Decommissioning Principles

With our co-owners, Southern California Edison is committed to:

Safety
- Safely decommissioning San Onofre
- Safely move the power plant’s spent fuel into dry cask storage, until government approved long-term storage options are available

Stewardship
- Leave the community better off
- Spending Nuclear Trust Funds wisely
- Return any unused monies to ratepayers

Engagement
- Decommissioning process is inclusive, forward-thinking, involving diverse stakeholders
SCE Topics

Decommissioning Timeline
- Update on 20-year timeline, regulatory filings and key decisions

SCE briefing and CEP discussion
A. Spent fuel storage
B. Irradiated Fuel Management Plan (IFMP)
C. Future decisions
NRC Requirements
Three Phases of Decommissioning

Decommissioning Planning

SCE ceases operations and notifies NRC
SCE submits Post-shutdown Decommissioning Activities Report
NRC reviews Post-shutdown Decommissioning Activities Report

Major Decommissioning Activities

SCE initiates cleanup activities, per the Post-shutdown Decommissioning Activities Report
NRC conducts periodic inspections
SCE submits license termination plan
SCE completes cleanup activities
NRC performs technical and environmental reviews of license termination plan and approves plan

License Termination

SCE conducts final status survey and submits reports
NRC conducts confirmatory surveys and reviews report
NRC approves final status survey report and modifies license
Dry Fuel Storage Part 50 license remains
## Proposed Decommissioning Timeline

### PHYSICAL PLANT CHANGES
- All Systems de-energized, depressurized, drained, temporary power ring established

### LICENSE SUBMITTALS
- Permanently Defueled Emergency Plan
- Permanently Defueled Technical Specifications

### DECOMMISSIONING SUBMITTALS
- DCE SUBMITTAL
- PSDAR SUBMITTAL

### DRY FUEL STORAGE (DFS)
- Engineering and Procurement
- DRY FUEL STORAGE PAD EXPANSION
- DRY FUEL STORAGE CANISTER FABRICATION
- SPENT FUEL POOL STORAGE

### DRY FUEL STORAGE PROJECT IMPLEMENTATION
- START DECONTAMINATION & DISMANTLEMENT (D&D) 10 years

### MAJOR D&D COMPLETE
- LICENSE TERMINATION PLAN
- Part 50 license modification to ISFSI only

### END OF PLANT DECOMMISSIONING
- (Dry Fuel Storage Pad Remains)

### Site Restoration Work
- COMPLETION OF REMAINING SITE RESTORATION WORK
- Any remaining State requirements for unrestricted land use

### License Submittals
- IFMP SUBMITTAL
- DCE SUBMITTAL
- PSDAR SUBMITTAL

### Implementation
- All Fuel in Dry Fuel Storage
- Major Milestone
Nuclear Regulatory Commission Submittals

Irradiated Fuel Management Plan (IFMP)
Description of Spent Fuel storage management and funding plan

Post-shutdown Decommissioning Activities Report (PSDAR)
Identifies the planned decommissioning activities, a schedule for the completion of these activities, estimate of the expected costs, and environmental impacts associated with the site-specific decommissioning activities

Decommissioning Cost Estimate (DCE)
Provides funding levels and process through the decommissioning periods

Permanently Defueled Emergency Plan (PDEP)
Description of station Emergency Plan and Emergency response organization commensurate with decommissioned conditions of the plant

Permanently Defueled Technical Specifications (PDTS)
License basis for current defueled condition of the station
## Required NRC Decommissioning Submittals Schedule

<table>
<thead>
<tr>
<th>Submittal</th>
<th>Target Date</th>
<th>Community Engagement Panel</th>
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<tbody>
<tr>
<td>Irradiated Fuel Management Plan (IFMP)</td>
<td>3Q2014</td>
<td>Feedback By June 6, 2014</td>
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<tr>
<td>Post-shutdown Decommissioning Activities (PSDAR)</td>
<td>3Q2014</td>
<td>Feedback</td>
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<tr>
<td>Decommissioning Cost Estimate (DCE)</td>
<td>3Q2014</td>
<td>Feedback</td>
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<tr>
<td>Permanently Defueled Emergency Plan (PDEP)</td>
<td>Submitted</td>
<td>Awareness</td>
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<tr>
<td>Permanently Defueled Technical Specifications (PDTS)</td>
<td>Submitted</td>
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Spent Fuel Storage
Spent Fuel Storage

Current State

Fuel Assemblies in Spent Fuel Pools = 2668

Future State

Expanded Dry Fuel Storage Pad

Approximately 100 canisters containing 2668 Fuel Assemblies (includes 1115 High Burn-up Fuel Assemblies)

Future State Off-site

50 canisters already in place

To DOE 3855 Fuel Assemblies in approximately 150 canisters

Existing Dry Fuel Storage Pad (with Unit 1,2,3 spent fuel)

50 canisters

1187 Fuel Assemblies (includes 8 High Burn-up Fuel Assemblies)
Spent Fuel Storage

• Approximately 1/3 of the Spent Fuel for SONGS Units 1, 2 and 3 have been transferred to dry cask storage

