HI-STORE CISF:

A Consolidated Interim Storage Facility for Spent Nuclear Fuel in Southeast New Mexico

December 2020
Consolidated Interim Storage

✅ Who is Holtec?

✅ Project Brief:
  - Safety
  - Security
  - Transportation

✅ Licensing Timeline
Holtec International

- Core Business Activities
  - Safe & Secure Storage Used Nuclear Fuel
  - Heat Transfer Equipment
  - SMR-160 Delivery
  - Battery Energy Storage Systems
  - Decommissioning Nuclear Plants
  - Consolidated Interim Storage

- Largest US exporter for capital equipment supporting the nuclear industry

- 134 nuclear plants worldwide: 71 domestic, 63 international

- Over 60,000 SNF assemblies loaded / 1,400+ Holtec systems loaded

A vertically integrated turnkey supplier of goods and services to the power generation industry since in 1986
Holtec’s Worldwide Dry Storage and Transport Experience

1,400+ Systems Loaded

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Nuclear Fuel & How it is Stored
How Nuclear Fuel is Stored

Wet Storage

Dry Storage
National Imperative

- NWPA 1982
  - Codified Repository as National Strategy
  - 1 mill/kWhr
  - $12B Spent on Yucca
  - Yucca Never Opened
  - Jan 31, 1998: Contract Breach

- On-Site Storage
  - 121 Facilities/39 States
  - Each w/ security, operations, maintenance

- National Liability
  - $800M/yr
  - $1.3B/yr beginning 2022
  - $6.9B through 2017
  - $34.1B Total
  - U.S. Treasury Judgement Fund

- Blue Ribbon Commission - 2012
  - Reaffirmed Repository as National Strategy
  - CISF Compliments Repository
Consolidated Interim Storage

- **Safe**: SNF storage system is designed and built to withstand *natural* and *man-made* events with no release of radioactivity.

- **Secure**: SNF storage system and facility provide an impregnable fortress to protect SNF against *attacks*.

- **Retrievable**: Allows removal of SNF canisters from facility in one shift for shipping to repository.

- **Temporary**: *Compliments* repository, not *competition*. Canisters of SNF will be shipped to repository in the same manner they were shipped to site.
CISF Utilizes HI-STORM UMAX Technology

- **HI-STORM UMAX:**
  - Seal welded canisters
  - Below grade vertical silos
  - Requires no water or electric
  - Produces no pollution, emissions, or noise

- Maximum Safety: Earthquakes, Oil & Gas Accidents, other postulated accidents

- Maximum Security: NRC DBT

- No Affect on Environment
  - No aquifers, ground water, or minerals affected
  - Radiation dose fraction of cosmic radiation

- No Negative Affect on State Economy
  - Oil & Gas: Drilling, Fracking, Disposal Wells
  - Ranchers & Farmers
Mentome, Texas – March 26, 2020

- **Earthquake Metrics**
  - 10K Year Return – 0.27g
  - U.S. NRC DBE – 0.45g
  - Proposed CISF – 1.3g

- **Mentome, TX**
  - 5.0 Richter Scale
  - 5%g – 0.05g

- **Proposed CISF**
  - Rated for 1.3g
  - 26x > Mentome, TX

**PGA (%g): Peak Ground Acceleration (percent of 1 g-force)**
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HI-STORM UMAX Construction
Controlled Low-Strength Material
Pours Complete
Rebar for Top Pad
HI-STORM UMAX Loaded
HI-STORE Site Layout

- Initial Storage Capacity: 500 canisters
- Total Storage Capacity: 10,000 canisters
- Facility utilizes 300 of 1,000 acres available
- Operations could commence in 2024
Transportation to HI-STORE

- Well-developed rail infrastructure
- HI-STORE 3.8 miles west of BNSF spur – Intrepid North
- Casks move by rail and remain on rail car until on HI-STORE facility
Transportation to HI-STORE

Transportation of Spent Nuclear Fuel Strictly Regulated

- Department of Transportation:
  - Regulates shippers of hazardous material
  - Oversees vehicle safety, shipper training, emergency response, routing, shipping documents

- Nuclear Regulatory Commission:
  - Approves Shipping Containers: Design, fabrication, operation, and maintenance
  - Regulates Physical Protection of shipments

Transport Casks: Designed by Holtec / Licensed by NRC

- HI-STAR 190 primary means
- Other licensed variations based on canister to be shipped
Transportation: Unit Train Consist

- Two locomotives - Redundancy
- Buffer Railcar – Protect Security and Engineers
- One or More Cask Railcars – Expect 10 Cask Railcars
- Rail Escort Vehicle
  - Safety Monitoring System – Reduce Derailments from Equipment Failures
    - Wired and Wireless Sensors
    - Monitored in REV and at off-train monitoring center
  - Security (10 CFR 73.37 / NUREG-0561)
Transportation: HI-STAR Cask

- Transport Casks
  - Safely confine fuel and shield workers and public from radiation
  - Multiple layers of steel, lead, and other materials

- Inside cask SNF is contained in another sealed canister

- Fully loaded casks can weigh 125-210 tons
Atlas Rail Car with HI-STAR 190XL

- Railcar with Cask
  - Cask w/transport package: 240 tons
  - Railcar: 97.5 tons
  - Total: 337.5 tons
  - 28 tons/axle

- Dash 9 GE-C44-9W
  - Total: 210 tons
  - 35 tons/axle

- E80 Rail Rating
  - 40 tons/axle
Cask Design Robust & Safe

- Designed to protect public from releases of radioactive material in the unlikely event of an accident
- Must survive four successive accident conditions:
  - free drop, puncture, fire, and submersion in water
Nuclear Insurance

Price Anderson Act

- General Public Personal Injury and Property Damage: $13.436B
- Tiered Coverage
  - Private - $450M per site
  - Industry Self-Insurance
    - $12,368M (pool)
    - $618.4M (pool)
- Applicability
  - Transporting fuel to site
  - Storing fuel or waste on site
  - Transporting fuel or waste off site
  - Reactor Operation
  - Theft or Sabotage

Onsite Insurance - NRC Directed

- Onsite Property Insurance: $1.06B
- Stabilize and decontaminate reactor and site
Holtec Financial Assurance

- Decommissioning Fund
  - $24M for Phase 1 - 500 Canisters
  - Regulated by U.S. NRC
  - $840/ton of spent nuclear fuel placed in fund
  - Initial funds plus earnings over life of facility cover cost for complete decommissioning
  - Cost estimate updated every three years
    - Reviewed by U.S. NRC
    - Adjusting for:
      - Current prices of services, inflation, and approach
      - Key assumptions as necessary

- Financial Profile
  - Profitable every year since founded, no long-term debt, large and diverse customer base, $5B in backlog orders.
  - Financial plan sets aside additional funds above decommissioning fund to allow ongoing facility operations
NRC Licensing Process

- License Application Submittal (March 2017)
- NRC Begins Safety Review (10 CFR Part 71, 72, 73)
- NRC Issues Safety Evaluation Report (July 2021)
- NRC Decides Whether to Accept Application for Review
- NRC Dockets License Application (March 2018)
- NRC* Begins Environmental Review (NEPA)
- ASLBP Issues Findings; Potential NRC License Summer 2021
- NRC Adjudicatory Hearings (ASLBP) (January 2019)
- Operational Summer 2024

NRC*: BLM and NMED Coordinating Agencies
ASLBP: Atomic Safety and Licensing Board Panel
Questions?
Ed Mayer
Program Director

(856) 797-0900 Ext. 3671
(703) 401-7330

e.mayer@Holtec.com

1 Holtec Blvd.
Camden, NJ 08104