system elements



# Design Margin Helps During Extreme Heat – Climate Change

The proposed loading plan will have significant margin on heat rejection capacity of the system to accommodate for severe weather conditions, “extreme heatwaves,” and other beyond-design-basis conditions

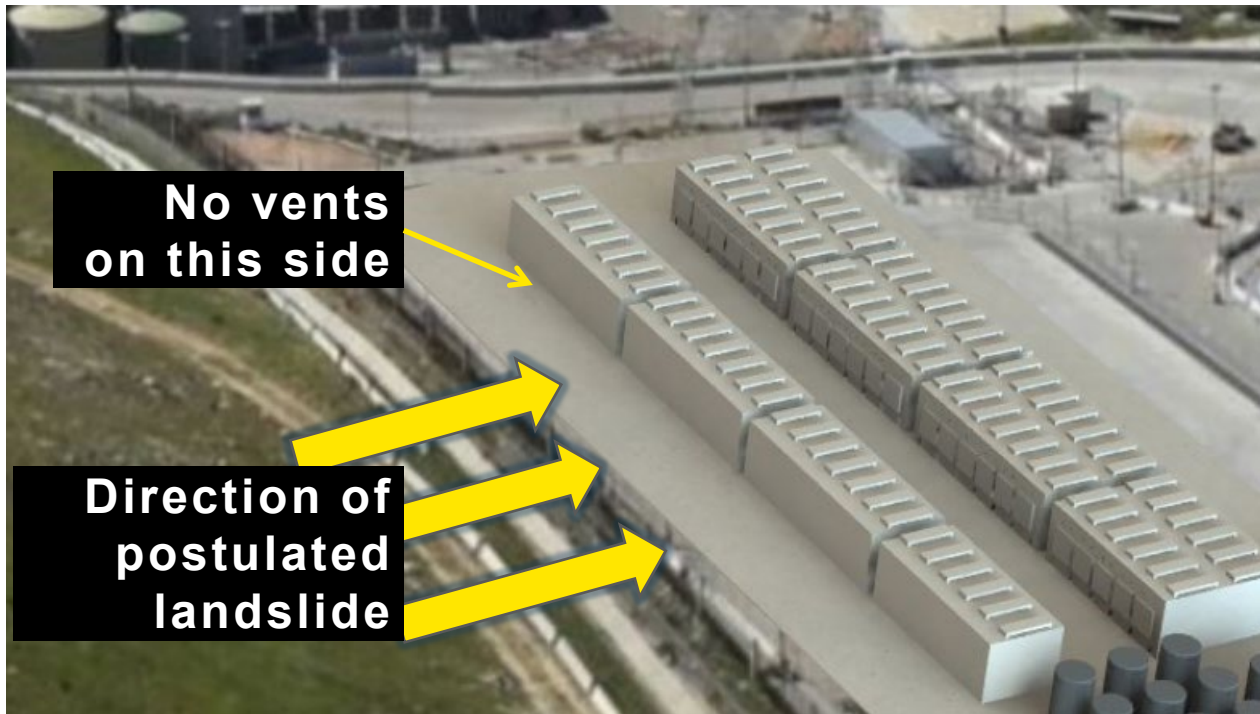
Variable basket plate thickness improves heat transfer



# No Vent Blockage under Extreme Landslide Conditions

Under postulated extreme landslide, the NUHOMS systems will continue passive cooling while debris is cleared, since they are installed in groups with shared air vents

Landslides were evaluated during the original licensing of the DC ISFSI. There are no active landslides or other evidence of existing ground instability in the ISFSI area.



**Internal vent channels within group of NUHOMS HSMs**

# SONGS NUHOMS Inspection Video



# Proven Offload Performance by Orano

## Achievements during all 4 Full Pool Offloads

- Zero safety issues
- Zero regulatory issues
- 100% on budget
- 100% on time
- 100% under dose goal
- Effective coordination with customer teams
- No drop risk; Loaded canisters always supported

An infographic for the Orano EOS NUHOMS dry storage system. It features a background image of the large, grey, cylindrical storage containers with circular openings. Two workers in yellow safety vests and hard hats are standing near the base of the containers. The infographic lists key achievements in yellow boxes: '4 full offloads completed', '0 safety issues', '0 regulatory issues', '100% on budget', '100% on time', and '100% under dose goal'. It also includes technical specifications: 'EOS NUHOMS dry storage system', 'Up to 50 kW total heat load', and '4.2 kW max heat per assembly'. The Orano logo and website 'orano.group/usa' are at the bottom.

**Certainty.**

When you go by the numbers,  
**the numbers are impressive.**

**4**  
full offloads completed

**0**  
safety issues

**0**  
regulatory issues

**100%**  
on budget

**100%**  
on time

**100%**  
under dose goal

**EOS NUHOMS** dry storage system  
Up to **50 kW** total heat load  
**4.2 kW** max heat per assembly

orano.group/usa

The Orano logo, featuring a stylized yellow 'O' icon followed by the word 'orano' in lowercase black font.



**orano**



 [@Orano\\_USA](#)



## **Per Peterson, Member and Ferman Wardell, Consultant**

- 1. Meet with Acting NRC Senior Resident Inspector**
- 2. FLEX Program Update**
- 3. Maintenance Rule Program Status**
- 4. NRC Office of Inspector General Report on Counterfeit, Fraudulent and Suspect Parts**
- 5. Quality Verification Elevated Audit Findings**
- 6. Radiation Protection During Outage 1R23 & Tour of Containment**
- 7. Observe Outage 1R23 Outage Control Center**
- 8. Workplace Seismic Safety**
- 9. Configuration Management Program**
- 10. New Independent Spent Fuel Storage Installation Cask System**
- 11. Human Performance Update**
- 12. Meet with DCCP Officer Adam Peck, Site Vice President**
- 13. Observe Corrective Action Review Board Meeting**



## Meet with Acting NRC Senior Resident Inspector

- DCISC Agenda for this Fact-finding meeting
- Outage 1R23 Inspections
- Infrequent Operations and Evolutions
- High Winds occurring at the time of the meeting
- Fuel Handling Equipment problems
- Residual Heat Removal System relief valve replacement error



## **FLEX Program Update**

- **Equipment Stored in Specially-Designed Building**
- **Some Equipment Stored Outside Properly Covered**
- **All Equipment Maintained, Tested, Replaced by DCCP Personnel**
- **All Equipment “Operational and In Position”**
- **FLEX Program Is Healthy**



## Maintenance Rule Program Status

- 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,"
- Status Categories:
  1. (a)(1) – SSC needs additional preventive maintenance goals and monitoring
  2. (a)(2) – SSC has effective preventative maintenance
- DCPD Status:
  - 12 of 13 Systems Completed Action & In Monitoring
  - One System Completing Corrective Actions
  - All Systems Expected to Be (a)(2) in 2022



## **NRC Office of Inspector General Report on Counterfeit, Fraudulent, and Suspect Parts**

- **NRC Weakness/Needs to Improve**
- **DCPP Process:**
  - **Procedure AD9.ID11, “Supplier Evaluation Process” to address misrepresented vendor parts**
  - **Procedure AD9.ID10, “Suspected Vendor Misrepresentation”**
  - **Procedure QCP.10.1, “Receipt Inspection Program” to specifically address misrepresented vendor parts**
  - **Procedure AD9.ID1, “Procurement of Items and Related Services” to address misrepresented vendor parts**
  - **DCPP Process Appears Effective**



## Quality Verification Elevated Audit Findings

- Two Audit Findings Thought by DCISC to be “Escalated” Were Actually “Elevated”
- “Escalated” Are Problematic Findings
- “Elevated” Are Normal Findings
- The Two “Elevated” Findings Were Satisfactorily Resolved



## **Radiation Protection During Refueling Outage 1R23** **and Tour of Containment**

- **DCPP Measures Collective Radiation Exposure (CRE)**
- **Outage Goal of 18.35 Person-Rem**
- **To-Date Goal Reduced to 13.683. Actual To-Date of 11.7.**
- **Actual Outage CRE 18.3**
- **FFT Was Briefed and Dressed for Containment Entry**
- **Toured Containment**
- **FFT Received 1.0 milliRem Radiation Dose**
- **Outage Work Performed Effectively and Safely**