• Currently 2668 Spent Fuel Assemblies reside in the SONGS Unit 2 and Unit 3 spent fuel pools

• Approximately 1/3 of the Spent Fuel for SONGS Units 1, 2 and 3 are characterized as High Burn-up Fuel:
  - Unit 2 Pool - 570 Spent Fuel Assemblies
  - Unit 3 Pool - 545 Spent Fuel Assemblies
  - Dry Cask - 8 Spent Fuel Assemblies
Spent Fuel Pool to Dry Fuel Storage
Dry Fuel Storage
Dry Fuel Storage

Current ISFSI facility:
• 50 loaded Spent Fuel canisters
• 12 empty modules
• Space for 26 more modules

The existing ISFSI storage facility must be increased to accommodate approximately 100 additional canisters
Irradiated Fuel Management Plan
**NRC Requirement**

**Irradiated Fuel Management Plan, 10 CFR 50.54 (bb) states:**

“For nuclear power reactors licensed by the NRC, the licensee shall, within 2 years following permanent cessation of operation of the reactor .... submit written notification to the Commission for its review and preliminary approval of the program by which the licensee intends to manage and provide funding for the management of all irradiated fuel at the reactor following permanent cessation of operation of the reactor until title to the irradiated fuel and possession of the fuel is transferred to the Secretary of Energy for its ultimate disposal in a repository.”
Irradiated Fuel Management Plan

Irradiated Fuel Management Plan

• For San Onofre, the “program” is to move the fuel from the spent fuel pools (“wet storage”) to the Independent Spent Fuel Storage Installation (ISFSI)

• The NRC review in accordance with its standard process
  ▪ Required review for completeness, technical review, Safety Evaluation report

• No standard format or specific content guidance
  ▪ Kewaunee, Crystal River, and Zion IFMPs used as a template
San Onofre Irradiated Fuel Management Plan Overview

Irradiated Fuel Management Plan key points

- 2668 irradiated fuel assemblies in spent fuel pools (“wet storage”) to be safely transferred to the ISFSI, also known as dry fuel storage pad or “dry storage” by 2019

- 2024 assumed start date for DOE acceptance of spent fuel from the industry, and San Onofre fuel will be removed by 2049

- Adequacy of existing funds to cover all aspects of decommissioning, including cost of irradiated fuel management

- Living document that can be revised and updated

- Spent fuel pools will be isolated from their normal support systems and replaced by stand-alone cooling and filtration units (also termed a “spent fuel pool island”)
NRC Review Criteria

IFMP Review and Approval Criteria

NRC to evaluate and provide preliminary approval of the spent fuel management and funding program, the submittal should include:

• Estimated cost to isolate the spent fuel pool (SFP) and fuel handling systems or the cost to construct an ISFSI or a combination of wet/dry storage;

• Estimated annual cost for the operation of the selected option (wet or dry storage or a combination of the two) until DOE takes possession of the fuel;

• Estimated cost for the preparation, packaging, and shipping the fuel to DOE;

• Estimated cost to decommission the spent fuel storage facility; and

• A brief discussion of each of the areas identified and the estimated time for these activities
San Onofre Irradiated Fuel Management Plan Overview

What the IFMP does not include:

- Expansion footprint of the Independent Spent Fuel Storage Installation
- Selection of the fuel canister vendor, design or type
- Decisions on canning or not canning fuel assemblies
## Industry Comparison of Irradiate Fuel Management Plans

### Recent IFMP submittals

<table>
<thead>
<tr>
<th>Plant</th>
<th>Number of Fuel Assemblies in wet Storage</th>
<th>Completed by date from wet to dry Storage</th>
<th>IFMP Submittal</th>
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<tbody>
<tr>
<td>San Onofre</td>
<td>2668</td>
<td>2019</td>
<td>Forecast late August 2014</td>
</tr>
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SCE Future Decisions for Spent Fuel Storage
SCE Future Decisions for Spent Fuel Storage

Cask Selection

All three vendors were determined to be technically acceptable

- AREVA TN NUHOMS 24PT design is currently utilized at SONGS. The 32PTH2 system was designed and licensed specifically for enhanced SONGS requirements

- Holtec Umax system - Umax is designed for the SONGS criteria, but would require a minor license amendment for the seismic requirements

- NAC MAGNASTOR design - The NAC system design can be modified to meet the SONGS design criteria, but would require a more involved license amendment
SCE Future Decisions for Spent Fuel Storage

- Canister Capacity (i.e., 24, 32, or 37 Fuel Assemblies)
- Canning Fuel Assemblies for High Burn-up Fuel
- Location of ISFSI expansion
The existing ISFSI storage facility must be increased to accommodate approximately 100 additional canisters.

The concept to the left shows relative expansion requirement.

Red line shows existing installation.
SONGS Independent Spent Fuel Storage Installation Expansion

- Relative expansion requirements shown
- Red line shows existing installation, with two options for expansion

Existing ISFSI Pad (55,000 sqft)

Option A: Proposed Expansion to West (92,000 sqft)

Approx. 293 ft

Option B: Proposed Expansion to South (94,000 sqft)

Approx. 440 ft

Approx. 212 ft
Decommissioning Principles

Safety
Stewardship
Engagement