Used Nuclear Fuel in the U.S.-Moving Forward

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NCSL Nuclear Legislative Working Group
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One of the things that makes nuclear electricity so clean is that all of the hazardous byproducts of nuclear reactions remain contained in the original fuel in which these reactions took place - hence the term used nuclear fuel.
Nuclear Electricity – more than ever

U.S. Nuclear Power Plants
• 98 reactors across 59 sites
• 99,355 megawatts-electric of baseload capacity
• 807.1 billion kilowatt-hours in 2018
• 92.3 percent capacity factor in 2018

In producing a record amount of clean energy in 2018, U.S. nuclear reactors discharged ~2,000 metric tons of used fuel
Before and After

New Nuclear Fuel

There is little to no outward difference between the condition of the fuel before it goes into the reactor and when it is discharged. However, inside the fuel rods, the radioactive byproducts of nuclear fission remain. The condition of cladding is carefully monitored at every stage.
Used Nuclear Fuel Storage in the U.S.
Used fuel inventory*
Approximately 81,518 MTU
Increases 2 - 2.4k MTU annually

ISFSI** storage
130,252 assemblies
36,696 MTU (45%)
2,966 casks/modules loaded
72 Operating ISFSIs
  70 dry storage, 1 pool, 1 modular vault
Eventually to be deployed at 76 sites
  Fuel from 119 reactors

Long term commitment to ISFSIs
Licenses being extended to 60 years
Licenses extensions approved at 30 sites
NRC has found 100 year storage to be safe

*As of December 31, 2018
** ISFSI = Independent Spent Fuel Storage Installation
NEI’s Used Fuel Principles

• Protect and the Nuclear Waste Fund and use it as intended
• Develop Consolidated Interim Storage
• Complete Yucca Mountain licensing and abide the result
• Reform management of the Federal Program
• Do not unnecessarily restart the Nuclear Waste Fee
• Protect utilities’ contract rights
• Provide benefits to host communities
• Develop advanced technologies as it becomes feasible to do so*

*But not with the Nuclear Waste Fund
# The US Decommissioning Marketplace

<table>
<thead>
<tr>
<th>Status</th>
<th>Plant</th>
<th>Current Owner</th>
<th>Current NRC Licensee</th>
<th>Ownership Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants that have completed decommissioning but still have used fuel stored on site</td>
<td>Rancho Seco</td>
<td>SMUD</td>
<td>SMUD</td>
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<td>Yankee Rowe</td>
<td>Yankee Atomic</td>
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<td>Maine Yankee</td>
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<td>Connecticut Yankee</td>
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<td>Trojan</td>
<td>Portland GE</td>
<td>PGE</td>
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<tr>
<td></td>
<td>Rancho Seco</td>
<td>SMUD</td>
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<td></td>
<td>Big Rock Point</td>
<td>Entergy</td>
<td>Entergy</td>
<td>Pending to Holtec</td>
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<tr>
<td>Plants* that have permanently shut down and entered decommissioning</td>
<td>Humboldt Bay</td>
<td>Pacific GE</td>
<td>PGE</td>
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<td></td>
<td>Lacrosse</td>
<td>Dairyland</td>
<td>Energy Solutions</td>
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<td>Zion 1&amp;2</td>
<td>Exelon</td>
<td>Energy Solutions</td>
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<td>San Onofre 1,2,3</td>
<td>SCE</td>
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<td>Crystal River</td>
<td>Duke</td>
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<td>Kewaunnee</td>
<td>Dominion</td>
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<td>Vermont Yankee</td>
<td>Northstar</td>
<td>Northstar</td>
<td>Northstar purchase from Entergy closed 1/19</td>
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<td>Fort Calhoun</td>
<td>OPPD</td>
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<td>Oyster Creek</td>
<td>Exelon</td>
<td>Exelon</td>
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<tr>
<td>Plants that have announced intent to enter decommissioning</td>
<td>Three Mile Island 1</td>
<td>Exelon</td>
<td>Exelon</td>
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<td>Pilgrim</td>
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<td>FENOC</td>
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<td>NextEra</td>
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<td>Diablo Canyon</td>
<td>Pacific GE</td>
<td>PGE</td>
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</tbody>
</table>

*Does not include shutdown plants that are co-located with an operating reactor (Indian Point 1, Peach Bottom 1, Fermi 1, Dresden 1, Three Mile Island 2, & Millstone 1)*
Decommissioning and Used Fuel Suppliers are Building More Efficient Business Models

- Decommissioning Experience/Expertise
  - Nuclear
  - Non-Nuclear
  - Domestic and International
- Decommissioning Plant Ownership
- Used Fuel Ownership
- Transportation
- LLW Disposal
- Used Fuel Consolidated Interim Storage
Getting from here to there

NEI Used Fuel Transportation Tabletop Exercise, May 21 2019
Transformation Enables Solutions

Utility ISFSIs

Waste Control Specialists

Eddy-Lea Energy Alliance

License application under review
Expected to be available 2023

Yucca Mountain

Fate Uncertain

License application under review
Expected to be available 2023

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