EDDY - LEA ENERGY ALLIANCE

HOLTEC INTERNATIONAL

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

Holtec's Worldwide Dry Storage and Transport Experience

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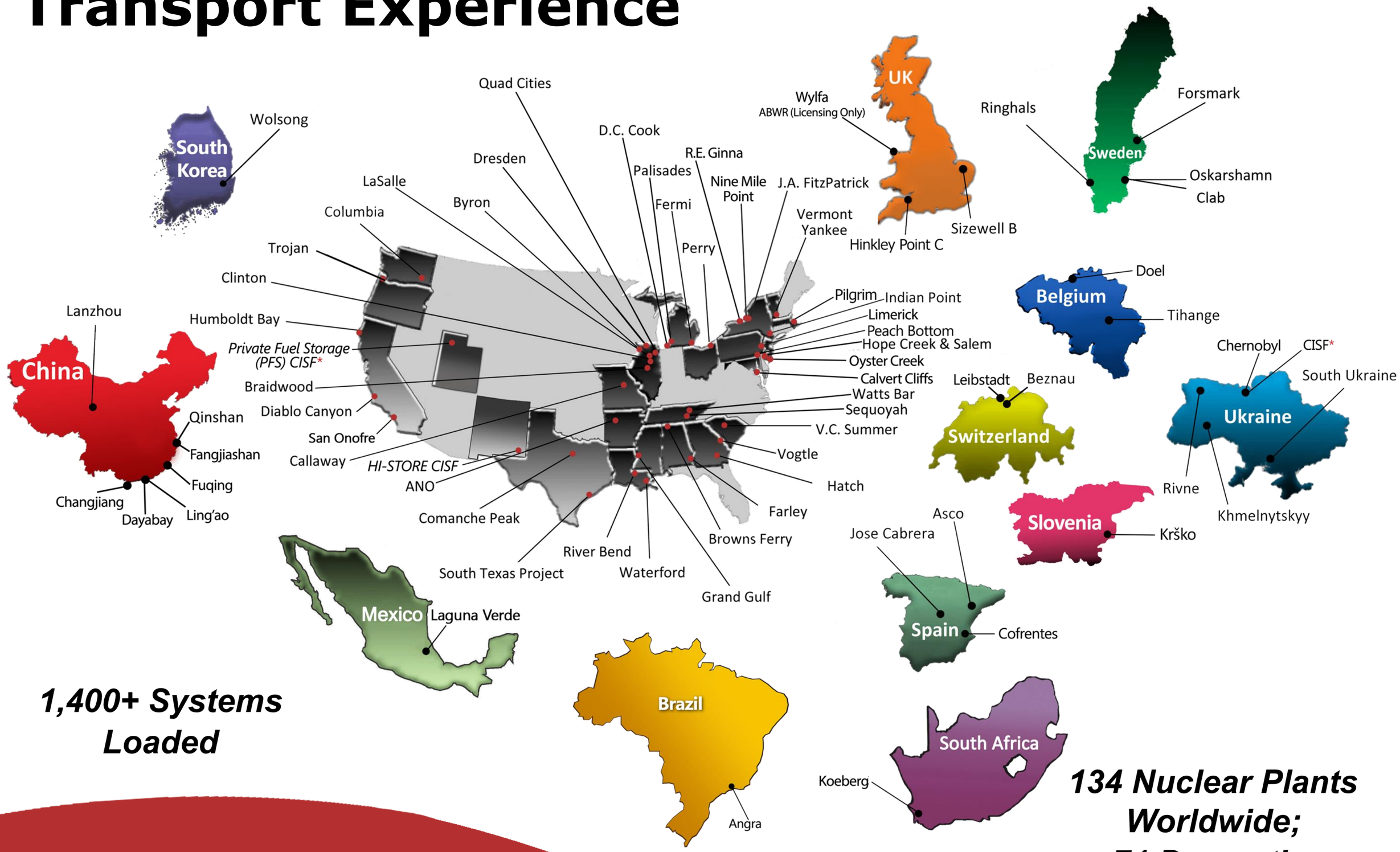
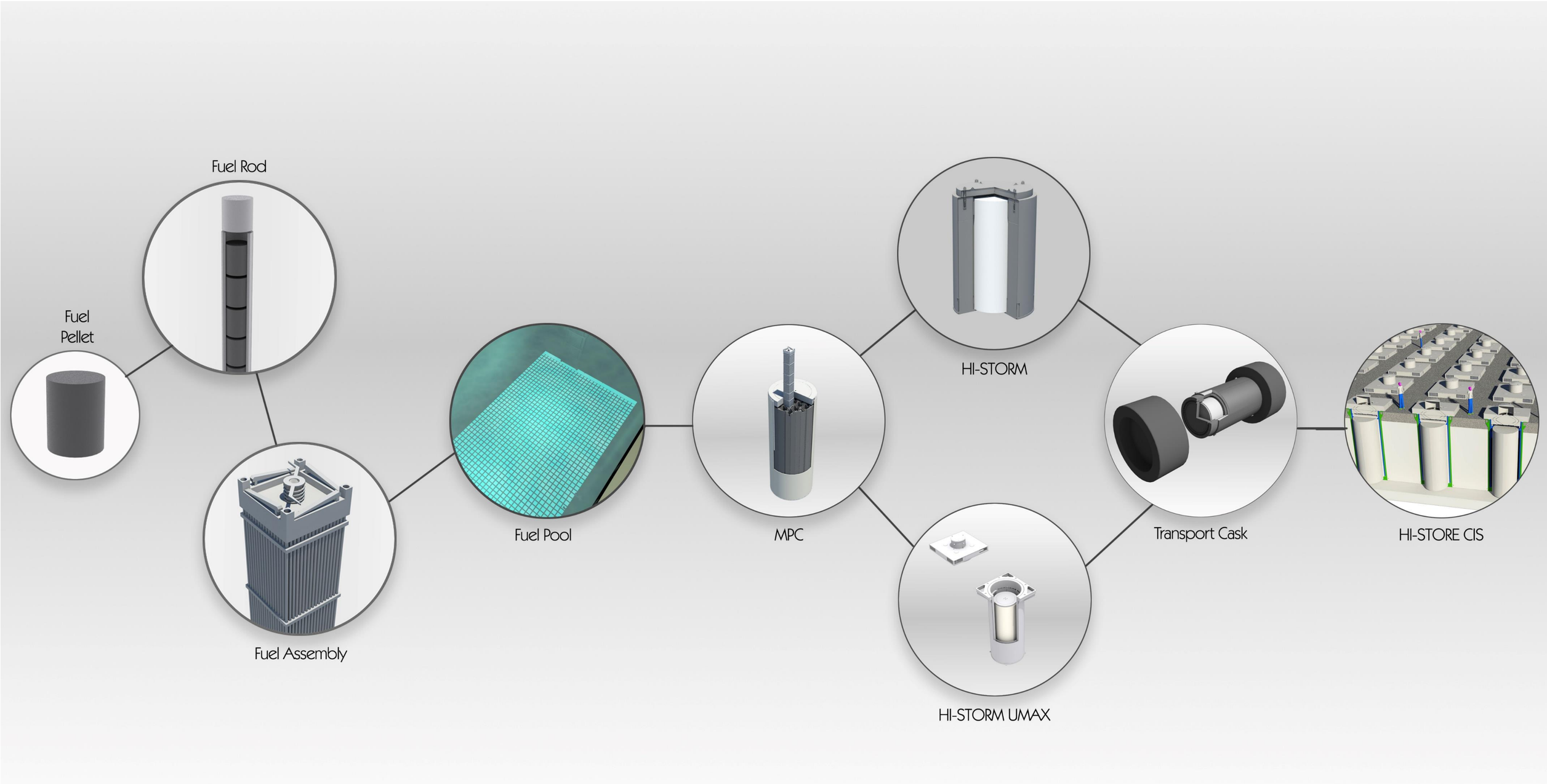


