


HOLTEC INTERNATIONAL

EDDY - LEA ENERGY ALLIANCE

HI-STORE CISF:

A Consolidated Interim Storage Facility for Used Nuclear Fuel & HLW

Briefing to the Radioactive and Hazardous Materials Committee of the State of New Mexico

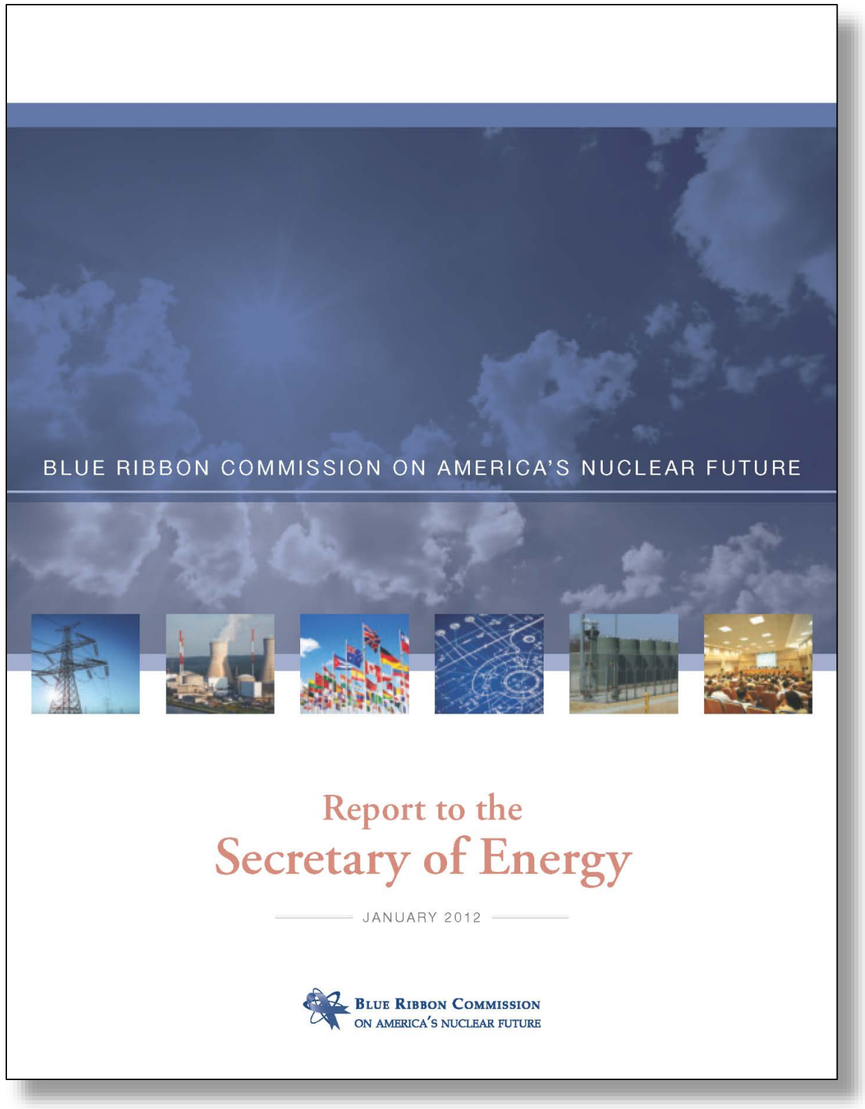
By: Dr. Stefan Anton
VP of Engineering, Holtec International
May 18, 2018

Topics

- Project Purpose and Overview
- Who is Holtec International?
- HI-STORE: A Consolidated Interim Storage Facility for Used Nuclear Fuel (UNF) & High Level Waste (HLW)
- Safe & Secure Transport of Used Nuclear Fuel

Project Purpose and Overview

- The principal purpose of this project is to implement the recommendation of the Blue Ribbon Commission on America's Nuclear Future to establish one or more (privately operated) consolidated interim storage facilities for used nuclear fuel (UNF)
- These would combine the storage of fuel from numerous current sites, specifically from shut-down reactor sites where the used fuel is the only thing left
- Any such project has two distinctly different aspects with different involvement of organizations, namely UNF storage and UNF transport

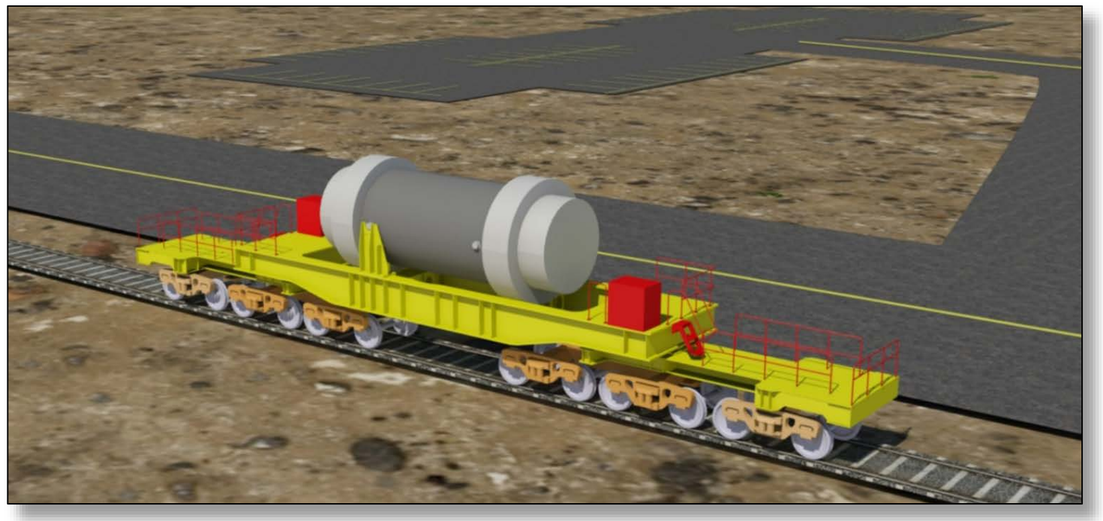


Project Aspect: UNF Storage

- Organizations involved in UNF Storage
  - Site: ELEA
  - Licensee/Operator: Holtec
  - Regulator: NRC, Site Specific License under 10 CFR Part 72
  - Emergency Response: State and Local Authorities
  - Title to UNF: DOE or Holtec
    - Final Titleholder is DOE

Project Aspect: UNF Transport

- Organizations involved in UNF Transport
  - ✔ Transport Casks: Holtec
  - ✔ Regulator for Casks: NRC, Certificate under 10 CFR Part 71
  - ✔ Regulator for Transport Operation: Department of Transport
  - ✔ Transport Operation: Shipping Company
  - ✔ Emergency Response: State and Local Authorities
  - ✔ Title to UNF: DOE or Holtec