Dressing out for Containment



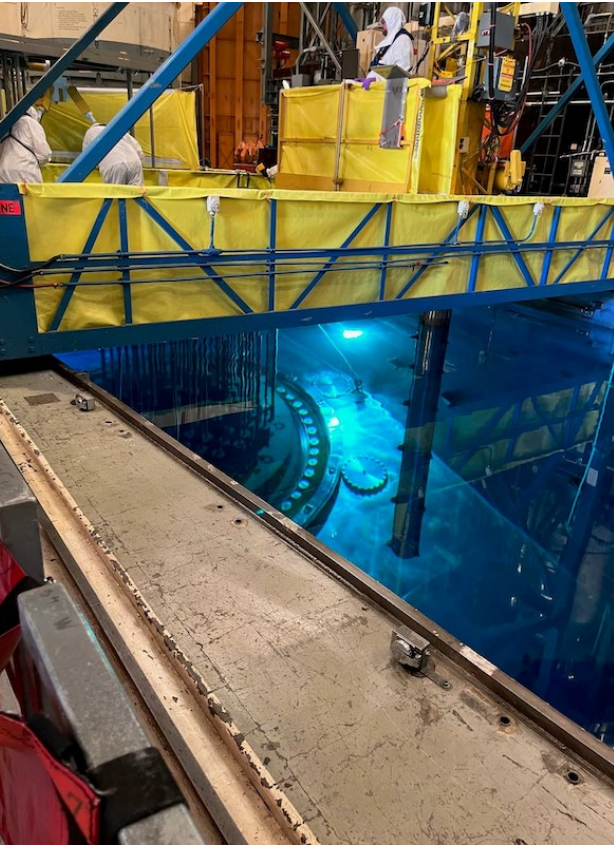
At Pressurizer



Refueling Canal



Reactor Head



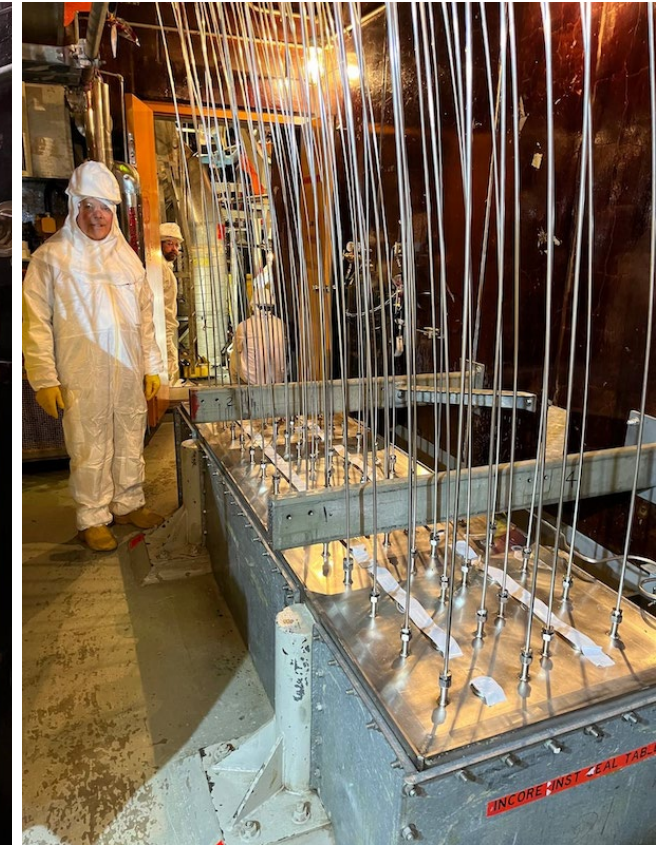
Reactor Cavity & Reactor Vessel



Reactor Coolant Pump Seal



Instrumentation Cabinets



Incore Instrumentation Seal Table



## Observe Outage 1R23 Outage Control Center

- Engineering, Operations, Maintenance, RP, Chemistry, Schedule Control
  - Safety Update
  - Plant Update/Defense-in-Depth
  - Functional Area Report-Outs
  - Emerging Issues Update
  - Non-Outage Unit Update
  - Outage Status
  - Around-the-Room
- OCC Exhibited Effective, Tight Control



## Workplace Seismic Safety

- DCPD's "Standards for Bracing Office Furniture, Cabinets, and Storage Racks Revision 2 (1/30/2020)."
- Protect personnel from injury and ensure egress routes are not blocked by office furniture impact
- FFT toured the Instrumentation and Electrical Facility
- The facility appeared to meet all applicable DCPD standards.
- DCPD Workplace Safety Program Appeared Satisfactory



## Configuration Management Program

- Configuration Management (CM) is defined as: “a systematic approach for identifying, documenting, and changing the characteristics of a facility’s Structure, System, or Components (SSC) and ensuring that conformance is maintained between the design requirements, physical plant configuration, and facility configuration information.” Or . . .
- . . . plant documents reflect as built configuration
- DCPD CMP Backlog Was Zero – Good Performance



## **New Independent Spent Fuel Storage Installation Cask System**

- **DCPP Has Selected the Orano Dry Cask System for Its ISFSI**
- **Horizontal Casks with 37 Fuel Assemblies Per Cask**
- **Licensed by NRC**
- **In Use at 17 U.S. Nuclear Power Plants**
- **Presentation By Orano At This Public Meeting**



## Human Performance Update

- **Human Performance Events:**
  - **Station Level Events (highest significance)**
  - **Department Level Events**
  - **Organizational Learning Opportunities (lowest significance)**
- **Highest numbers of HU events occurred during outages**
- **Practically all of the total events were classified as Organizational Learning Opportunities (lowest significance)**
- **Only one SLE since September 2020 indicates that DCCP's HU performance has been good.**
- **DCCP's goal is to have zero HU events.**



## **Meet with DCCP Officer Adam Peck, Site Vice President**

- **Discussed Fact-finding Agenda Items**
- **Discussed Other Items of Mutual Interest**



## Observe Corrective Action Review Board (CARB) Meeting

- Review Root Cause Evaluations (RCEs)
- Approve Corrective Actions to prevent recurrence.
- Approve Effectiveness Evaluations for CAP documents
- Review CAP metrics to ensure the CAP is meeting management expectations
- Review notifications screened by Notification Review Team
- Recommend *Eagle Eye Award*\* Nominations
- CARB Appeared Effective

\* *Eagle Eye Award – those who see and solve significant CAP issues*



## **Per Peterson, Member and Ferman Wardell, Consultant**

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## **Peter Lam, Member, and Richard McWhorter, Consultant**

- 1. Learning Services Department**
- 2. New Spent Fuel Storage System**
- 3. Containment Structure Inspections**
- 4. Nuclear Fuel Performance**
- 5. Flow Accelerated Corrosion Program**
- 6. Containment Spray System**
- 7. Radiation Protection Department Performance During Refueling Outage 1R23**
- 8. Meet with Nuclear Regulatory Commission (NRC) Acting Senior Resident Inspector**
- 9. Meet with DCCP Director**
- 10. Capital Project Planning**
- 11. Refueling Outage 1R23 Results**
- 12. Online Maintenance Scheduling**
- 13. Maintenance Department**
- 14. Foreign Material Exclusion Program**



## Learning Services

- Last Initial Licenses Operator Training Class Completed in Early 2021
- Last Non-Licensed Operator Training Class Completed in May 2022
- Licensed Operator Continuing Training and Maintenance and Technical Training Programs Ongoing with Slow Reductions in Activities and Staffing
- Reviewed Departmental Performance Improvement Dashboard and Excellence Plan
- Certified Fuel Handler Training Program to be Administered by the Decommissioning Group
- Conclusion – Learning Services Department overall performance was good. Department is focused on ensuring that staff remaining on site through the cessation of power operations will be adequately qualified.



## New Spent Fuel Storage System

- **Current System – Holtec Multi-Purpose Canisters and Overpacks (32 assemblies per canister moved and stored vertically)**
- **Proposed System – Orano NUHOMS Extended Optimized Storage System**
- **Dry Shielded Canister (37 assemblies each; vacuum dried; He filled). Moved Horizontally and Inserted into Reinforced Concrete Storage Module**
- **Advantages – Simplifies Movements to Pad and All Fuel Could Be Moved within Two Years of Cessation of Power Operations**
- **Different Licensing Process from Current System**
- **Conclusion – DCPP’ s approach to procuring a new system for managing the storage of spent fuel assemblies appeared to be appropriate. The DCISC should continue to review the process and system.**



## Containment Structure Inspections

- **Test and Inspection Requirements – Concrete Structure, Steel Liner, Integrated Leak Rate Tests**
- **Both Units’ Concrete Shells Inspected in 2021. Majority of Surface Inspected Using Drone and High-Resolution Camera.**
- **Detailed Reports Provided and Reviewed. Indications of Defects Categorized and Reviewed in Accordance with Applicable Codes.**
- **Only Two New Indications on Unit 1 – Reviewed and Found Acceptable. Total of 28 Indications for Unit 1 and 20 for Unit 2.**
- **Conclusion – The DCCP Containment Structures were sound and appeared to have no safety issues or concerns. The DCISC should review the results of recent Containment steel liner inspections.**



## Nuclear Fuel Performance

- Unit 1 – Current Cycle 24, No Defects Since 1991 (19 cycles)
- Unit 2 – Current Cycle 23, No Defects Since 2011 (7 cycles)
- No Significant Debris Found on Fuel During Refueling Outage 1R23
- Future Core Designs to be Optimized Given Approaching Cessation of Power Operations.
- Conclusion – DCCP's nuclear fuel has for many years performed flawlessly with no defects or leakage. This is excellent performance.



## Flow Accelerated Corrosion

- Phenomenon Wherein the Removal of a Corrosion Layer by Fluid Flow Can Lead to Rapid Wall Thinning and Leaks or Ruptures
- Program for Proactive Inspections and Replacements
- Number of Needed Inspections Down Significantly from Past Due to Approaching Cessation of Power Operations.
- Still Inspect Areas Not Modeled or Subject to Unusual Plant Conditions
- Two Areas Inspected During Refueling Outage 1R23; No Repairs Needed
- Conclusion – DCCP continues to manage its Flow Accelerated Corrosion Program effectively.



## Containment Spray Systems

- **System Used to Spray Water into Containment for Post-Accident Depressurization and Cooling. Also Provides for Chemical Addition.**
- **No Major Issues; Both Units' Health Rated as 'Green'**
- **Maintenance Rule Program Unavailability and Reliability Goals Being Met with Significant Margin.**
- **Conclusion – DCCP's Containment Spray Systems' health was Green (Healthy), and there were no significant system issues.**



## Radiation Protection Department Performance During 1R23

- **Collective Radiation Exposure (Person-Rem):**
  - **Planned Goal – 21.250**
  - **Revised Goal – 18.350**
  - **Achieved – 18.332**
- **Record Low CRE for a Unit 1 Outage; As Low As Reasonably Achievable (ALARA) Program Performance Good.**
- **No Major Performance Issues or Concerns in Department. Staffing Slowly Decreasing.**
- **Conclusion – Radiation Protection Department performance during Refueling Outage 1R23 was good.**



## **Meet with Acting NRC Senior Resident Inspector**

- **Items Discussed Included:**
  - **NRC Office of Inspector General (OIG) Report on Oversight of the Auxiliary Feedwater System at DCP**
  - **NRC Response to OIG Report**
  - **NRC Staffing**
  - **Recent Inspection Results**



## **Meet with DCPD Director**

- **Blair Jones, Director, Strategy, Policy and Engagement**
- **Dr. Lam Discussed Items from the Fact-Finding Meeting and Other Subjects of Interest**



## Capital Project Planning

- **Project Review Working Group Activities Complete and Closed**
- **Normal Process Currently Used for Review and Approval of Capital Projects, Centered Around Plant Health Prioritization Committee.**
- **Reviewed List of Capital Projects Proposed But Not Approved**
- **Reviewed List of Capital Projects Proposed and Approved**
- **Conclusion – DCP’s process for authorizing or cancelling proposed capital projects appeared effective. Selections made to delete projects using this process did not appear to compromise plant operational safety.**



## Refueling Outage 1R23 Results

- All Planned Work Completed with No Scope Deletions
- Performance Measures

|                                       | <u>Goal</u> | <u>Actual</u> |
|---------------------------------------|-------------|---------------|
| • Serious Injury or Fatality Events   | 0           | 0             |
| • Nuclear Safety Issues               | 0           | 0             |
| • Site Human Performance Clock Resets | 0           | 0             |
| • Outage Duration (Days)              | < 30        | 29.2          |
| • ALARA (Person-Rem)                  | < 21.3      | 18.3          |
| • Power Ascension (Days)              | < 5         | ~ 7 (not met) |
| • Reliability (Days following outage) | > 90        | ~ 1 (not met) |
- Conclusion – DCCP’s Refueling Outage 1R23 was successfully performed. The DCISC should follow up on reviewing the causes and corrective actions for Forced Outage 1X24.