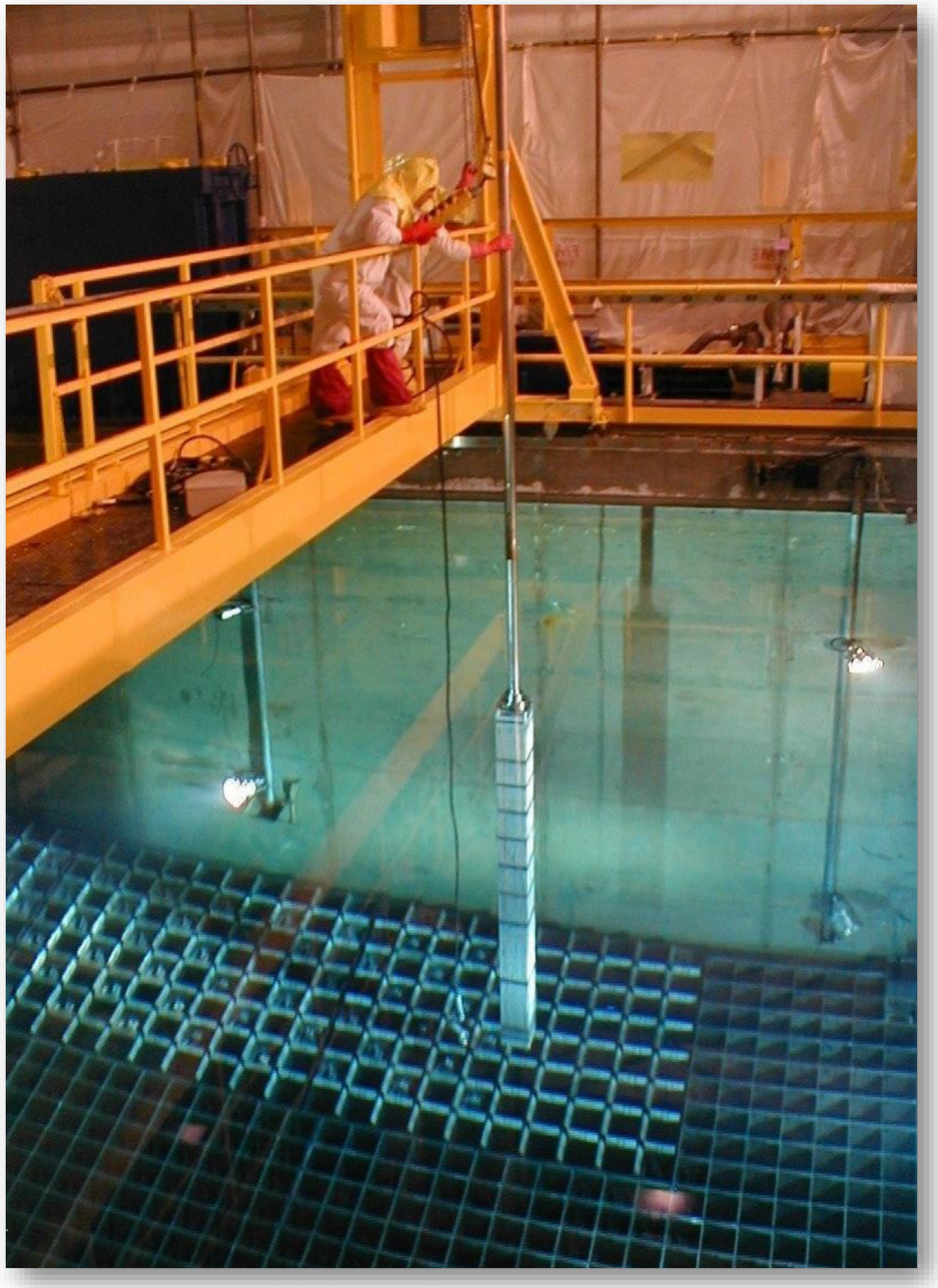
1,400+ Systems Loaded

134 Nuclear Plants Worldwide; 71 Domestic, 63 International

Nuclear Fuel & How it is Stored