Site-Specific License Timeline for Holtec's HI-STORE CISF Project

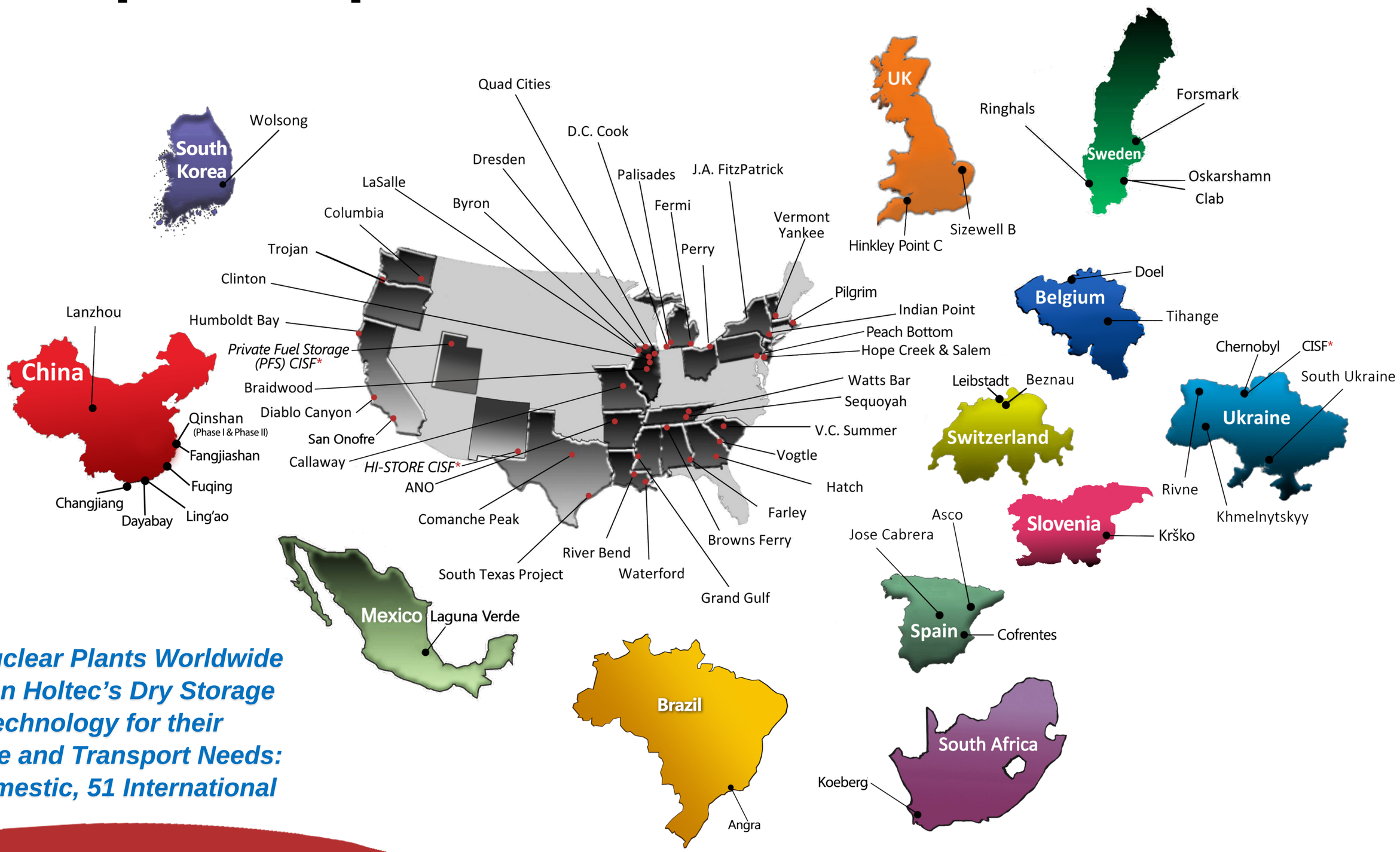
- Application submitted to USNRC: March 2017
- Application accepted by USNRC: March 2018
- NRC Request for additional information March 2018– Mid 2019
- NRC Public Meetings: April – May 2018
- NRC Completes Review: July 2020
- Pending Agreement with DoE and/or Nuclear Utilities:
  - ✔ Construction Could Start: 2020
  - ✔ Construction Complete: 2023
  - ✔ Accept First Shipment: 2023

Who is Holtec International?

- A US-based and US-owned supplier of goods and services to the power generation industry
  - Established in 1986
  - Impeccable safety record and program
  - Robust Quality Assurance Program
  - Three U.S. manufacturing plants (1.3 Million ft2)
- Vertically Integrated Company
  - Design
  - Engineering
  - Licensing
  - Procurement
  - Manufacturing
  - Installation
- Financially strong with self-financed R&D: SMR-160, Decommissioning & Consolidated Interim Storage
  - No history of long-term debt
  - Highest industrial credit rating [D&B-1R2]
  - Orders booked for future deliveries: 5.0 Billion USD +
- Business Mix:
  - 85% Nuclear power & nuclear waste
  - 10% Fossil power-combined cycle
  - 5% Renewables - solar, wind, etc.

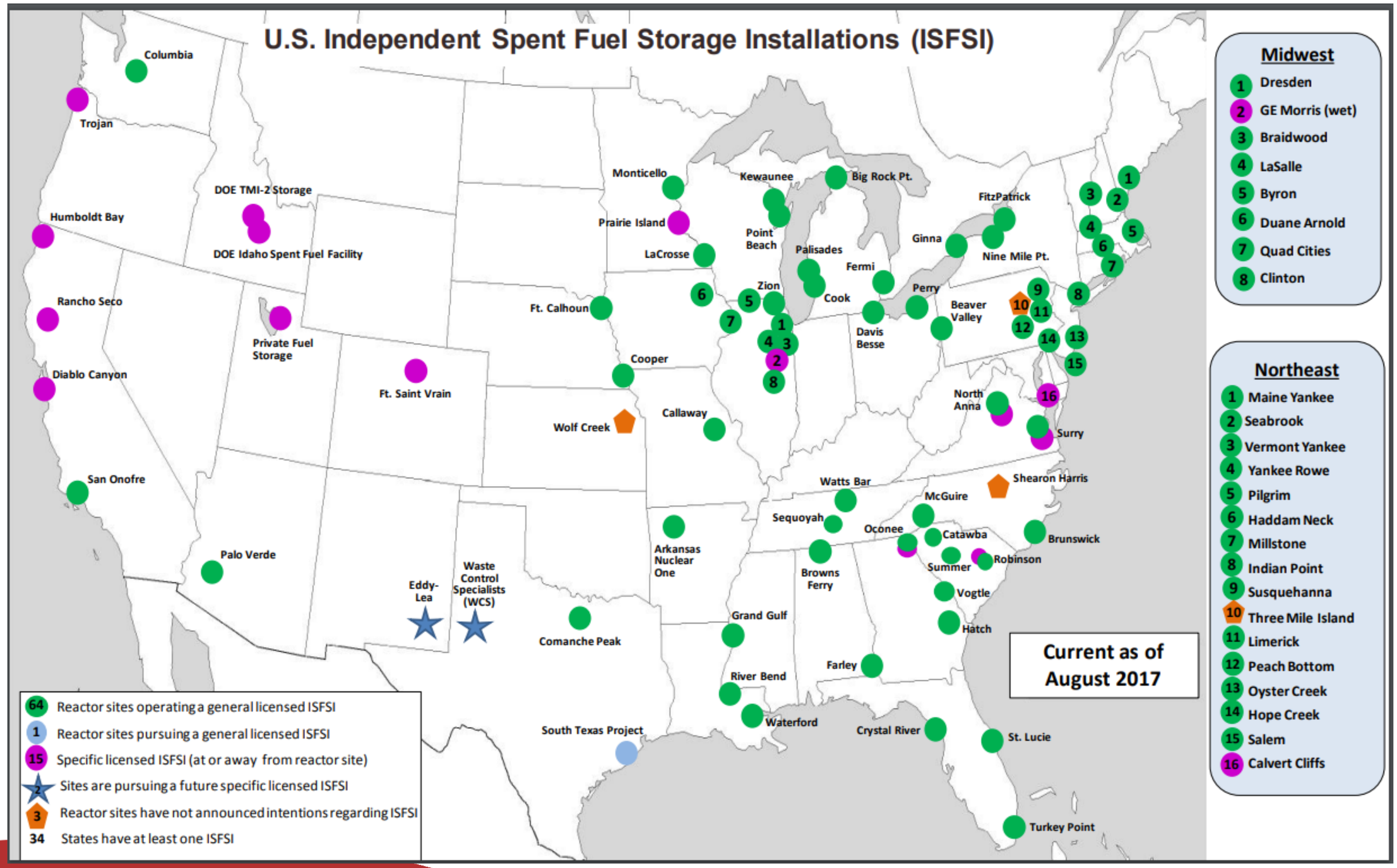
Holtec's Worldwide Dry Storage & Transport Experience