## Online Maintenance Scheduling

- **Process Starts with 12-week Rolling Matrix, a Preplanned Sequence for Taking Systems Out of Service for Preplanned Maintenance and Testing.**
- **Corrective Maintenance Issues are Reviewed for Significance and Scheduled into the Same 12-week Rolling Matrix.**
- **Specific Risk Reviews Performed at Several Points Along Planning Cycle, Culminating in an Integrated Risk Review Team Meeting.**
- **Phoenix Risk Model Also Used to Provide a Quantitative Analysis of Risk Based on the Probabilistic Risk Assessment Model**
- **Conclusion – DCCP has satisfactory procedures and programs in place for managing the risks of performing maintenance activities online.**



## Maintenance Department

- **Recent Reorganization to Reduce the Number of Managers. Slow Ongoing Reduction in Staffing. Voluntary Separation Program Initiated by PG&E.**
- **Recent Department Performance Good, Including Refueling Outage 1R23.**
- **No Major Human Performance Issues and Green (Healthy) Indicators Overall.**
- **Focused on Using Observation Review Meetings to Identify Activities Not Meeting Station Standards and Initiate Improvements.**
- **Conclusion – Maintenance Department performance at DCPD continued to be good. The DCISC should review Maintenance Department performance again in about one year. Also, the DCISC should review the Voluntary Separation Program that was recently initiated by PG&E.**



## Foreign Material Exclusion Program

- Program to Prevent the Undesired and Potentially Harmful Intrusion of Foreign Materials into Plant Systems or Components.
- Extensive Controls Used When Systems Opened for Maintenance
- Issues Tracked and Categorized as Events, Threats, or Conditions.
- Refueling Outage 1R23 – Zero Events, One Threat, Six Conditions
- Conclusion – DCCP's performance in Foreign Material Exclusion during Refueling Outage 1R23 was very good.



## **Peter Lam, Member, and Richard McWhorter, Consultant**

- 1. Learning Services Department**
- 2. New Spent Fuel Storage System**
- 3. Containment Structure Inspections**
- 4. Nuclear Fuel Performance**
- 5. Flow Accelerated Corrosion Program**
- 6. Containment Spray System**
- 7. Radiation Protection Department Performance During Refueling Outage 1R23**
- 8. Meet with Nuclear Regulatory Commission (NRC) Acting Senior Resident Inspector**
- 9. Meet with DCCP Director**
- 10. Capital Project Planning**
- 11. Refueling Outage 1R23 Results**
- 12. Online Maintenance Scheduling**
- 13. Maintenance Department**
- 14. Foreign Material Exclusion Program**

# Diablo Canyon Power Plant: State of the Plant Update

Dennis Petersen

Station Director

June 23, 2022



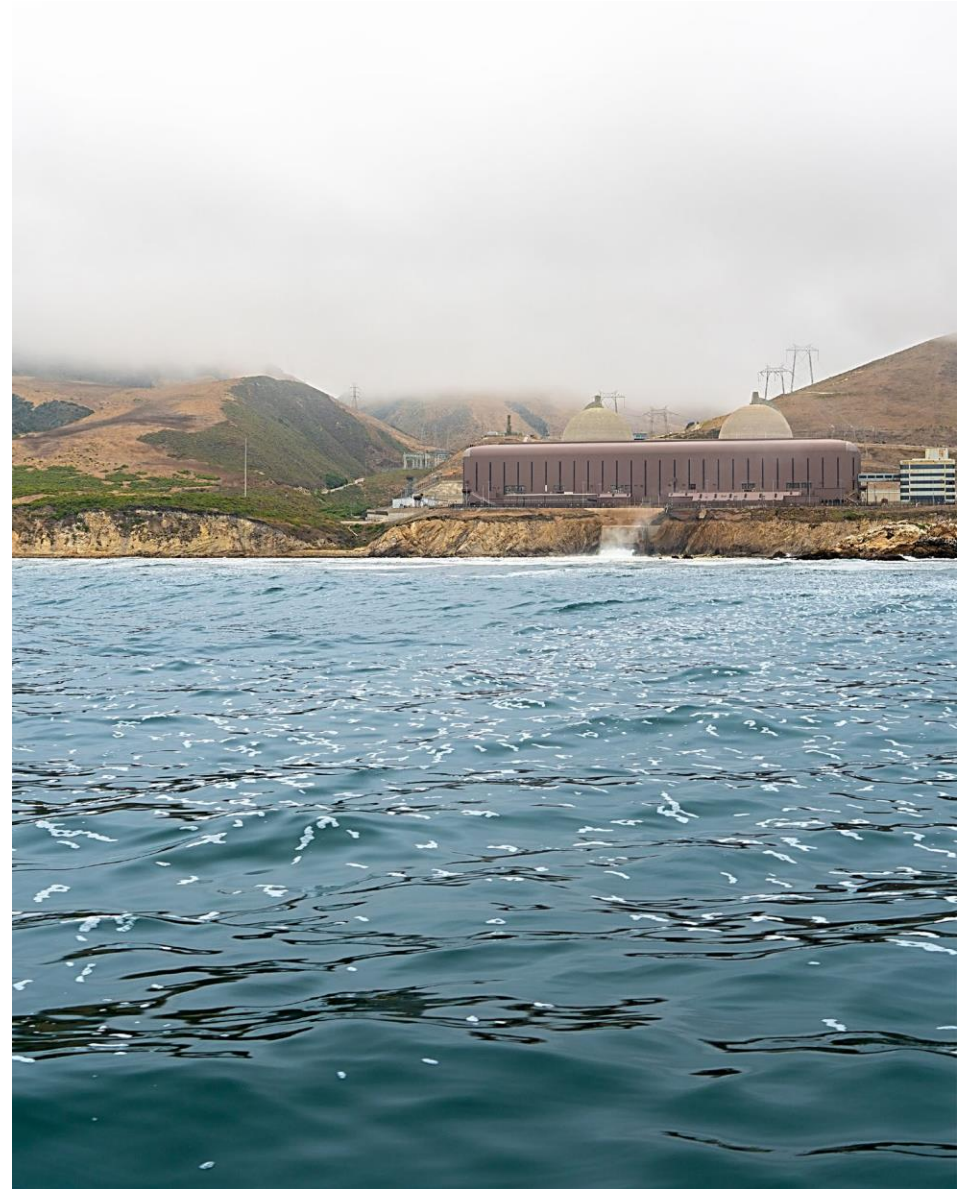
## Station Update

## Key Upcoming Activities



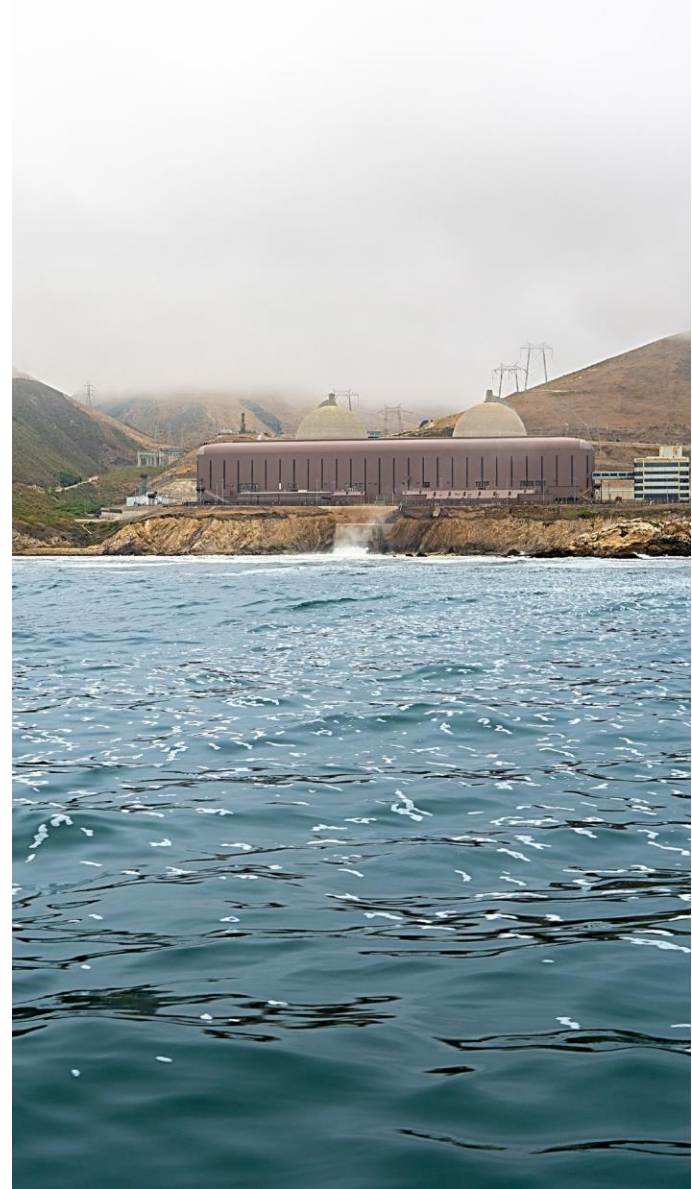
## Plant Operation

- Units 1 & 2 are safely operating at 100% power with a Probabilistic Risk Assessment (PRA) of “Green”
- All NRC Performance Indicators (PIs) are “Green”