How Nuclear Fuel is Stored

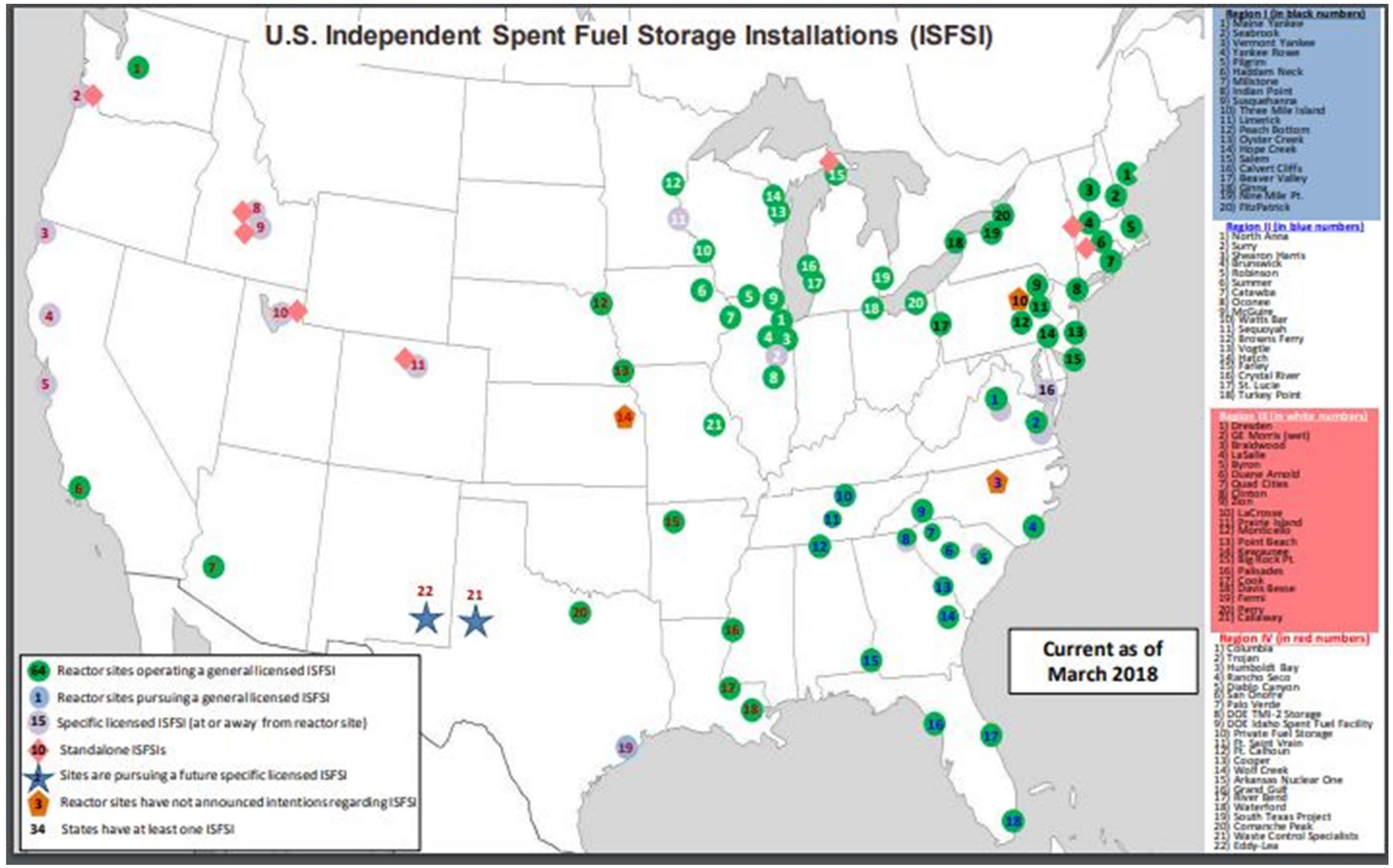


Wet Storage

Dry Storage

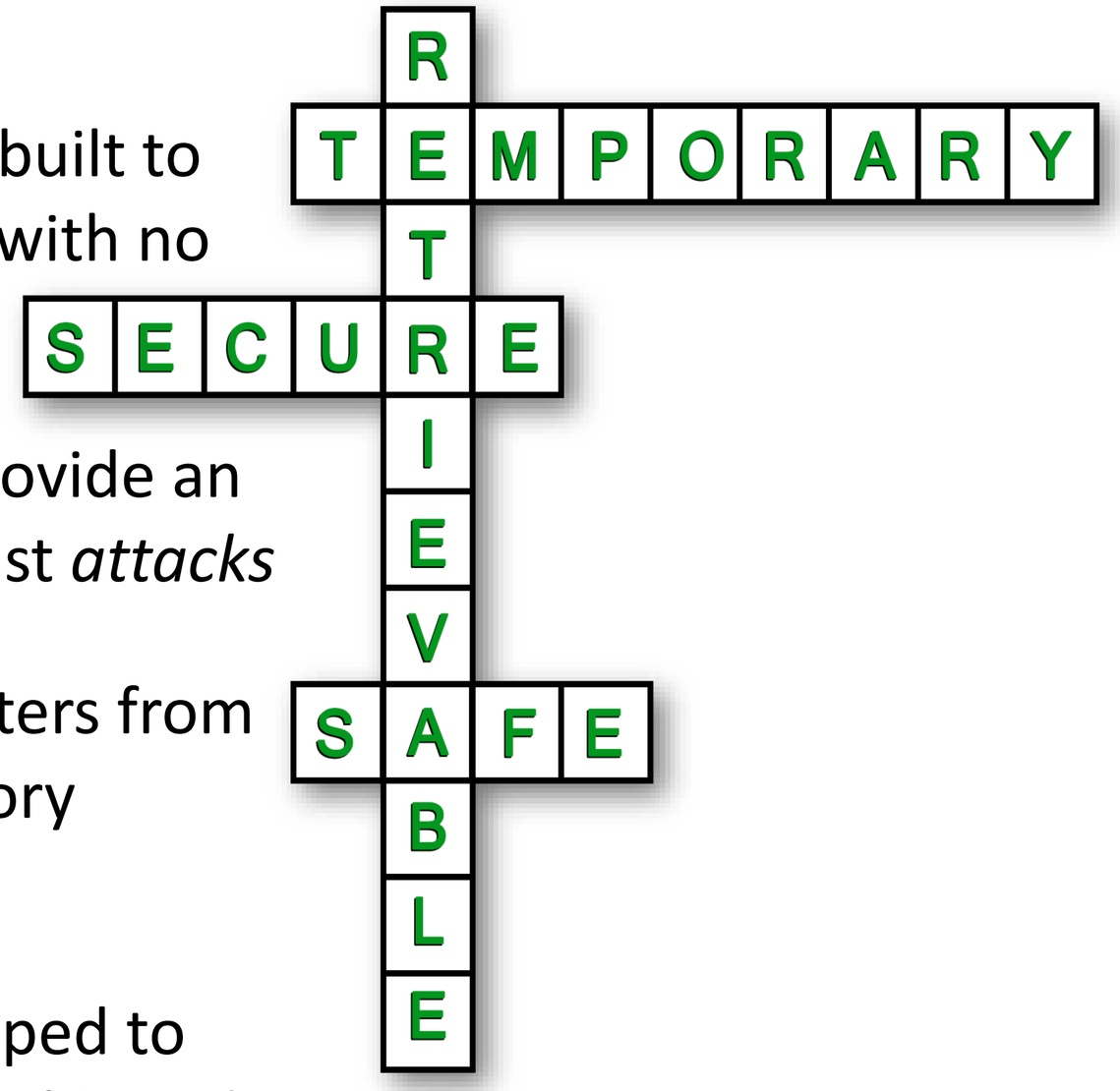
National Imperative