HOLTEC INTERNATIONAL



110 Nuclear Plants Worldwide Rely on Holtec's Dry Storage Technology for their Storage and Transport Needs: 59 Domestic, 51 International

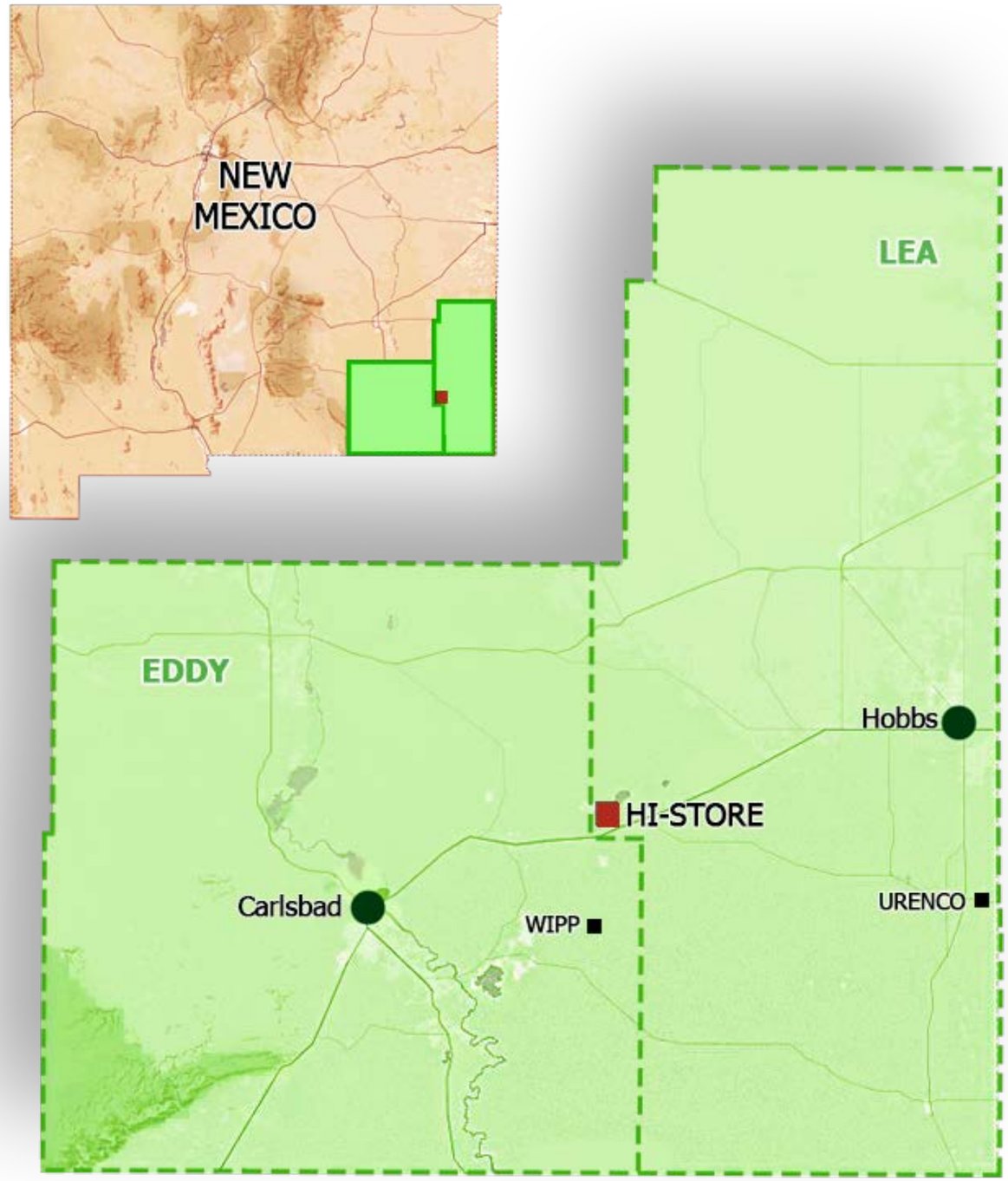
U.S. Independent Spent Fuel Storage Installations



