Welcome and Meeting Overview
Linda Seeley, Panel Member

Michael Lucas  
Morro Bay

Bob Pavlik  
San Luis Obispo

Bruce Severance  
Grover Beach
## Welcome and Meeting Overview

**Linda Seeley, Panel Member**

<table>
<thead>
<tr>
<th>Item #</th>
<th>What – Content</th>
<th>Action Path</th>
<th>Who</th>
<th>Target Start Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Panel Meeting Start</td>
<td>Inform</td>
<td>All</td>
<td>6:00</td>
</tr>
<tr>
<td>2.</td>
<td>Welcome and Meeting Overview</td>
<td>Inform</td>
<td>Chuck Anders</td>
<td>6:00 (5)</td>
</tr>
<tr>
<td>3.</td>
<td>Safety Briefing</td>
<td>Inform</td>
<td>Dr. Tim Auran</td>
<td>6:05 (5)</td>
</tr>
<tr>
<td>4.</td>
<td>PG&amp;E Update Q&amp;A /Panel Discussion</td>
<td>Inform</td>
<td>Maureen Zawalick Panel</td>
<td>6:10 (10) 6:20 (10)</td>
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<tr>
<td>5.</td>
<td>Recap of Public Input Process</td>
<td>Inform</td>
<td>Linda Seeley</td>
<td>6:30 (10)</td>
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<td>6.</td>
<td>California Energy Commission (CEC) Perspective Q&amp;A /Panel Discussion</td>
<td>Inform</td>
<td>Dr. Justin Cochran, CEC Panel</td>
<td>6:40 (20) 7:00 (15)</td>
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<tr>
<td>7.</td>
<td>Public Comment</td>
<td>Inform Discuss</td>
<td>Bill Almas/ All</td>
<td>7:15 (20)</td>
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</table>
| 8.     | New Cask System – Response to Public’s Questions  
• Regulatory Approval Path  
• Design  
• Specifications | Inform Discuss | PG&E / Orano | 7:35 (40) |
| 9.     | Break |  |  | 8:35 (10) |
| 10.    | Public Comment | Inform Discuss | Mariam Shah/ All | 8:45 (40) |
| 12.    | Adjourn meeting | Action | Chuck Anders | 9:30 |
Safety Orientation
Dr. Tim Auran, Panel Member

Earthquake
Know the safest places to drop, cover, and hold, such as under sturdy desks and tables.

Fire
Know your exits, escape routes, and evacuation plan. If safe to do so, use your compliant fire extinguisher. Exit the house and call 911.

Diablo Canyon Fire personnel in attendance

Active Shooter
Get out, hide out, take out, and call 911.

SLO County Sheriff deputies in attendance

Medical Emergency
Know who can perform first aid and CPR. Call 911 if you’re alone or share your location with the call leader to send help. If you have an AED, ensure you and others in your household know where it’s located and how to use it.

Psychological Safety
✓ We care for each other.
✓ Look out for one another.
✓ Create a safe space for all.
✓ Welcome new ideas from everyone.
✓ Practice self-care.

Ergonomics
✓ Practice 30/30 (every 30 minutes, move & stretch for 30 seconds).
✓ Ensure proper ergonomics.
✓ Use and update RSI Guard.

COVID-19
✓ Wash hands frequently
✓ Wear a mask when required
✓ Get vaccinated if you are able to
✓ Follow current CAL-OSHA regulations and local county health orders.
PG&E Update

Maureen Zawalick
PG&E Vice President, Decommissioning and Technical Services
Recap of Public Input Process
Linda Seeley, Panel Member

April 20 Panel Meeting

- PG&E Selected Orano’s NUHOMS® system
- Transfer of fuel from wet storage to dry casks in two years
- Overview of the Orano NUHOMS® system
- Panel solicited Questions and Comments from public
Recap of Public Input Process
Linda Seeley, Panel Member

**Public Input**

- Public questions at 4/20/22 Panel Meeting
- Written questions submitted to the Panel
- Questions from Panel members

**Questions**

- 32 technical questions to Orano TN about the proposed SNF storage and transfer system, experience & training, etc.
- 42 questions to PG&E about risks, security, cask aging management, etc.
Establishment & Purpose

- California’s primary energy policy and planning agency.
- Committed to reducing energy costs and environmental impacts of energy use while ensuring a safe, resilient, and reliable energy supply.
Core Responsibilities