- 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



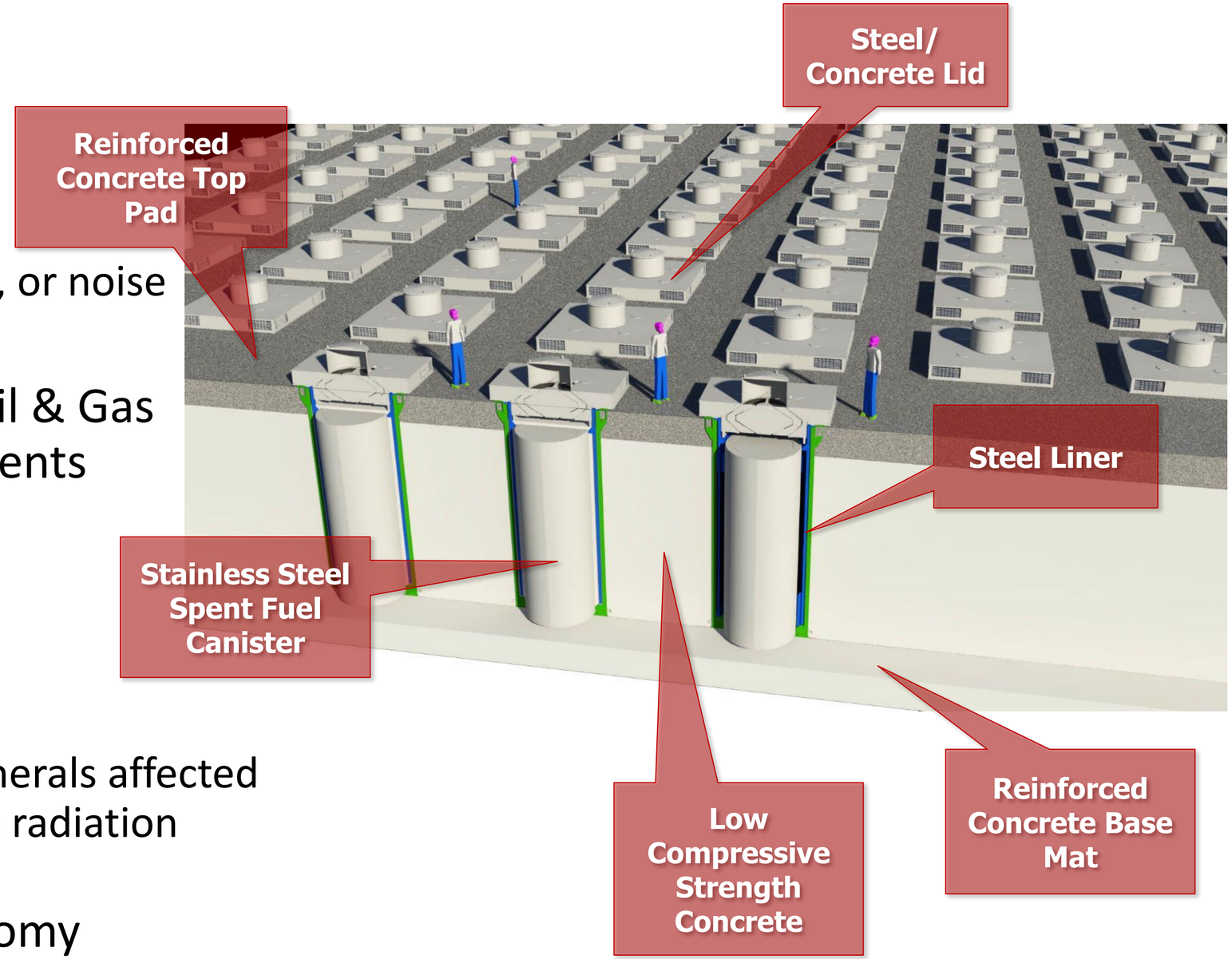
Consolidated Interim Storage

- **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