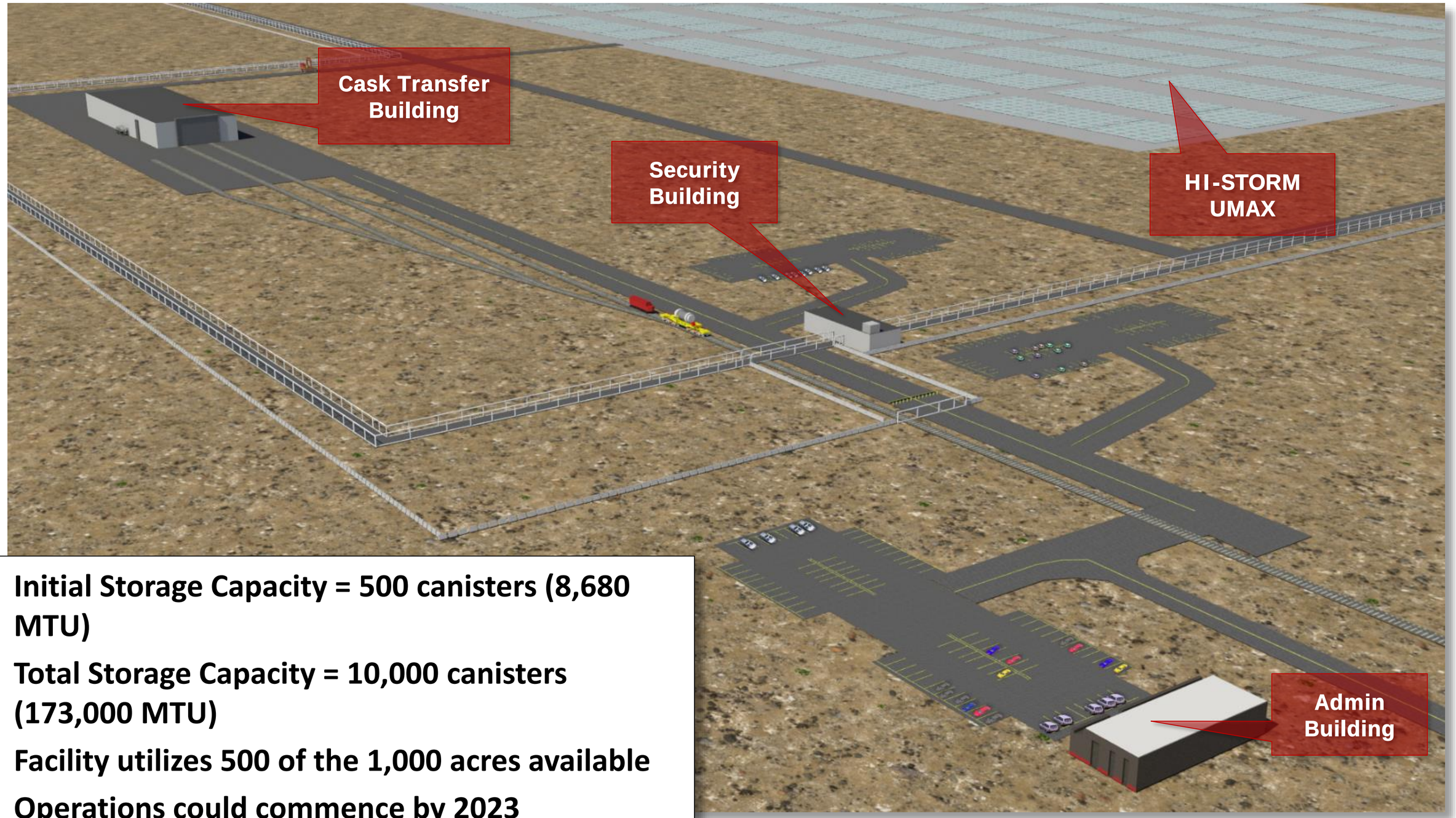
Source: U.S. NRC File Photo

HI-STORE CISF Site

- 1,000 acres: Geologically stable, dry, elevated land
- Developed infrastructure: Electric, water, roads & rail
- Remote location:
  - ✔35 miles from nearest town
  - ✔Midway between Carlsbad & Hobbs, NM
- Populace: Robust scientific & nuclear workforce
  - ✔WIPP
  - ✔URENCO



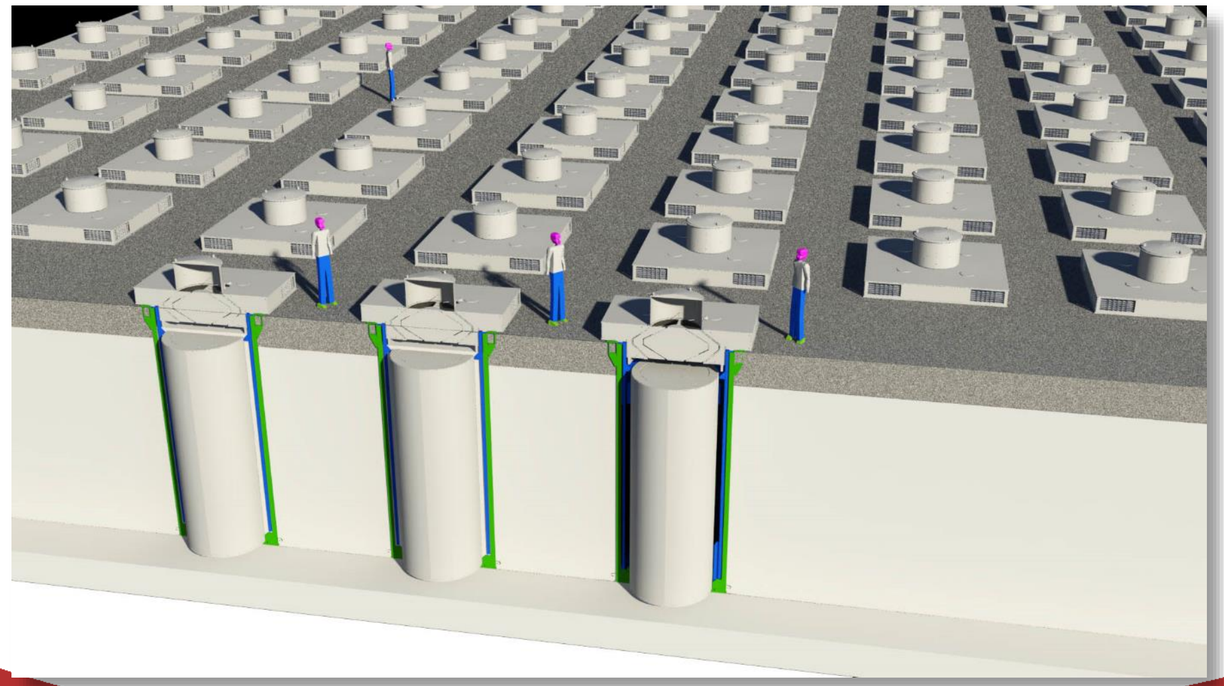
HI-STORE CISF Site Layout



- Initial Storage Capacity = 500 canisters (8,680 MTU)
- Total Storage Capacity = 10,000 canisters (173,000 MTU)
- Facility utilizes 500 of the 1,000 acres available
- Operations could commence by 2023