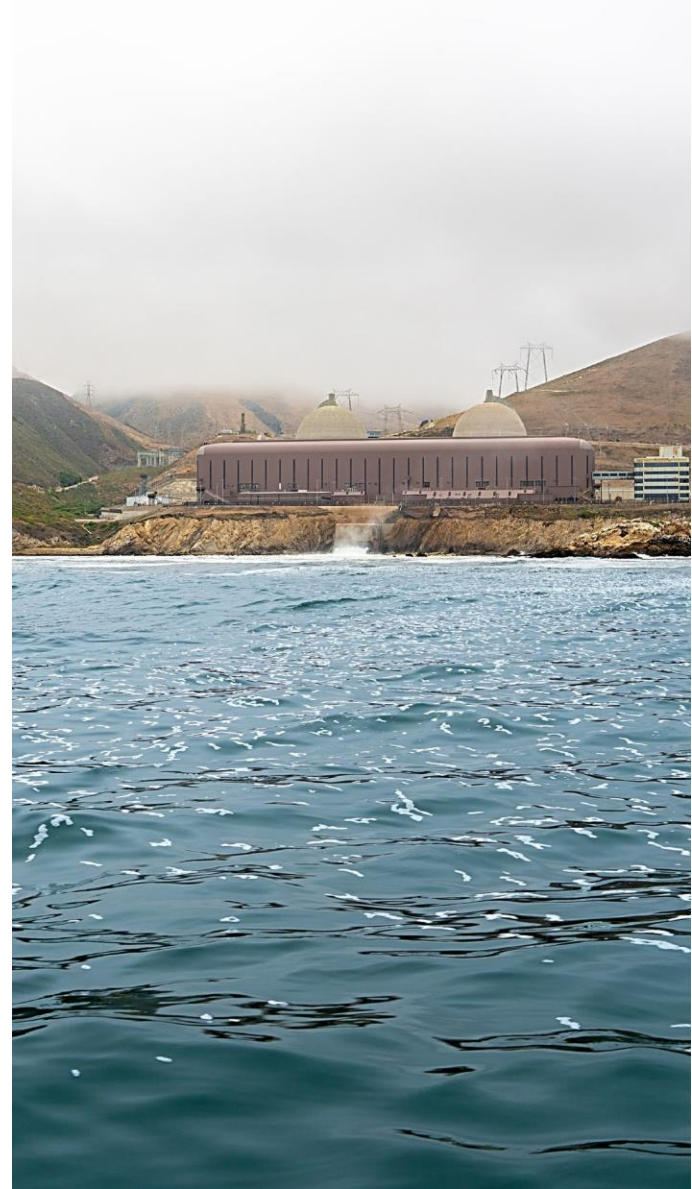
## Station Update

- Completed 1R23 Refueling Outage
  - March 26 – April 22, 2022
  - Completed reactor refueling and key maintenance activities
- Maintenance Outage (Safety First)
  - Steam relief valve issue on secondary side of plant (internal component caused air inleakage to condenser)
  - Separated from grid per normal procedures to make repairs
  - Reconnected to grid upon successful completion of repairs



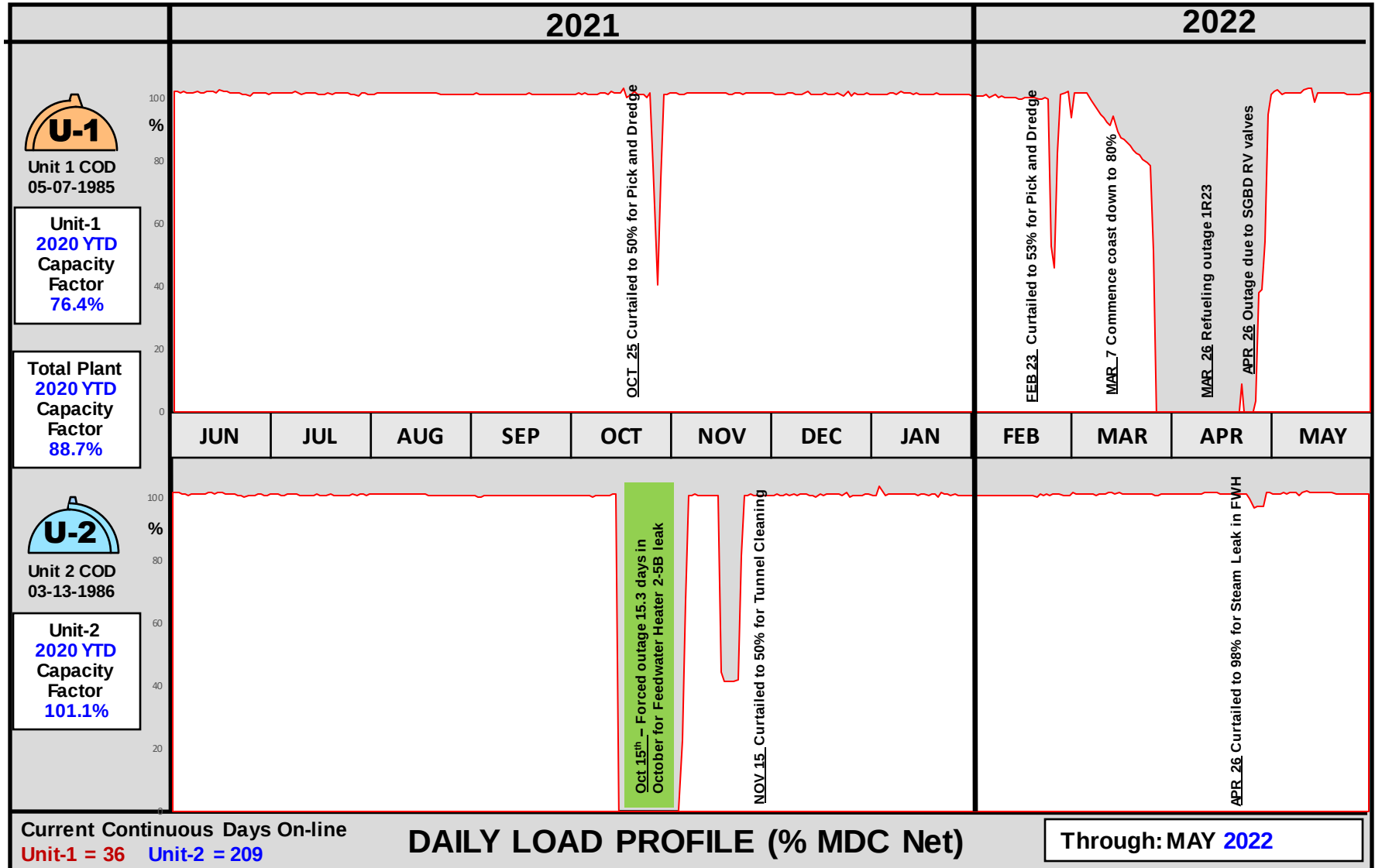
## Station Update

- Tier 2 retention agreement
  - Attrition rates continue to align with projections
  - Focusing on Retrain and Redeployment efforts to help employees identify post-operational options
- Voluntary Separation Program (VSP)
  - Company-wide initiative
  - Voluntary early resignation for targeted groups
  - 22 individuals affected at DCPD
- Unit 1 significant accomplishment
  - Surpassed 20 years of operation without an automatic or manual trip
  - DCPD Unit 1 is now the leader among U.S. nuclear plants in this category



# Daily Load Profile: Past 12 Months

## Daily Capacity Factor Power History Curves

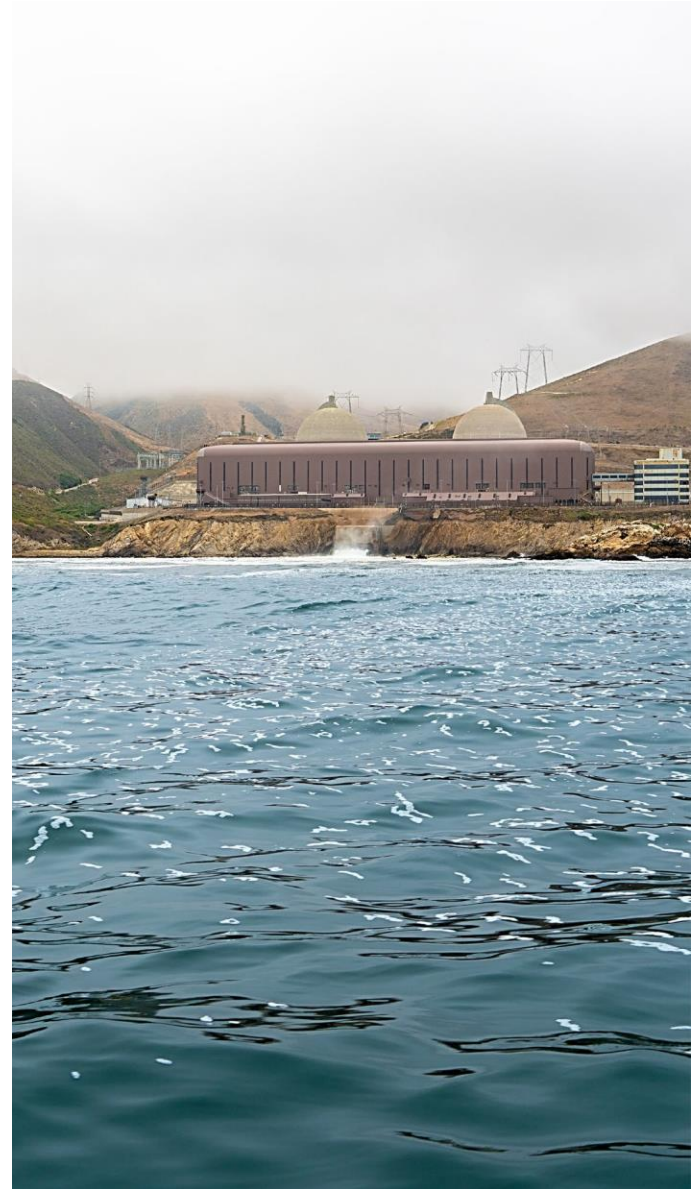




# Station Update

## COVID-19 Update

- No impact on Diablo Canyon Power Plant safe operations
- Case numbers fluctuating in conjunction with local cases
- Maintaining on-site testing capabilities





## Upcoming Station Activities

- NRC Design Basis Assurance Inspection – June 2022
- NRC Security Access Control Inspection – July 2022
- Nuclear Safety Oversight Committee site visit – July 2022
- NRC Radiation Protection Inspection – July 2022
- NRC Emergency Preparedness and Performance Improvement Inspection – September 2022
- Unit 2 Refueling Outage – October 2022

# Thank You

Dennis Petersen



# Results of 1R23 Refueling Outage

Mike Quitter  
Outage Manager  
June 23, 2022



## Executive Summary

Diablo Canyon Unit 1 twenty third refueling outage (1R23) began on March 26<sup>th</sup> at 21:00 hours. Refueling outage 1R23 ended on April 22<sup>nd</sup> at 10:14 hours with the Output Breaker closure.