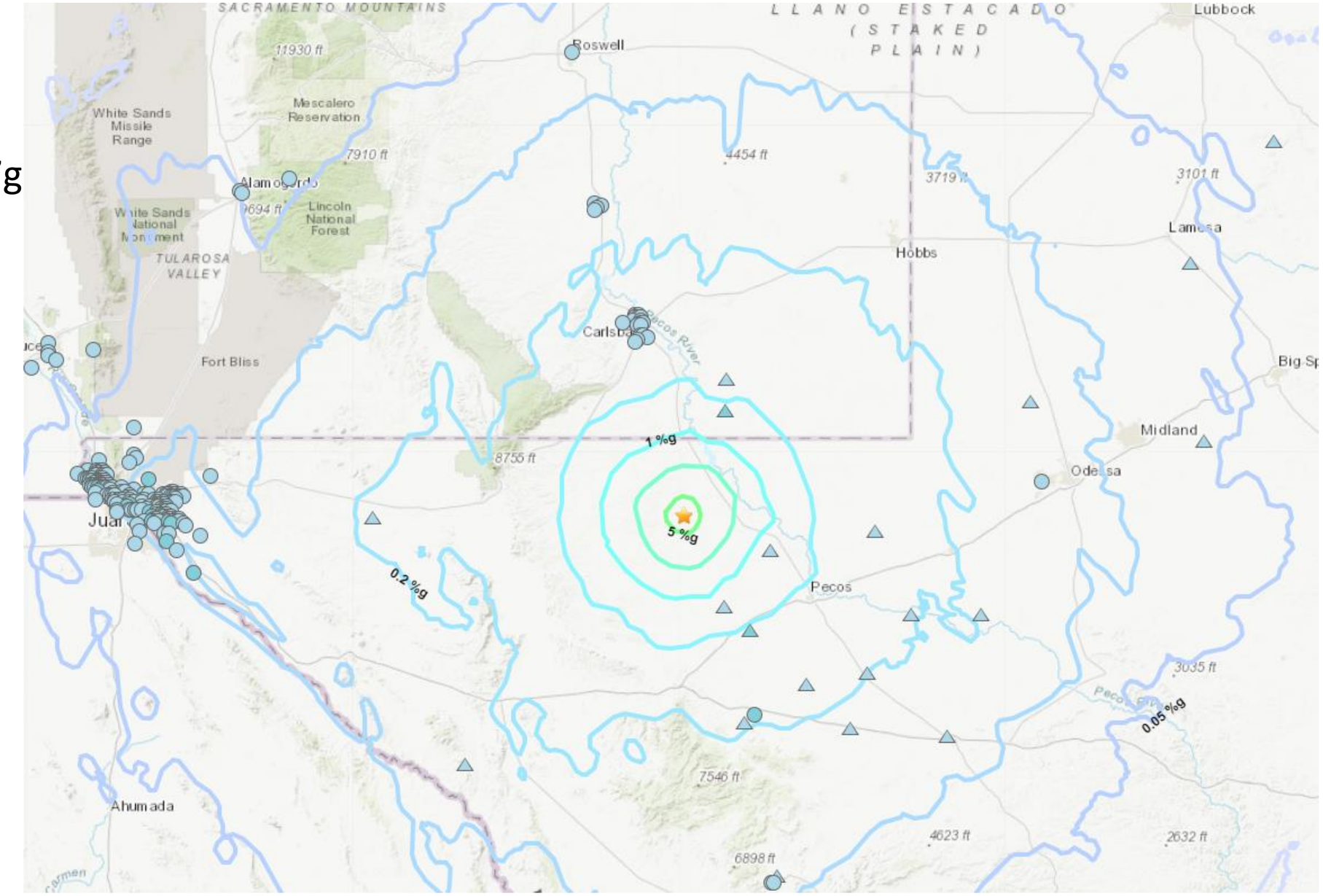
CISF Utilizes HI-STORM UMAX Technology

- 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)	0.1	0.2	0.5	1	2	5	10	20	50	100