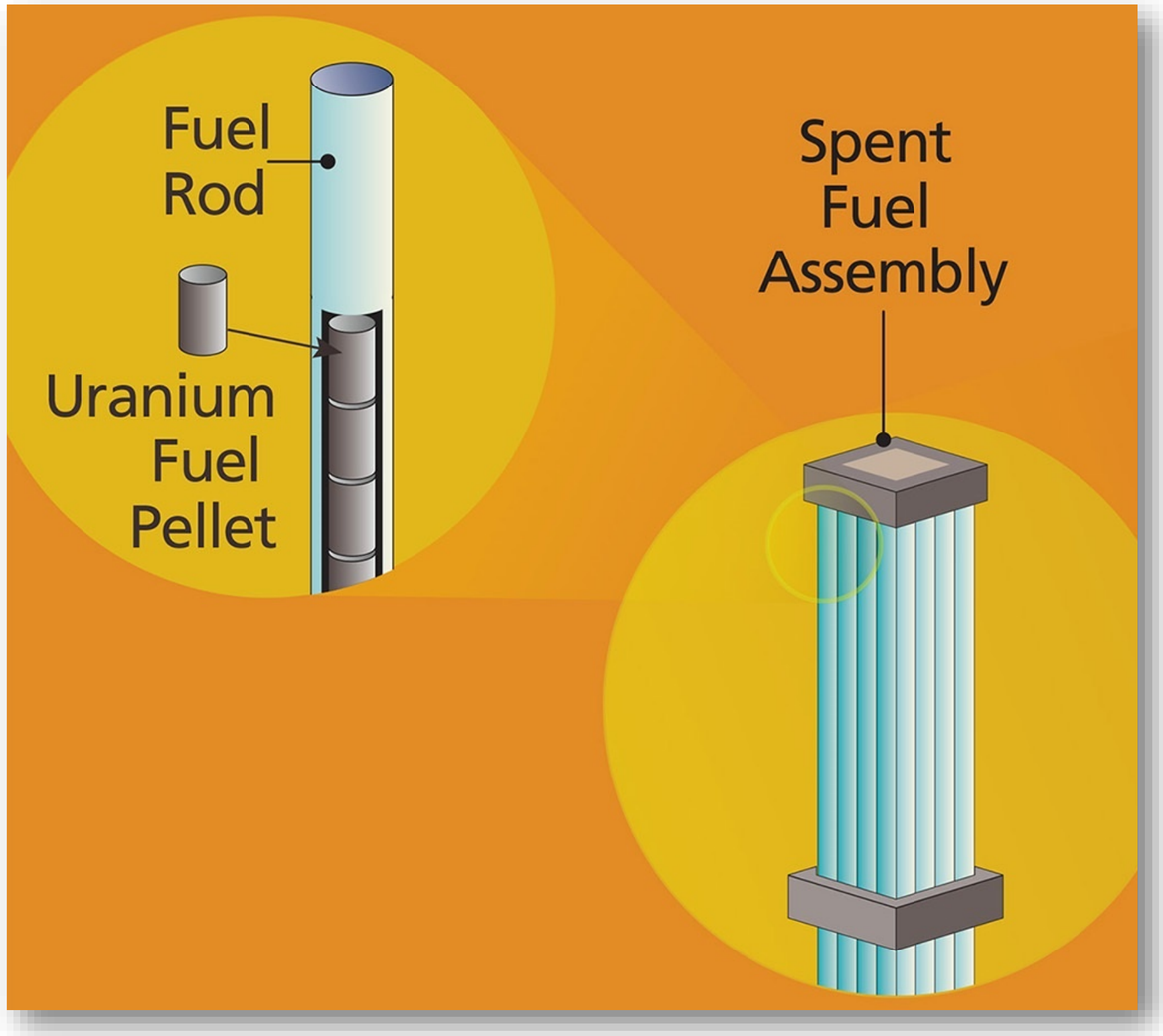
HI-STORM UMAX: The Safest and Most Secure Facility for Used Nuclear Fuel

- Maximizes safety
  - ✔ Minimizes dose to environment and crew
  - ✔ Virtually immune to environmental disasters: hurricanes, floods, tornados, and earthquakes
  - ✔ Designed to withstand crashing aircraft or on-site fire without any radiological consequences
- Maximizes security
  - ✔ Facility is visually inconspicuous
  - ✔ Profile < 2 ft. tall
  - ✔ No area of obstructed view
  - ✔ Reduced visibility from public land
  - ✔ Less visible target from the air
- Temporary & Retrievable
  - ✔ Canister placed into storage, or removed from storage, in less than one shift
  - ✔ A transitional storage facility



Safety In-Depth

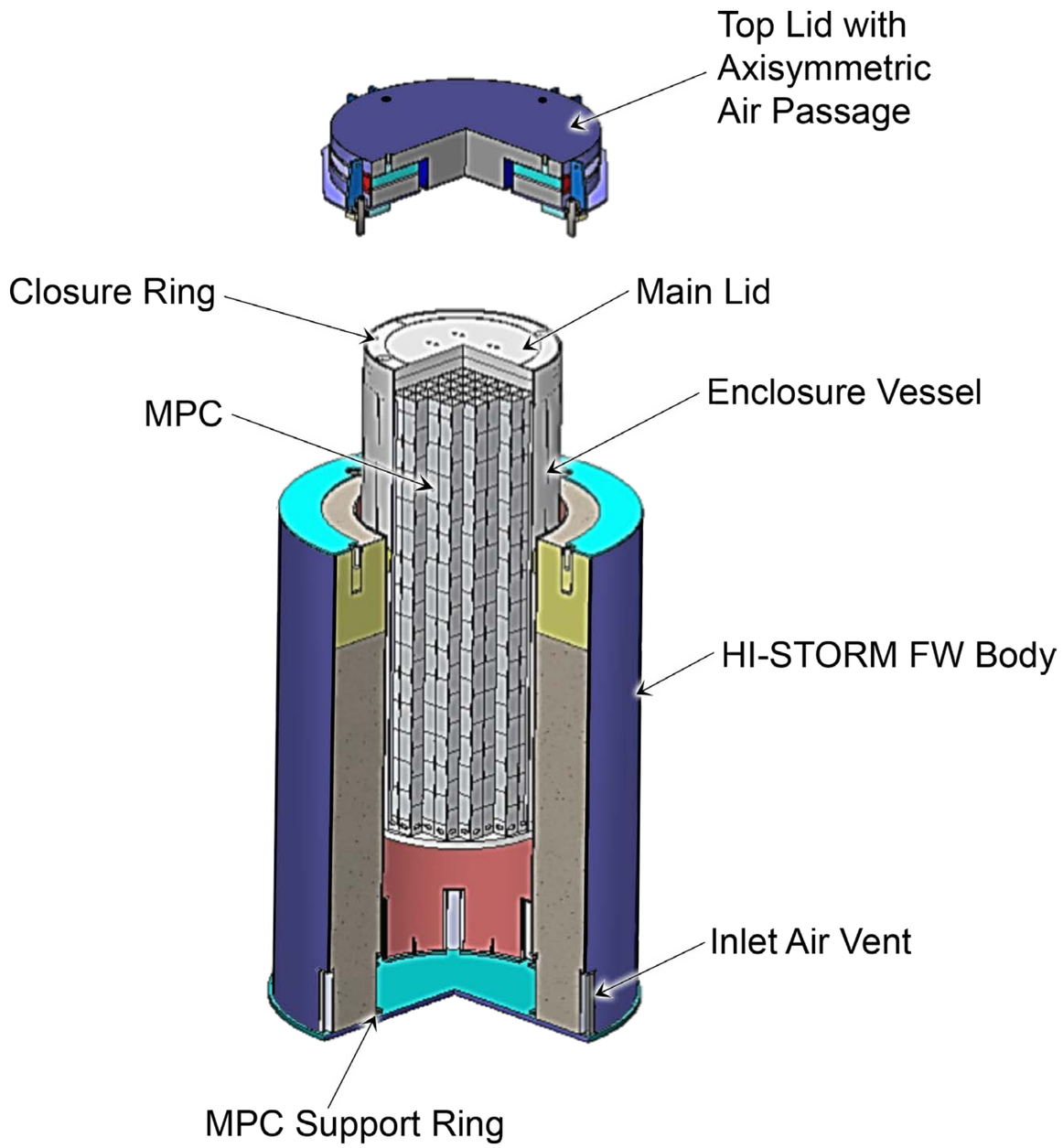
1. Commercial nuclear fuel is solid in the form of cylindrical UO_2 pellets. UO_2 is a highly temperature resistant ceramic material. Pellets are about ½ inch in diameter and ½ inch long
2. Fuel pellets are stacked in a sealed metal tube, made from a specially selected material (zirconium). The tube with the pellets is called the fuel rod. Rods are typically 12 ft long.
   – For handling purposes, rods are combined into “fuel bundles” or “fuel assemblies”, which may contain several hundred rods