# 1R23 Goals Vs Actuals

| Performance measure                                    | Goal                                             | Actual                            |
|--------------------------------------------------------|--------------------------------------------------|-----------------------------------|
| (SIF) events                                           | 0                                                | 0                                 |
| Nuclear Safety Events                                  | 0                                                | 0                                 |
| Site Clock Resets                                      | 0                                                | 0                                 |
| Outage duration                                        | ≤ 35 days                                        | 26 Days, 6 Hours,<br>47 Minutes   |
| ALARA (Rem)                                            | ≤ 21.250<br><i>* revised to 18.350<br/>Rem *</i> | 18.332 Rem                        |
| Significant Foreign Material<br>Exclusion (FME) events | 0                                                | 0                                 |
| Power Ascension                                        | ≤ 5 days                                         | maintenance outage (Safety first) |
| Reliability                                            | ≤ 90 days                                        | maintenance outage (Safety first) |

# 1R23 Successes

- No nuclear safety challenges (defense in depth)
- No industrial safety significant injury or fatality
- No foreign material challenges
- No clearance tagging challenges
- No station level events
- Lowest dose ever achieved
- There were several efficiencies in the schedule that allowed for most efficient duration

- **Primary**

- Drain-down primary valve scope
- Reactor coolant system spray isolation valve – enhanced repack
- Refueling cavity upender kick-off spring replaced
- Special Lifting Device (SLD2) 10-year in-service inspection
- Reactor coolant pump 1-3 repair small oil leak which required containment entry at power to perform oil additions
- Weld repair in reactor coolant system valve stem leak-off line to pressurizer relief tank
- Repack of valve due to boric acid leaking

- **Secondary**

- Auxiliary saltwater pump 1-1 pump replacement
- Travelling screen 1-3, 1-4, and 1-5 overhauls
- Turbine stop Valve refurbishment
- Root cause evaluation extent of condition feedwater heater eddy current testing and tube plugging (5 feedwater heaters)

- **Electrical**
  - Main/aux bank window
  - Startup bank window
  - Main generator inspection
  - Vital bus F maintenance outage window

## **Executive Summary**

Diablo Canyon Unit 2 twenty third refueling outage (2R23) is scheduled to begin in October 2022 and it is initially scheduled for 35 Days.

# 2R23 Goals

| Performance measure                                 | Goal           |
|-----------------------------------------------------|----------------|
| (SIF) events                                        | 0              |
| Nuclear Safety Events                               | 0              |
| Site Clock Resets                                   | 0              |
| Outage duration                                     | $\leq 35$ days |
| ALARA (Rem)                                         | TBD            |
| Significant Foreign Material Exclusion (FME) events | 0              |
| Power Ascension                                     | $\leq 5$ days  |
| Reliability                                         | $\leq 90$ days |

- **Primary**
  - Primary valve maintenance window
  - Special Lifting Device (SLD2) 10-Year in-service inspection (requires coatings removal, in-service inspection, and re-coating)
  - Residual heat removal pump motor overhaul
  - Air test of containment spray nozzles
  - Accumulator nozzle inspections

- **Secondary**

- Main condenser expansion joint (EJ-6) replacement
- Main feedwater pump 2-1 rupture disc replacement
- Feedwater heater extent of condition Inspections / Repair (4 main feedwater heaters)
- Turbine stop valve and turbine governor valve inspections
- Main steam isolation valve inspection
- Auxiliary saltwater pump 2-2 motor and pump replacement
- Condensate polisher computer replacement project
- Travelling screen 2-6 overhaul
- Main generator inspection
- Main feedwater pump 2-2 pump inspection
- Circ water pump 2-2 motor overhaul

- **Electrical**

- Main/Aux bank and startup bank maintenance windows
- Auxiliary transformers 2-1 and 2-2 isophase bushing inspections
- Startup transformer 2-2 power factor testing
- Vital bus F maintenance outage window
- 4kV bus E aux feeder breaker racking overhaul
- 12kV and 4kV bus E PMs
- Non-Vital bus maintenance outage windows (3)

## Major partners

- Westinghouse
  - Fuel handling
  - Low power reactor physics testing
- Siemens
  - Main generator inspection
  - Main turbine stop valve refurbishment
  - Main turbine governor valve refurbishment

# Thank you

Mike Quitter

# Quality Verification's Perspective on Plant Performance

Raymond Robins

Quality Verification Senior Manager

June 23, 2022



Together, Building  
a Better California

## Performance Summary

During the first period of 2022, DCPD exhibited traits reflecting a strong Nuclear Safety Culture and effectively implemented the QAP consistent with regulatory requirements and commitments to the Nuclear Regulatory Commission (NRC).

Improvement was observed in 2022 with three key functional areas including Engineering, Maintenance, and Operational Focus. This period included the successful completion of the 1R23 outage which met all identified goals. Key areas of focus for the station are workforce management and industrial safety to ensure that “Everyone and Everything is always Safe”. QV will continue to monitor these as part of standard oversight activities.

## Operational Focus

- Increased focus on communicating impact and prioritizing equipment problems for resolution
- Improvement in timely identification of trends

## Maintenance

- Improvement in the use of error reduction tools has been observed
- Improvement in use of performance improvement tools such as the crew notebook and management review meetings

## Engineering

- Engineering leadership focus on equipment reliability excellence
- Engineering support of the most recent Unit 1 refueling outage
- Effective resolution of the results of the 2021 Engineering and Maintenance Rule Programs Audit

## Industrial Safety

- DCPD leadership maintains a strong focus on industrial safety and is implementing a station level actions to ensure that “Everything and Everyone is Always Safe”. Actions include implementing a Safety Oversight Committee, and improving peer-to-peer coaching.

## Workforce Management

- DCPD leadership has implemented a robust process to monitor that the station maintains appropriate qualifications and proficiency within each department and takes prompt action based on the results of those reviews.

**Overall plant performance remains strong and on a stable trajectory. The quality verification organization will continue to monitor and challenge the organization.**



# Thank you

Raymond Robins



# Diablo Canyon Power Plant

## Engineering Organization Update

Robert Waltos  
Assistant Director of Engineering

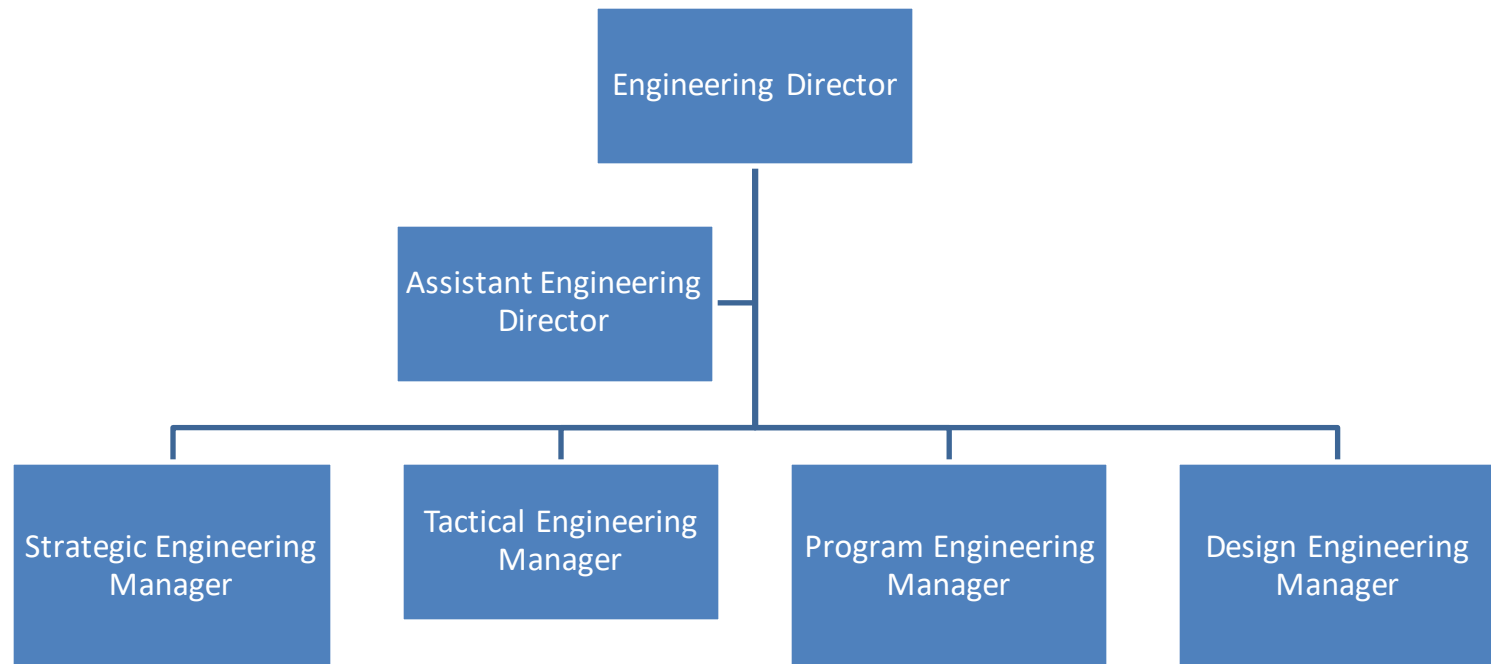
Diablo Canyon Independent Safety Committee  
June 23, 2022



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a Better California

# 2022 Engineering Organization

## 2022 Engineering Services



# 2022 Engineering Organization

- Engineering Department maintained same structure from the 2020 reorganization
  - Continued to adjust for continuous improvement
  - Maintain proficiency
  - Engineering Fix-it-Now (EFIN) provides rapid response to operational concerns

# 2022 Engineering Organization

- Tactical Engineering grouped Component Engineers to support EFIN and rapid response to plant challenges
- Strategic Engineering grouped System Engineers to allow focus on system monitoring and planning for maintaining reliable operation
- Program Engineering manages the major Engineering programs to allow focus through the end of licensed operation
- Design Engineering size decreased per plan due to reduction in projects

# Maintaining Proficiency: Knowledge Transfer & Proficiency Committee

Working group to identify and manage knowledge, qualification and proficiency gaps.