The California Energy Commission (CEC) has eight basic responsibilities as it sets state energy policy:

- **Forecasting**: Forecasts future energy needs and maintains historical energy data
- **Permitting**: Permits thermal power plants 50 megawatts (MW) or larger
- **Research & Development**: Administers the Energy Research and Development programs, advancing science and technology in energy related fields
- **Energy Efficiency**: Promotes energy efficiency by setting the state's appliance and building standards
- **Renewable Energy**: Supports the development of renewables resources
- **Contingency Planning**: Plans for and directs the State’s response to energy emergencies
- **Transportation**: Supports the deployment of alternative and renewable fuel sources and vehicle technologies
- **Policy Development**: Publishes the Integrated Energy Policy Report (IEPR) – the State’s energy policy document
CEC Role in Nuclear Power

Statutory authority and responsibility in the areas of nuclear power and nuclear waste disposal stem from the Warren-Alquist Act and agency expertise.

- Since the mid-1980's, California’s Governor has appointed an Energy Commissioner to represent California as the State Liaison Officer to the U.S. Nuclear Regulatory Commission (NRC).
  - Coordinates state agencies' technical expertise and engagement in NRC (federal) activities because of *Federal preemption of the State regulation of nuclear power and materials*
  - CEC has engaged in multiple NRC (and DOE) activities and have an established relationship with Federal, California, and western state(s) agencies.
- The CEC has completed major assessments of California’s nuclear power facilities, consisting of reports, IEPR chapters, and public workshops.
- The CEC has extensively engaged Federal agencies on the topics of spent fuel storage and transportation.
- The Chair appoints one of the Diablo Canyon Independent Safety Committee (DCISC) members and staff regularly engage with the DCISC.
Spent Fuel Collaboration

Both the Energy Commission and Diablo Canyon Power Plant (DCPP) staff agree that dry storage is the path forward.

Spent Fuel Collaboration Goals & Objectives:

- Safe, Uneventful, Expedited transfer of Spent Fuel to dry storage.
- Continued engagement and discussion with DCPP on Spent Fuel management.
- Develop plans and programs by including key stakeholders.
- Incorporate experience and lessons learned from recent spent fuel transfer campaigns.
- Exploit developing technologies to maximize site safety and monitoring.
- Work towards the eventual removal of all spent nuclear fuel from California lands.
Collaboration Timeline

Timeline Source: DCPP Presentation Slide
Collaboration Activities – Input

Spent Fuel Collaboration Activities: **Public Input**
**Period 2019 – 2020**

• Engagement in pre-RFP activities, including meetings, a site visit and technical workshop consisting of the CEC Chair, Commissioner, and key staff.

• Initial RFP Content review and discussion – focused on safety, environmental factors, stakeholder input, technical/regulatory/financial barriers, and target timelines.
Collaboration Activities – Input

Spent Fuel Collaboration Activities: **Public Input Period 2019 – 2020**

- CEC staff had multiple meetings with stakeholders and reviewed relevant resources, documents and recommendations (Strategic Vision, DCISC meeting comments, community meetings, etc.)
- Internal and External discussions on the UCLA Spent Fuel Storage Risk Assessment (DCPP, CEC technical staff, and DCISC)

**DCPP team incorporated stakeholders' recommendations into the RFP, resulting in an improved document.**
Collaboration Activities – Review

Spent Fuel Collaboration Activities: Confidential

Review Period

• Engaged in multiple technical and bid scoring/weighting discussions.
  • Technical review involved detailed discussions with DCPP technical team.
    • Process allowed for open and frank discussion of the proposals.
  • Scoring/weighting discussions were positive and gave insight into review/assessment process and how the DCPP team incorporated stakeholder feedback in their process.
Collaboration Activities – Review

Spent Fuel Collaboration Activities:

Confidential Review Period

- Following the technical review DCPP staff continued to provide status updates and supported meetings when requested.

In March of 2020 and 2021, the Chair’s office sent letters to the DCPP team indicating satisfaction with the level of engagement over the RFP and technical review process.
Next Steps

Continued engagement with DCPP, the NRC, and stakeholders on pertinent issues.

- Key issues going forward are the NRC licensing process, ISFSI construction, and the offloading campaign
  - CEC staff will monitor and engage in the NRC licensing process.
  - CEC staff will maintain discussions with stakeholders, the Decommissioning Engagement Panel, and the DCISC on pertinent issues and topics.
  - Continued engagement with DCPP on relevant spent fuel and decommissioning issues.