Source: U.S. NRC File Photo

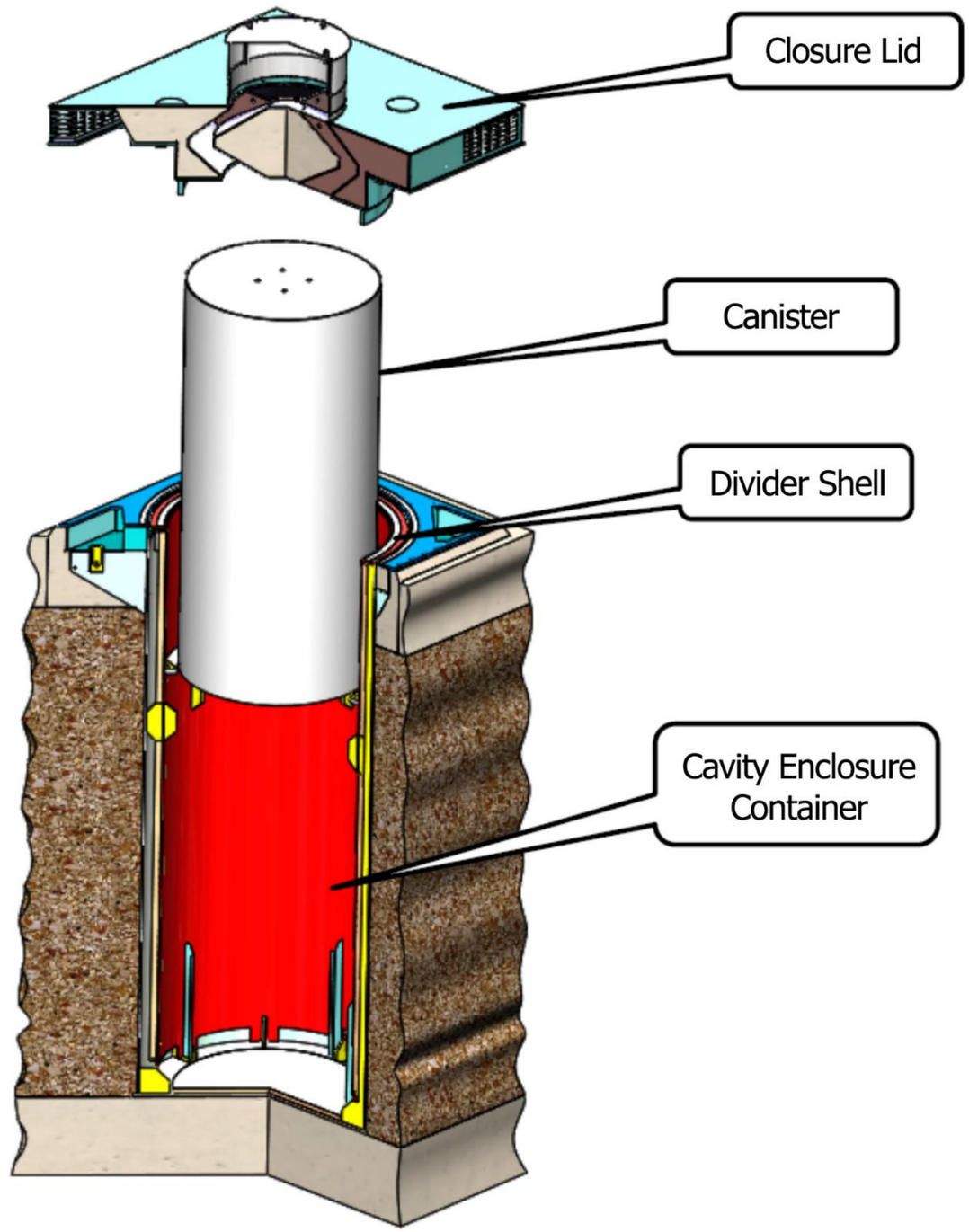
Safety In-Depth

3. For dry storage, between 24 and 89 fuel assemblies are placed into a fuel basket, for handling purposes, physical protection and improved shielding.
4. The basket is located inside the multi-purpose-canister (MPC), a seal-welded stainless-steel structure. Multi-Purpose means it is suitable for storage, transport and final repository without re-opening the canister