- Composed of Supervisors/Mentors within the Engineering organization, includes Learning Services representative
- Charter:
  - Identify engineering knowledge needs
  - Assign Knowledge Transfer (KT) plans to identified needs and monitor progress
- Coordinate with the Engineering People Committee (EPC) to match KT needs with opportunities for individuals interested in those areas of need

# Maintaining Proficiency: Engineering People Committee (EPC)

A group of colleagues within DCPPE Engineering chartered to:

- Align the needs of engineers with the Engineering Excellence Plan and Organizational needs.
- Deliver process improvements to support continuous improvement

## **Moving to a planned 3 section organizational structure:**

- All engineering functions and capabilities will be maintained
- Take advantage of end of licensed operation and reduction in long-term engineering work and capital projects
- Consistent with 2021 projections, organizational plans and current staffing transition plans
- Engineering capabilities will continue to utilize fully qualified individuals throughout the organization focusing on operational support from Tactical Engineering

# 2022 Excellence Plan Highlights

- Personnel Safety
  - Reinforcing elimination versus mitigation of safety hazards
  - Implemented focused observation effort in 23rd refueling outage on Unit 1 with emphasis on safety
  
- Human Performance
  - Continued to improve performance
  - Implemented focused observation effort in 23rd refueling outage on Unit 1 with emphasis on human performance

# 2022 Excellence Plan Highlights

- Improved Advocacy for Timely Resolution of Equipment Vulnerabilities
  - Continued strong technical conscience of Engineering staff
  - Adjusting equipment reliability focus to resolution not mitigation
- Improve Organizational Response
  - Improve efficiency of outsourcing
  - Leverage use of strategic teaming and resource sharing, engineer of choice and Vendors

- Strategic transition plan being effectively managed through efforts of Knowledge Transfer & Proficiency Committee and EPC
- Organizational and staffing changes maintain strong safety and human performance and capability to support safe and reliable operation
- Continued strong advocacy for safe and reliable operation through end of licensed operation
- Oversight groups (DCPP quality verification, nuclear safety oversight committee and Institute of Nuclear Power Operations) recognize the effective role of the engineering organization

# Thank you

Robert Waltos  
Assistant Director of Engineering

# Decommissioning

## New Dry Cask Storage System

Presented by:  
Tom Jones, Director, Strategic Initiatives

June 23, 2022



# Background: Spent Fuel Transfer Benefits

- Spent fuel transfer is critical path for decommissioning
- Location of the fuel handling building prevents meaningful decommissioning until fuel is loaded and moved to the ISFSI





# Background: Spent Fuel Transfer Benefits

- **Achieves a mutual goal of safely unloading the spent fuel pools sooner**
- **Earlier deliverable of the decommissioning project**
- **Earlier dismantlement of site structures**
- **Earlier repurposing**
- **Lower costs for customers**



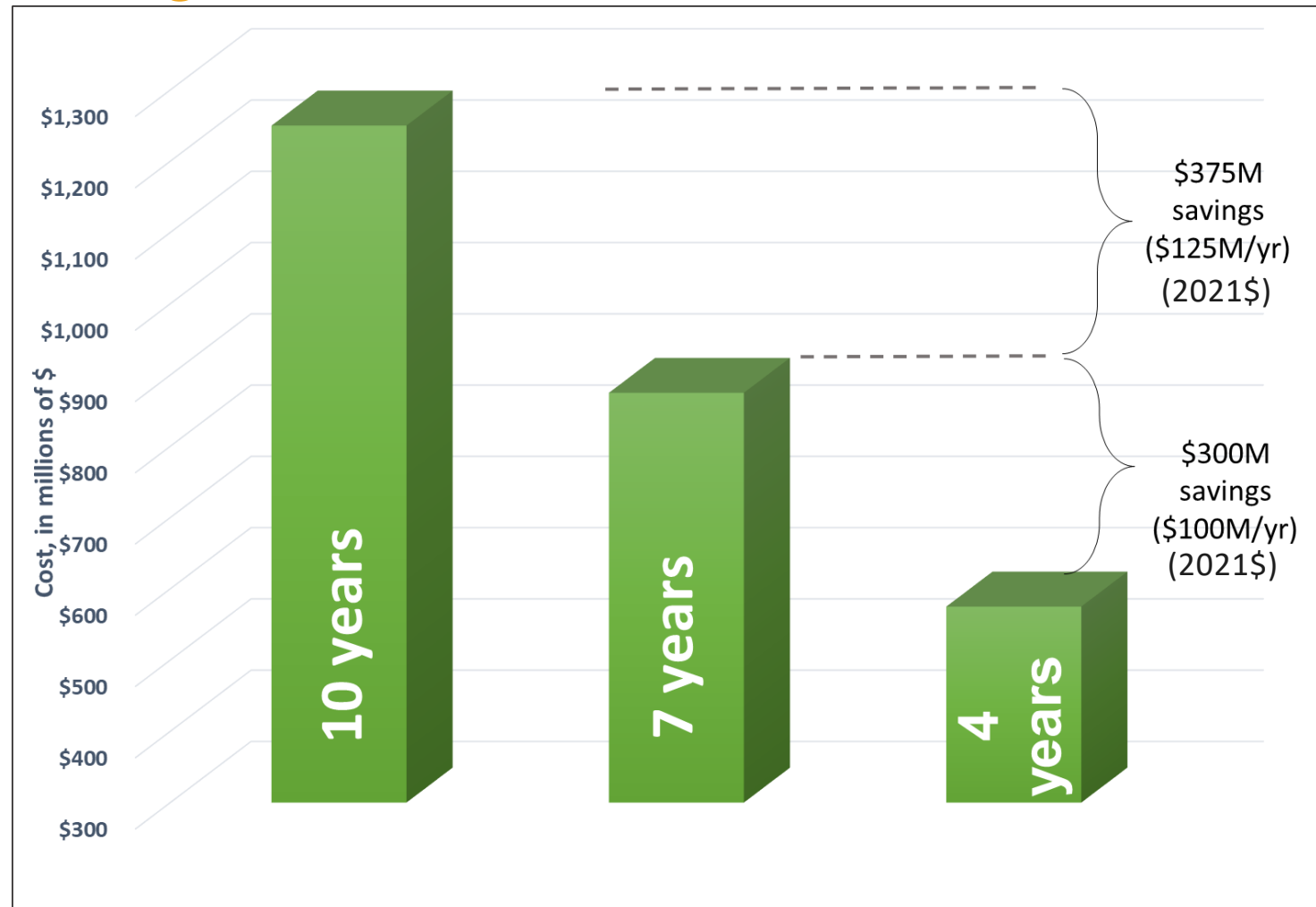
# Background: Spent Fuel Transfer Benefits

- **Facilitates DCPD decommissioning**

- Earlier Part 50 license termination

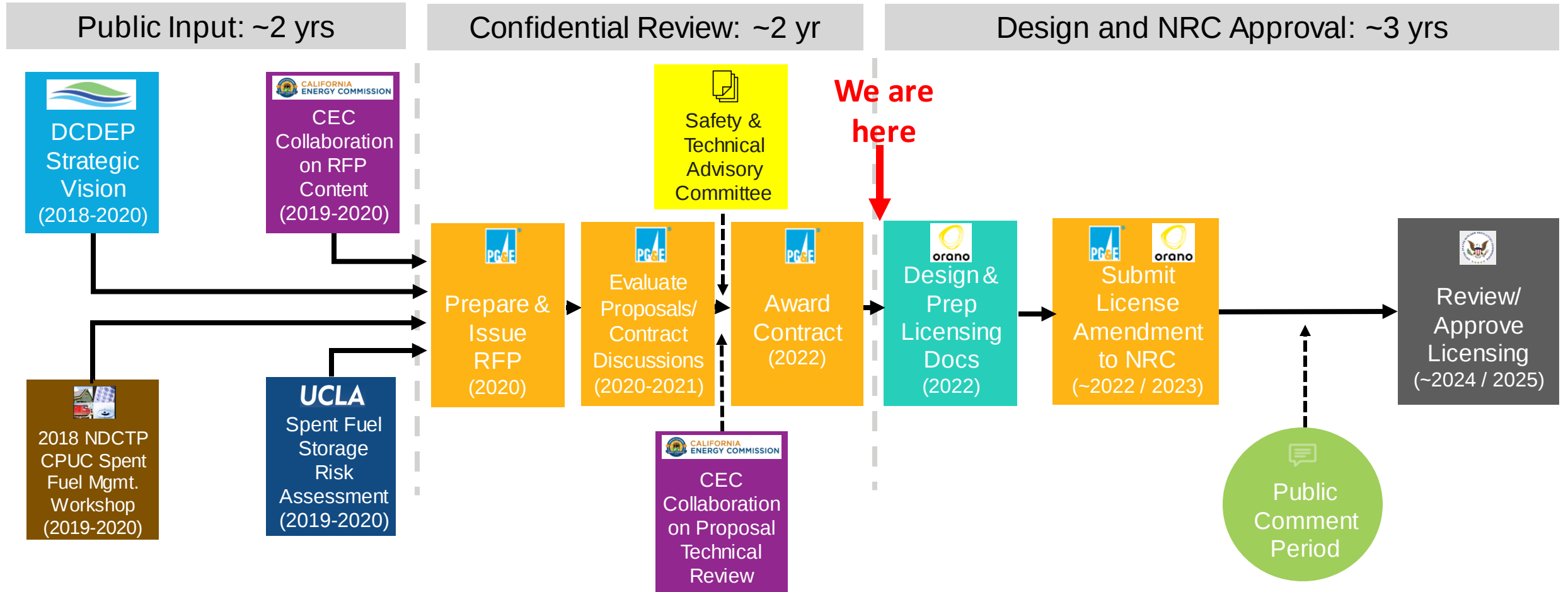
- **Cost Savings**

- **10-year** cooling time – current DC ISFSI Technical Specifications
- **7 years\*** – proposed revision in 2018 based on preliminary vendor evaluations
- **≤ 4 years\*** – goal from CPUC decision in 2021



\* Subject to NRC and other regulatory approvals

# Background: Process Overview



CEC: CA Energy Commission

CPUC: CA Public Utilities Commission

DCDEP: Diablo Canyon Decommissioning Engagement Panel

NDCTP: Nuclear Decommissioning Cost Triennial Proceeding

NRC: Nuclear Regulatory Commission

RFP: Request For Proposal

# Background: Request for Proposal Inputs

- **Key RFP inputs from Diablo Canyon Community Engagement Panel**
  - Safe spent fuel offload transfer to dry cask storage within 4 years after each unit shutdown (approved settlement agreement) (Strategic Vision IV.G.2.a)
  - Robust design that meets DCCP-specific parameters:
    - ✓ Seismic (Strategic Vision IV.G.2.b)
    - ✓ High burn-up fuel, heat load, etc. (Strategic Vision IV.G.2.c)
    - ✓ 80-year design life (Strategic Vision IV.G.2.b)
    - ✓ DCCP marine environment (Strategic Vision IV.G.2.c)
  - Ensure the system is easy to inspect in-place and is designed to reduce needs for aging management (Strategic Vision IV.G.2.d)
  - Minimize dose to the workers and public (Strategic Vision IV.G.2.e)
  - Subject to NRC and other required regulatory approvals
- **Real-time radiation monitoring will encompass existing and new systems** (Strategic Vision IV.G.2.d)



# Background: Request for Proposal

- **Independent technical expertise**

- California Energy Commission (CEC) collaboration
  - ✓ CEC reviewed the draft RFP technical requirements
  - ✓ CEC also participated in the technical review of bidder proposals
- B. John Garrick Risk Institute for the Risk Sciences at UCLA
  - ✓ Conducted an independent risk assessment of spent fuel storage
  - ✓ RFP included results from assessment
- Convened expert advisory board to review selection process decision
  - ✓ Former NRC and industry experts



