Holtec International HI-STORE – Consolidated Interim Storage Facility for Spent Fuel and HLW

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Agenda

- Experience
- Location
- Facility
- Technology
- Licensing
- Schedule
- Summary

Below-grade Storage at Humboldt Bay Power Plant, in Eureka, CA
Holtec Relevant Experience

Storage Facilities
- Private Fuel Storage (PFS)
- Ukraine Central Storage Facility
- Humboldt Bay
- Callaway
- Trojan
- Ukraine ISF-2

Storage Systems
- HI-STAR 100, HI-STORM 100, HI-STORM FW, HI-STORM UMAX

Transport Systems
- HI-STAR 60, 100, 180, 180D, 190
Who is the EDDY-LEA Energy Alliance - ELEA?

- Alliance of the Cities of Carlsbad & Hobbs and the Counties of Eddy & Lea
- Alliance is an LLC With 8 Board Members
- Equal Investment & Ownership
- Formed Under the Local Economic Development Act (LEDA) for Economic Development Purposes in 2006 & to Respond to Global Nuclear Energy Partnership (GNEP) Proposal from DOE
Location

- ELEA purchased 1,000 acres of land approximately halfway between Carlsbad and Hobbs, N.M. for potential use
- Land studied extensively during Global Nuclear Energy Partnership (GNEP) process
- Remote location, 35 miles from nearest population
- Geologic stability

- Excellent location for future repository nearby
- Dry Area
- Infrastructure present, including rail
- Preexisting robust scientific and nuclear operations workforce
- STRONG CONSENT FROM THE AREA
Location (cont.)
Location (cont.)
Site Layout
Facility: Phase 1 Construction

- Secure Area
- Rail Spurs from SWRR
- Operations & Security
- Cask Transfer Facility
- Batch Plant
- 200 HI-STORM UMAX Canisters
Full Facility: 4000 Canisters
Technology - HI-STORM UMAX

- Canister is entirely below grade
- RETRIEVABLE
- Passive heat rejection
- 22 ft. deep x 11 ft. wide
Technology - HI-STORM UMAX

<table>
<thead>
<tr>
<th>#</th>
<th>Component</th>
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<tbody>
<tr>
<td>1</td>
<td>Cavity Enclosure Container (CEC)</td>
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<tr>
<td>2</td>
<td>Divider Shell</td>
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<tr>
<td>3</td>
<td>Closure Lid</td>
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<tr>
<td>4</td>
<td>Canister</td>
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<tr>
<td>5</td>
<td>Top of Pad</td>
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<tr>
<td>6</td>
<td>Engineered Subgrade</td>
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<tr>
<td>7</td>
<td>Support Foundation Pad</td>
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Technology - HI-STORM UMAX

Benefits of Holtec’s HI-STORM UMAX Belowgrade Dry Storage Technology

✔ Enhanced Safety

✔ Enhanced Security
Enhanced Safety

- Utilizes the radiation shielding properties of the sub grade during storage for superior protection to workers and public from radiation
- Decreases the dangers presented by earthquakes and other extreme environmental phenomena such as hurricanes, tornado borne missiles, earthquakes, tsunamis
- Virtually eliminates the potential damage from fires, explosions, incident projectiles, or a World Trade Center or Pentagon type of attack on the stored canister
Enhanced Security

- Configured to be visually inconspicuous
  - Profile is less than 610 mm (2 ft.) tall
  - A less visible target from the air
  - Reduced visibility from public land
- There are no areas on the ISFSI where a person may hide, making security an easily implemented activity
Excavation
Excavation
CECs in Storage at HMD
CEC Placement
CLSM Pour - Controlled Low Strength Material
CLSM Pour - Controlled Low Strength Material
CLSM Pour Complete
Form for Top Pad
Upper Slab Pours
Installation of a Divider Shell
Completed HI-STORM UMAX ISFSI
Cask Transporter
Cask Transporter Delivering a Canister to the HI-STORM UMAX
Completed HI-STORM UMAX ISFSI at Callaway
HI-STORE Facility Priorities

Using the HI-STORM UMAX, the facility will be licensed to store all priority canisters located at shutdown & near term shutdown sites:

- Connecticut Yankee
- Humboldt Bay
- Kewaunee
- La Crosse
- Maine Yankee
- Millstone Unit 1
- SONGS
- Oyster Creek
- Rancho Seco
- Trojan
- Yankee Rowe
- Zion
- Vermont Yankee
Two Part Approach to Licensing

- Amend HI-STORM UMAX Certificate (72-1040):
  - Add additional Holtec canisters
  - Add canisters from shutdown / decommissioned plants – Priority Waste
  - Future: Update General License for all canisters projected to store SNF

- License HI-STORE under a 10 CFR 72 site-specific license
  - Initial application will request 500 canisters - Priority Waste
  - Future amendments for additional canisters up to 4000
  - Reference the amended HI-STORM UMAX Certificate and FSAR for technical details
Amend HI-STORM UMAX General License

- Final Safety Analysis Report (FSAR)
  - ✓ Generic HI-STORM UMAX FSAR already contains all the overall system information
  - ✓ Holtec will obtain amendment to generic CoC to include additional canisters, both Holtec fabricated and other systems
  - ✓ This generic CoC and associated supporting FSAR will be incorporated into the site-specific 10CFR72 license
  - ✓ This is consistent with the approach at PFS
HI-STORM UMAX Capabilities

HI-STORM UMAX designed to store majority of spent fuel storage canisters currently licensed in the US

- Size: Licensed to store canisters up to 75 ¾ inches in diameter and up to 213 inches tall
- Heat Load: Licensed to store canister heat loads of up to 37 kW with per assembly heat loads up to 1.69 kW
- Contents: Licensed to store burnups up to 68.2 GWd/MTU with a minimum fuel cooling time of 3 years
- Canister Weight: 90,000 lbs bounding

These are bounding conditions of canisters stored at shutdown sites – HI-STORM UMAX can store all.
Technical Details

- HI-STORM UMAX
  - CEC identical for all locations
  - Divider Shell and Lid will be adjusted for each canister type
Technical Details (cont.)

- Cask Transfer Facility
  - ✓ Standard Below-Ground Cask Transfer Facility (CTF) for all vertical canisters
  - ✓ Transfer operation for horizontal canisters - proprietary
HI-STORE Site Specific License Application

- License Application will utilize PFS SAR and NUREG 1567
- 40 year license
- Aging Management Plan for HI-STORE STORM UMAX and all canisters
  - For each canister the aging management must be initiated once the canister reaches its initial licensed lifetime (e.g. 20 years). When that happens at the HI-STORE facility depends on the initial loading date of the canister
  - Additional accessibility and monitoring options will be incorporated in the HI-STORE STORM UMAX design
HI-STORE Site Specific License Application

- Cask Receipt Inspection
  - Receipt inspection to ensure every canister meets the site specific requirements
    - Generate Baseline for future inspections. Full Surface inspection (inspection ring) is being considered
  - Canister history and previous inspections are considered

- Possession / Title / Ownership
  - DOE
Environmental Report

- Report will:
  - ✅ Cover full CISF content (4000 canisters)
  - ✅ Will utilize data from well-characterized area
    - WIPP, URENCO Enrichment Facility, GNEP, WCS
  - ✅ Additional (new) environmental data may not be needed

- Holtec will partner to develop report
  - ✅ Reviewing Proposals
  - ✅ Will select partner in short order

- Holtec participant on Part 72 site-specific license for PFS, including environmental report
What Holtec Requires to Start Construction

- Holtec will initiate licensing process:
  - Requires federal funding to construct & operate CISF

- Legislation (S854 / HR 3643):
  - Allows portion of Nuclear Waste Fund to pay for interim storage services
  - Enables DOE to take title of SNF and transport to CISF
HI-STORE Summary

- Under the partnership with ELEA, a 1000 acre area is available for the projected HI-STORE Consolidated Interim Storage Facility in New Mexico
- Facility uses the HI-STORM UMAX system
- There are no technical issues with establishing a Consolidated Interim Storage Facility
- Licensing effort is well underway for submittal to USNRC in June 2016
- Facility can be operational by 2020 with appropriate action in the area of transportation by DOE