Safety In-Depth

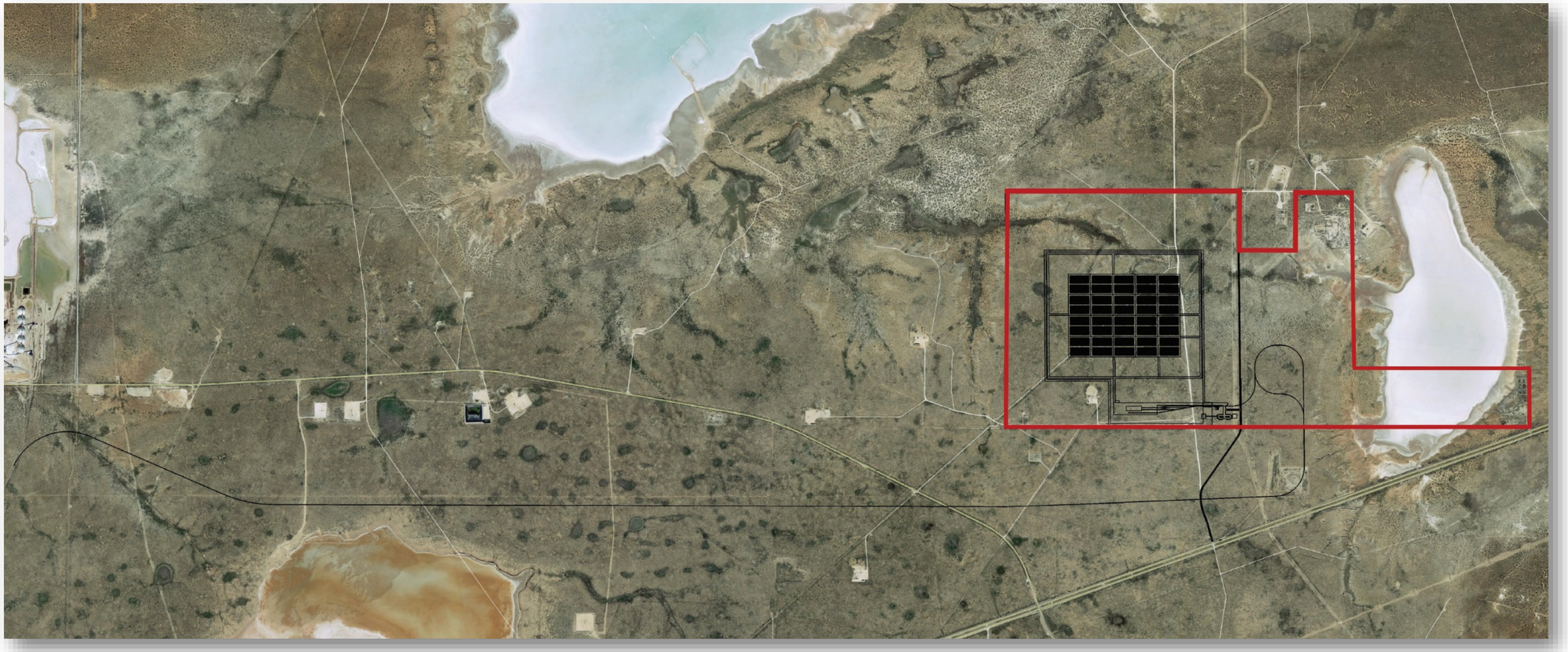
5. The canister is placed into the subsurface cavity, for shielding and physical protection
6. The cavity is closed with a heavy lid for additional shielding and physical protection
7. The site is surrounded by barriers and fences for physical security protection



Emergency Planning Zone

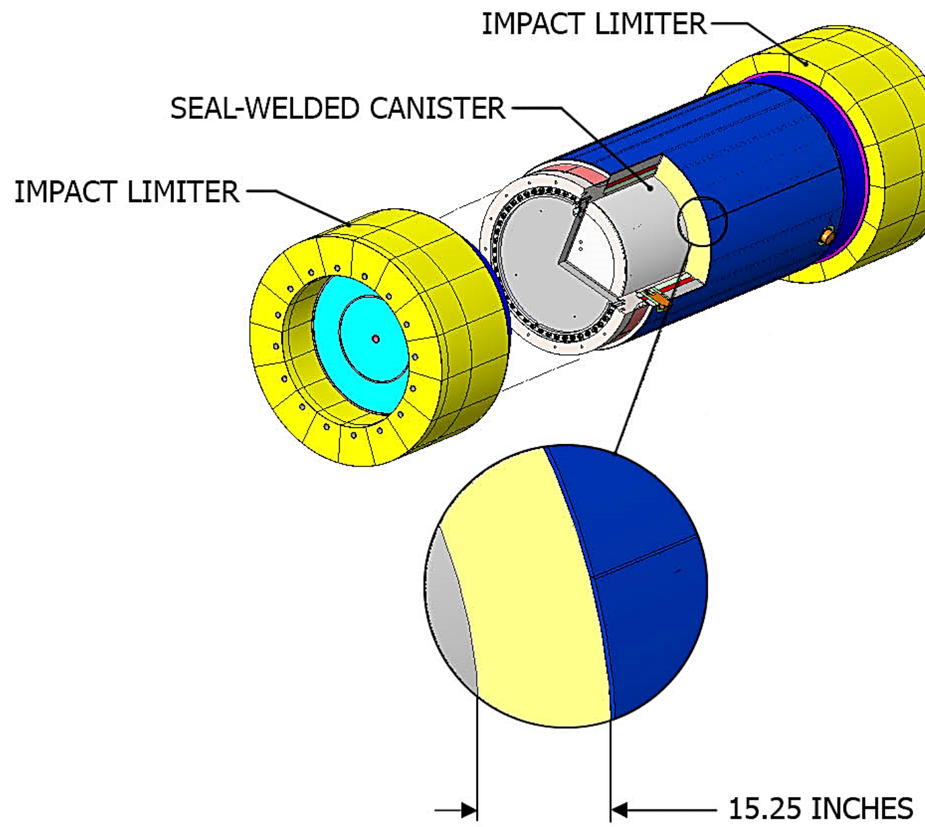
- The property boundary (owner controlled area boundary) is the boundary of the Emergency Planning Zone.
- There are no radiological effects under normal or accident conditions beyond that boundary.