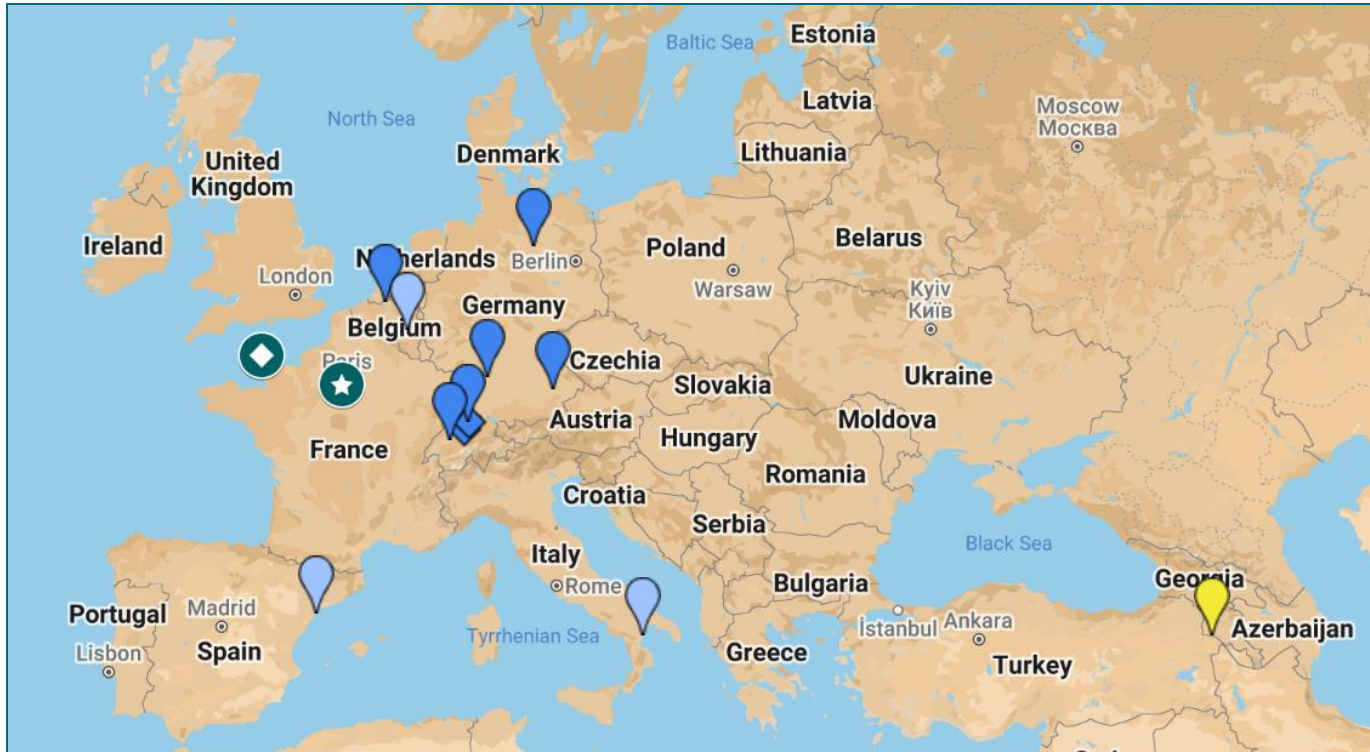
# Selection Process

- **Used PG&E's established competitive and confidential bid process**
  - RFP development: 2 years
    - ✓ Public workshops
    - ✓ Industry conferences
    - ✓ Bidders had early awareness of pending RFP
  - Bidders prepared proposals: 3 mo.
  - PG&E selection process: 1.5 yrs.
- **PG&E evaluated and scored each of the bidder proposals**
  - Public safety/technical capabilities: 40%
  - Safety (industrial and occupational): 15%
  - Commercial (long-term capability): 20%
  - Pricing: 20%
  - Supply chain responsibility and sustainability: 5%
- **Consisted of an experienced, cross-functional bid evaluation team**
  - Engineering and geosciences; licensing
  - Fuels and dry cask storage/transfer
  - Material handling and transportation
  - Sourcing
  - Project Controls
  - Finance

# Selection Process: Orano Experience in the US



# Selection Process: Orano International Experience



**Yellow = NUHOMS Sites**  
**Blue = Metal Cask**  
**Light Blue = Future Metal Cask**

*Includes customers for TN Americas, Orano NPS (France), and TN Tokyo.*

*Some sites are denoted with diamonds for better clarity*



# Selection Process

- **Key reasons why Orano was awarded the contract**

- Orano is the industry leader in horizontal dry cask storage systems with a proven track record throughout the U.S.
- The proposed system is currently licensed by the NRC. The system is subject to further NRC safety reviews as Orano looks to enhance the system's capabilities
- Provides a safe and technically robust dry cask storage system that meets site-specific requirements
- Satisfies community stakeholder and independent technical reviewers' feedback
- Proposed design allows for transfer of all spent fuel from the spent fuel pools to the DC ISFSI **23 months** after Unit 2 shutdown (dependent upon NRC approval of enhanced thermal capabilities)

# Orano System Overview

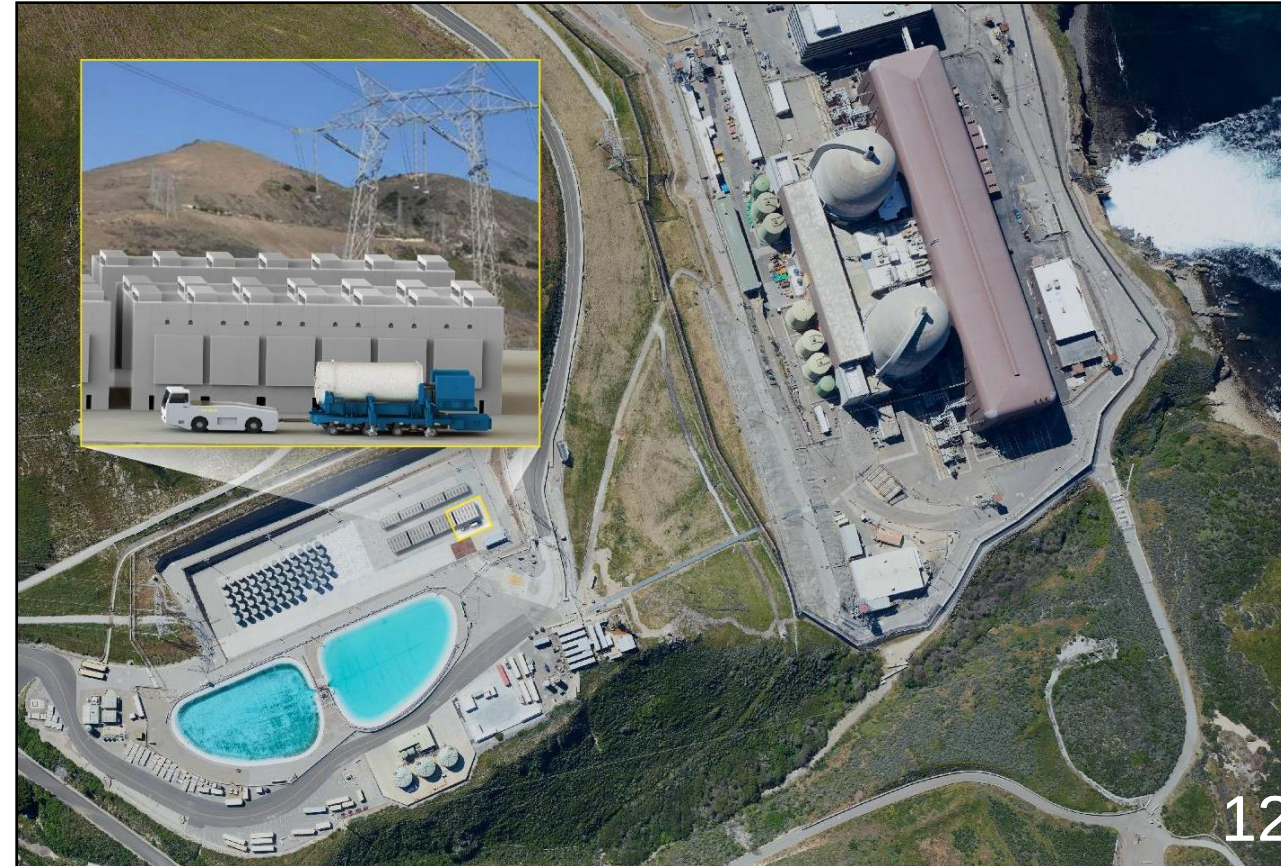
- Orano will employ their NUHOMS® Extended Optimized Storage (EOS) System

- Currently licensed by the NRC for general use

Conceptual Layout

- NUHOMS® EOS System is a modular horizontal storage system

- Spent fuel is placed in a dry shielded canister (DSC) that is placed in a concrete horizontal storage module (HSM)