CEC staff will continue to track relevant federal and regional activities and share information as it becomes available.
Thank you for your time and attention.

For additional information or follow-up questions please contact:
Justin Cochran, Ph.D.
Senior Nuclear Policy Advisor
California Energy Commission
916-657-4353
Justin.Cochran@energy.ca.gov
Public Comment
Bill Almas, Panel Member

• 3-minutes
• State Name, City of Residence and Affiliation
• Complex questions will be discussed at end of Public Comment session
• Please be respectful
Decommissioning

New Dry Cask Storage System

Presented by:
Tom Jones, Director – Strategic Initiatives

May 25, 2022
Topics

• Background from April 20th Meeting
• Layered Approach to Ensuring Safety
• Project Phases
• Key Takeaways and Next Steps
Background

• PG&E announced selection of Orano USA as our vendor to safely transfer the remaining spent fuel to the DC ISFSI after final unit shutdowns

• NUHOMS® Extended Optimized Storage (EOS) system:
  – 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
• **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).
Background

Public Input: ~2 yrs

- DCDEP Strategic Vision (2018-2020)
- CEC Collaboration on RFP Content (2019-2020)
- UCLA Spent Fuel Storage Risk Assessment (2019-2020)

Confidential Review: ~2 yr

- Prepare & Issue RFP (2020)
- Evaluate Proposals/Contract Discussions (2020-2021)
- Award Contract (2022)
- Design & Prep Licensing Docs (2022)
- Submit License Amendment to NRC (~2022 / 2023)

Design and NRC Approval: ~3 yrs

- Review/Approve Licensing (~2024 / 2025)

We are here

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

CEC Collaboration on Proposal Technical Review

Public Comment Period
Layered Approach to Ensuring Safety During Implementation

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

Independent Oversight of PG&E Reviews/Approvals

We are here
Three phases to the project:

1. Design, licensing, and manufacturing: 2022 – 2026 *(We are here)*

2. Transfer of spent fuel from the spent fuel pools to the DC ISFSI:
   2026 – 2027

3. Ongoing care of the system (maintenance, inspections): after
   2027

When available, a new contract would support shipment to a federally-licensed repository
• 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

• Currently in the first phase of implementing the new system
  – Design, licensing, and manufacturing phase

• Next Steps
  – PG&E will continue to solicit feedback from stakeholders over the coming months through DCDEP meetings, information sessions, and tours
Thank You

Tom Jones
Director – Strategic Initiatives
Tom.Jones@pge.com
NUHOMS EOS
Orano’s Premier Dry Storage System for Used Nuclear Fuel and GTCC Waste

May 25, 2022
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.


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
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.
Overview: Heat 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:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>FSAR</th>
<th>LAR</th>
<th>Best-Estimate</th>
<th>HBU Cask Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCT (model vs data)</td>
<td>348°C</td>
<td>318°C</td>
<td>254-288°C</td>
<td>229°C</td>
</tr>
<tr>
<td>Heat Loadouts</td>
<td>36.96kW</td>
<td>32.934kW</td>
<td>30.456kW</td>
<td>30.456kW</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>100°F</td>
<td>93.5°F</td>
<td>75°F</td>
<td>75°F</td>
</tr>
<tr>
<td>Design Specifics</td>
<td>Gaps</td>
<td>Gaps</td>
<td>Gaps</td>
<td>No Gaps?</td>
</tr>
</tbody>
</table>

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.
• 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
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 (and Amendment 17 that was 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
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

NUHOMS EOS System is designed and licensed for a maximum heat load of 50 kW per system.

Orano has previously loaded EOS systems at other commercial nuclear power plants with heat loads greater than 46 kW.

The highest anticipated heat 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.

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.
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.

Orano EOS NUHOMS
May 25, 2022
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
The Panel is taking a short break

The meeting will resume soon
Public Comment
Mariam Shah, Panel Member

- 3-minutes
- State Name, City of Residence and Affiliation
- Complex questions will be discussed at end of Public Comment session
- Please be respectful
Upcoming Activities

Independent Spent Fuel Storage Installation
OPEN HOUSE – Dates to be announced

NRC Post Shut Down Decommissioning Activities Report
Public Meeting - Dates to be announced

DCDEP Public Meeting
August 24, 2022
Thank you for your participation

Visit https://DiabloCanyonPanel.org for meeting video, presentation slides and support materials