Emergency Planning Zone



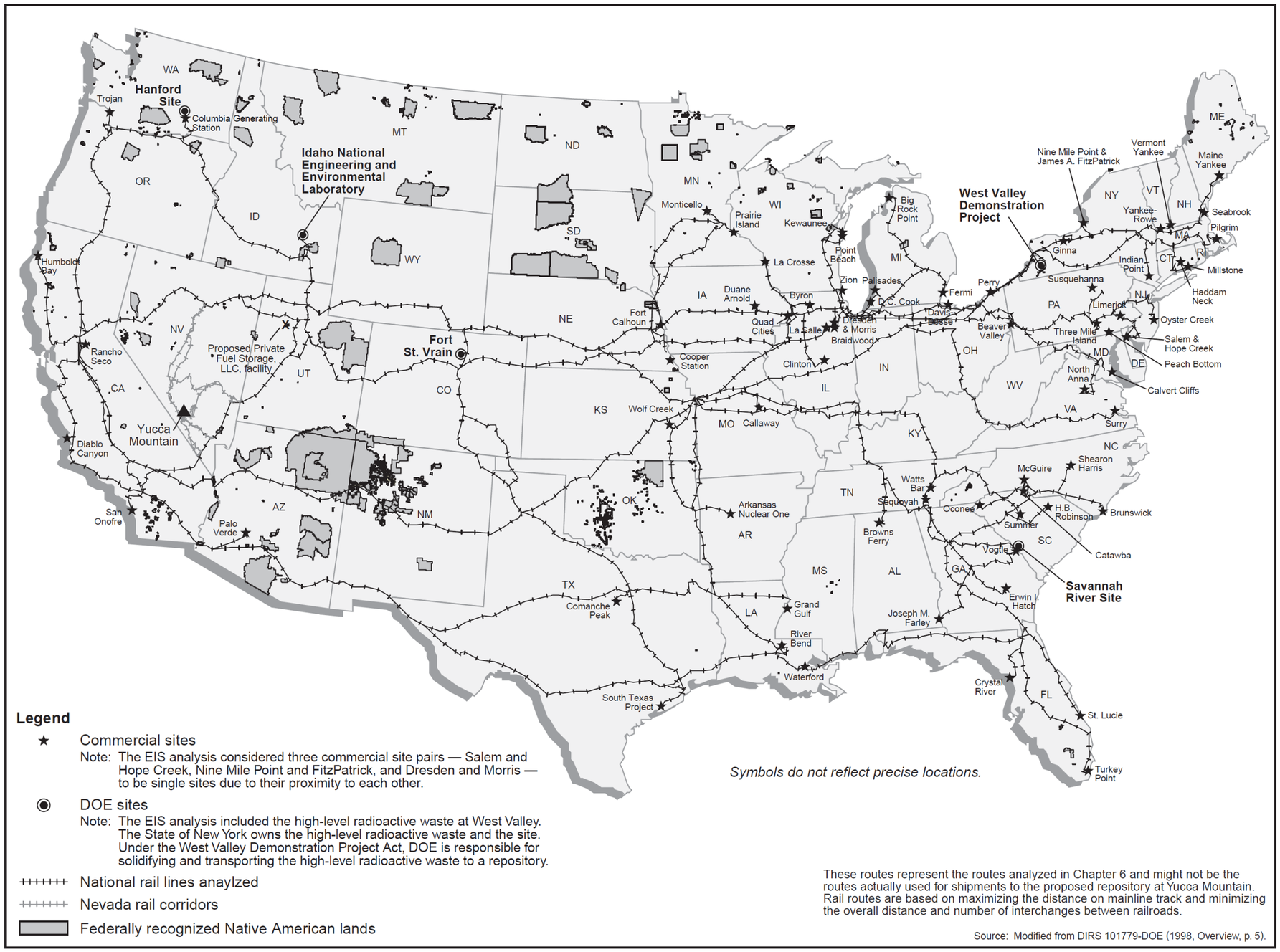
Safe & Secure Transport of UNF & HLW

- Transport of UNF and HLW use robust and safe transport casks and specially designed railcars
- Transport casks are designed and fabricated to safely confine the fuel, and shield workers and the public from radiation
  - ✔ Multiple layers of steel, lead, and other materials
- Inside the cask, the used fuel, in solid form, is contained in another sealed canister
- Fully loaded casks weigh 125 tons or more for rail shipments



Holtec Transport Cask

US Nuclear Plant Site Locations and Rail Routes



Legend

★ Commercial sites

Note: The EIS analysis considered three commercial site pairs — Salem and Hope Creek, Nine Mile Point and FitzPatrick, and Dresden and Morris — to be single sites due to their proximity to each other.

◉ DOE sites

Note: The EIS analysis included the high-level radioactive waste at West Valley. The State of New York owns the high-level radioactive waste and the site. Under the West Valley Demonstration Project Act, DOE is responsible for solidifying and transporting the high-level radioactive waste to a repository.

National rail lines anaylzed

Nevada rail corridors

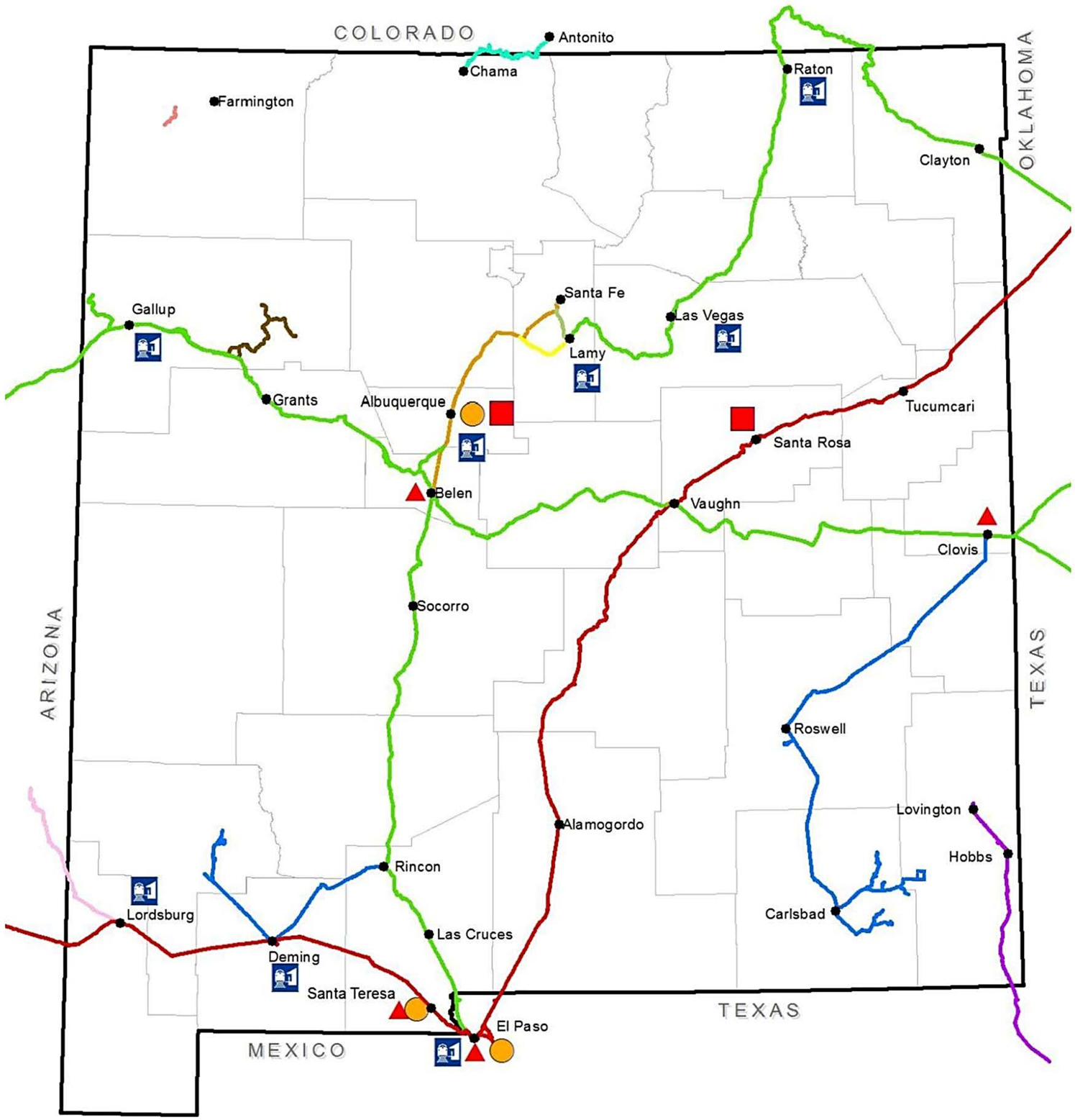
Federally recognized Native American lands

These routes represent the routes analyzed in Chapter 6 and might not be the routes actually used for shipments to the proposed repository at Yucca Mountain. Rail routes are based on maximizing the distance on mainline track and minimizing the overall distance and number of interchanges between railroads.

Source: Modified from DIRS 101779-DOE (1998, Overview, p. 5).

Source: *Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*. DOE/EIS-0250

New Mexico Rail Routes



Source: New Mexico State Rail Plan, March 2014

Questions?