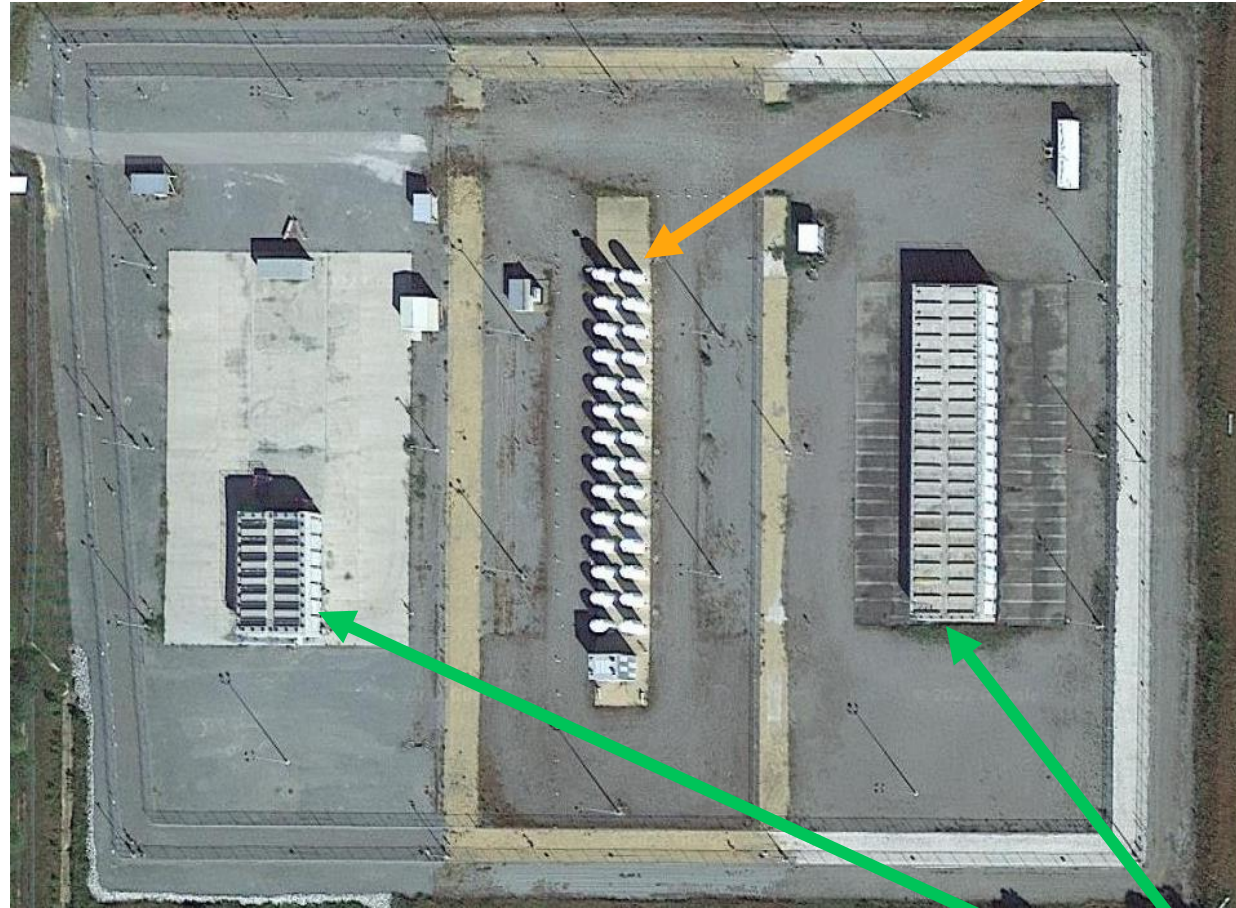


# Licensing Approach

- The DC ISFSI is a site-specific NRC license
- Orano's NUHOMS® Extended Optimized Storage (EOS) System is licensed by the NRC for general use under NRC Docket 72-1042
  - General licensed systems are designed and licensed for a variety of locations and conditions
  - This means many sites can use the system under the single general license
- Like many other sites, PG&E plans to use Orano's system via their general license
- Like the below sites, the DC ISFSI will have both site-specific and general licenses:
  - North Anna
  - Robinson
  - Surry
  - Oconee

# ISFSIs with General and Site-Specific Systems

Site-Specific  
Licensed Casks



**North Anna – Virginia**  
(Dominion Energy)

General Licensed  
Casks



**Surry – Virginia**  
(Dominion Energy)

# U.S. ISFSIs With Multiple Storage Vendors

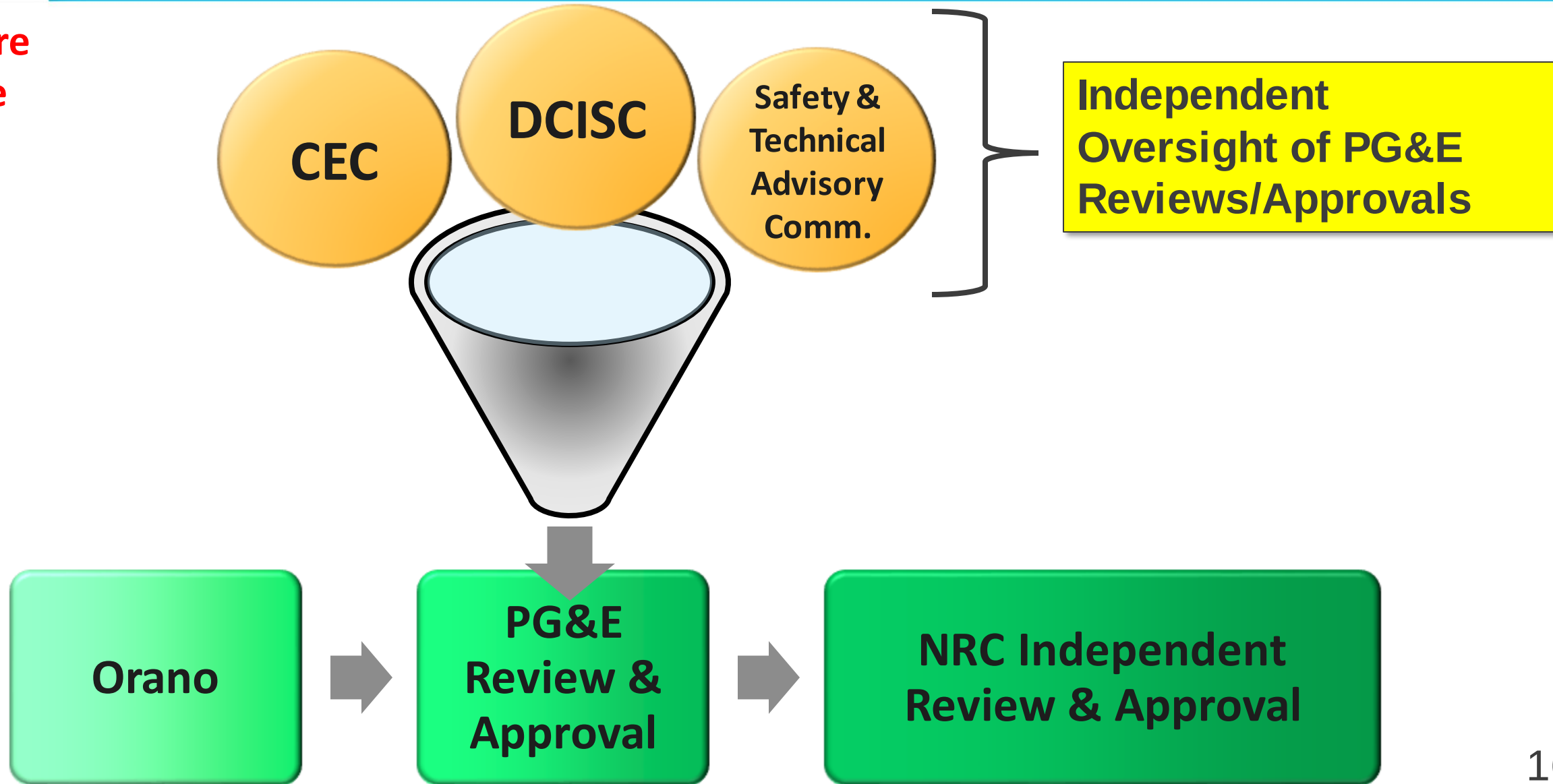
- Arkansas Nuclear One
- Calvert Cliffs
- McGuire
- Ginna
- Kewaunee
- Limerick
- Nine Mile Point
- Oyster Creek
- Palisades
- Peach Bottom
- Point Beach
- Robinson
- SONGS
- Surry
- Susquehanna



# Layered Approach to Ensuring Safety During Implementation

CEC: CA Energy Commission  
DCISC: Diablo Canyon Independent Safety Committee  
NRC: Nuclear Regulatory Commission

We are here



# Draft Project Schedule

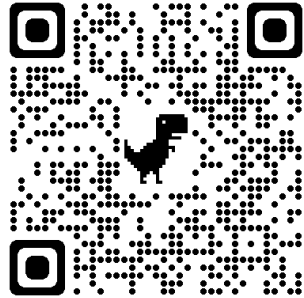
## Big Picture

- PG&E Orano Kick-off Meeting was held May 2022
- Engineering and Licensing: 2022 – 2024 (for most)
  - Orano submit a license amendment request for their general license by Q4 2022
- DSC Fabrication at Orano Facilities: Aug 2023 – Aug 2025
- On-Site Modifications / HSM Casting: Sep 2024 – Feb 2026
- DSC On-site Deliveries: starts in 2025
- Spent Fuel Offload: Mar 2026 – Jul 2027
  - Unit 1 by Nov 2026
  - Unit 2 by July 2027

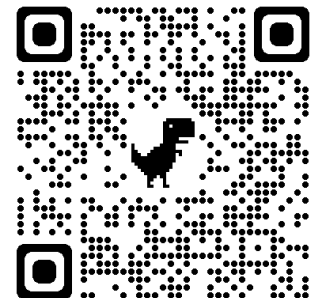
# Videos of Orano Systems

**See publicly-available videos of Orano's two most-recent loading campaigns similar to DCPP that shows the Orano system at work**

- Fort Calhoun:



**See the publicly-available available video of a robotic inspection of the Orano System at San Onofre**





# Key Takeaways and Next Steps

- **PG&E will provide rigorous oversight as Orano designs, manufactures, and safely transfers remaining spent fuel from DCPP operations to onsite interim dry storage**
  - Multi-layered approach to safety oversight
- **PG&E invites and will support DCISC's technical/safety review of the proposed system**
  - Including potential benchmarking trip to manufacturing facility and training academy

# Thank You

**Tom Jones**

Director, Strategic Initiatives

Tom.Jones@pge.com





## Items for Consideration

- Review of Topics Discussed at the February Public Meeting
- Changes Driven by the Proposed Revised Timeline for the Movement of Spent Fuel to the ISFSI
- Engagement of a Technical Consultant on an *ad hoc* Basis.



## Second Restated Charter

**I.A.(1) – Safety of operations shall mean activities in connection with generation of electricity by Diablo Canyon and/or the operation of the Diablo Canyon Spent Fuel Pools and related support systems and the Diablo Canyon Independent Spent Fuel Storage Installation (ISFSI), including the transport of nuclear fuel to and from Diablo Canyon’s Spent Fuel Pools and the storage of nuclear fuel within the Spent Fuel Pools and the transport and storage of nuclear fuel to and within the ISFSI or elsewhere at Diablo Canyon.**



## Second Restated Charter

**II.D.(2) – The Committee may contract for services, including the services of consultants and experts, to assist the Committee in its safety review. Disclosure of PG&E information or records to any such person shall be governed by the provisions of this agreement in the same manner as disclosure to members of the Committee. No disclosure of confidential information shall be made to any person who does not have a need to receive the information in order to assist the Committee in its safety review. Nor shall such disclosure be made to any person known to have a conflict of interest.**

**III.(1) – The Committee will terminate its review of safety of operations upon further order of the CPUC or upon the date of successful completion of the transfer of all nuclear fuel from both Diablo Canyon Spent Fuel Pools to the ISFSI.**