PGA (%g): Peak Ground Acceleration (percent of 1 g-force)

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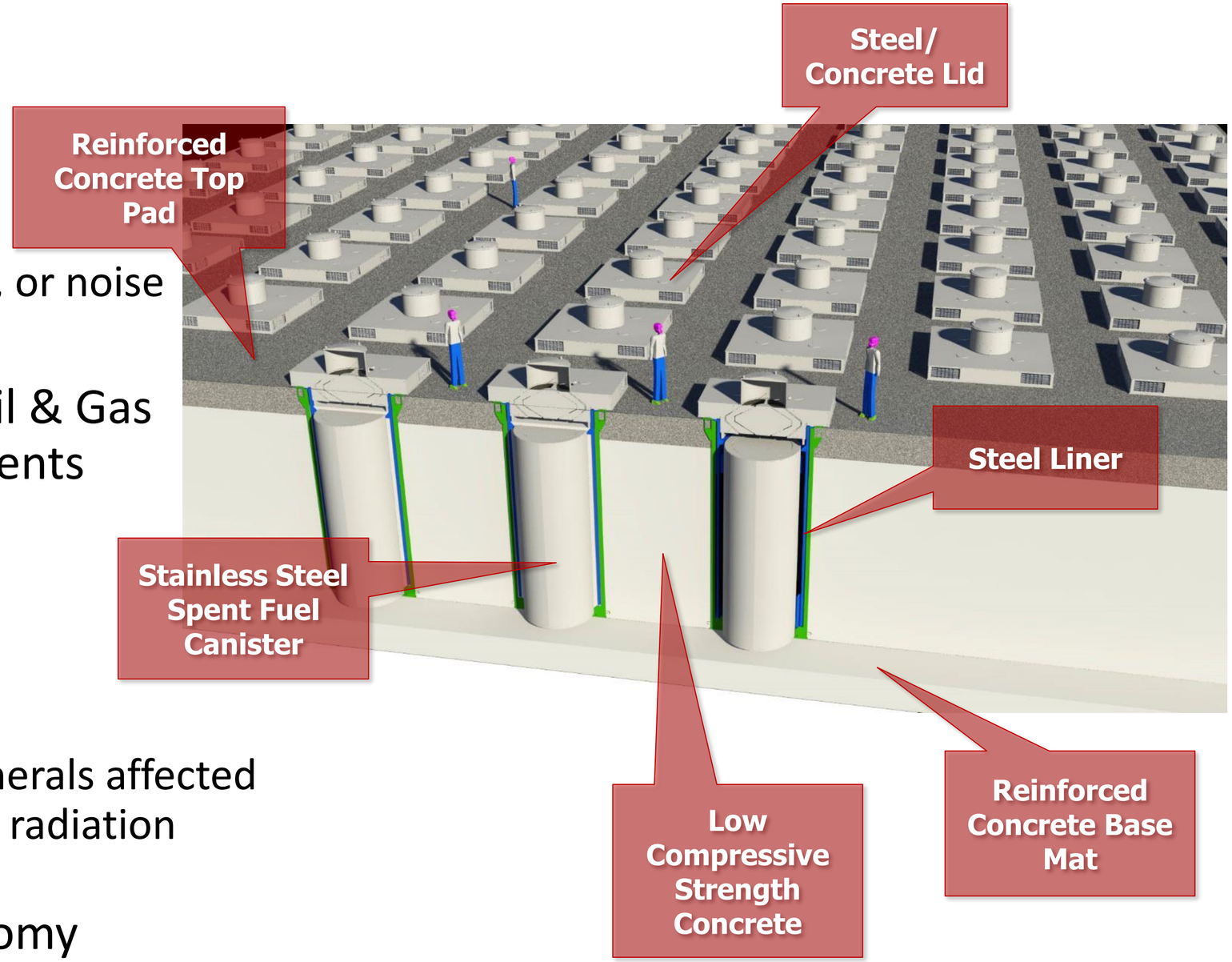


HI-STORM UMAX Construction

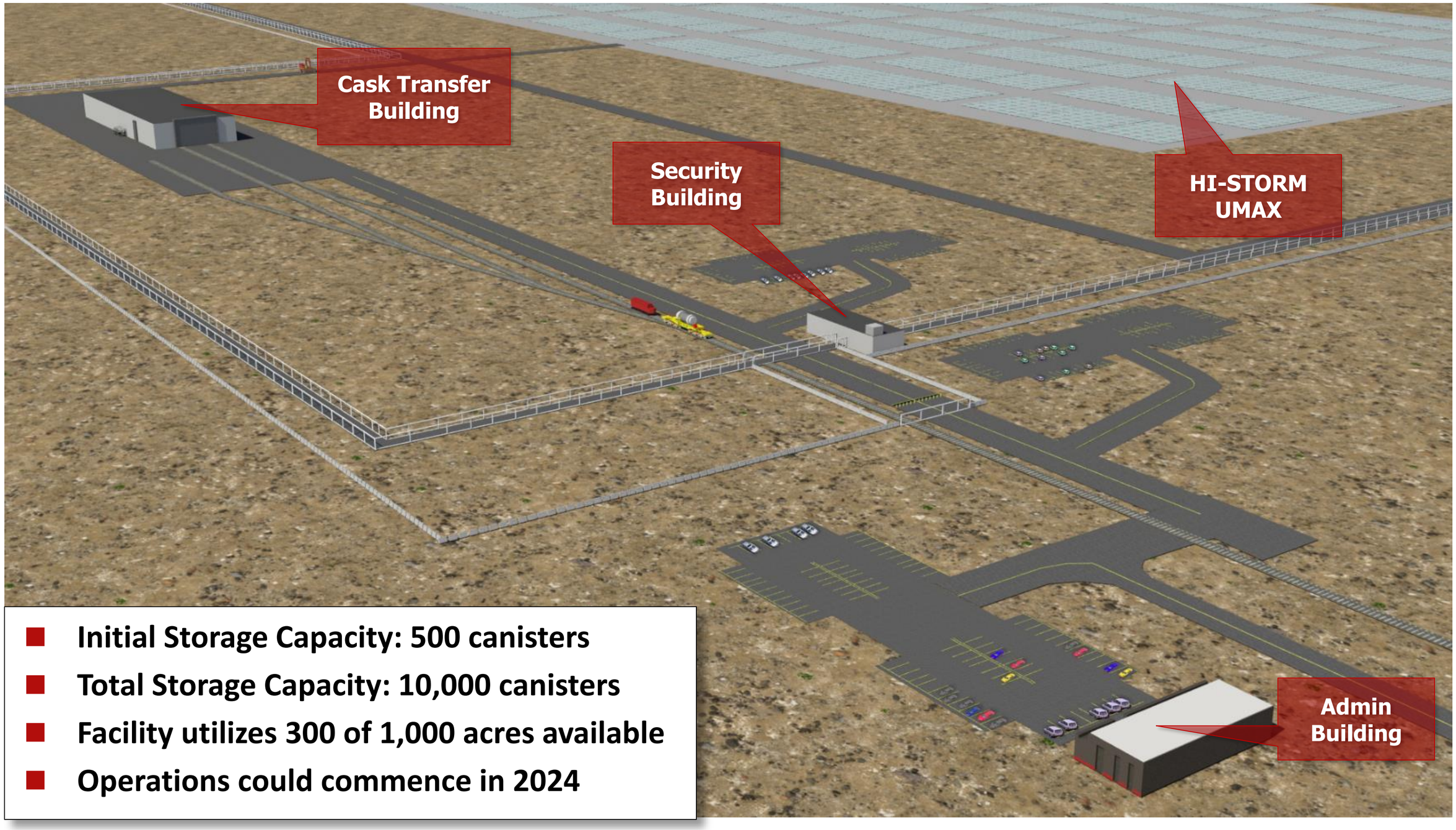
Controlled Low-Strength Material

Pours Complete

Rebar for Top Pad

HI-STORM UMAX Loaded

HI-STORE Site Layout



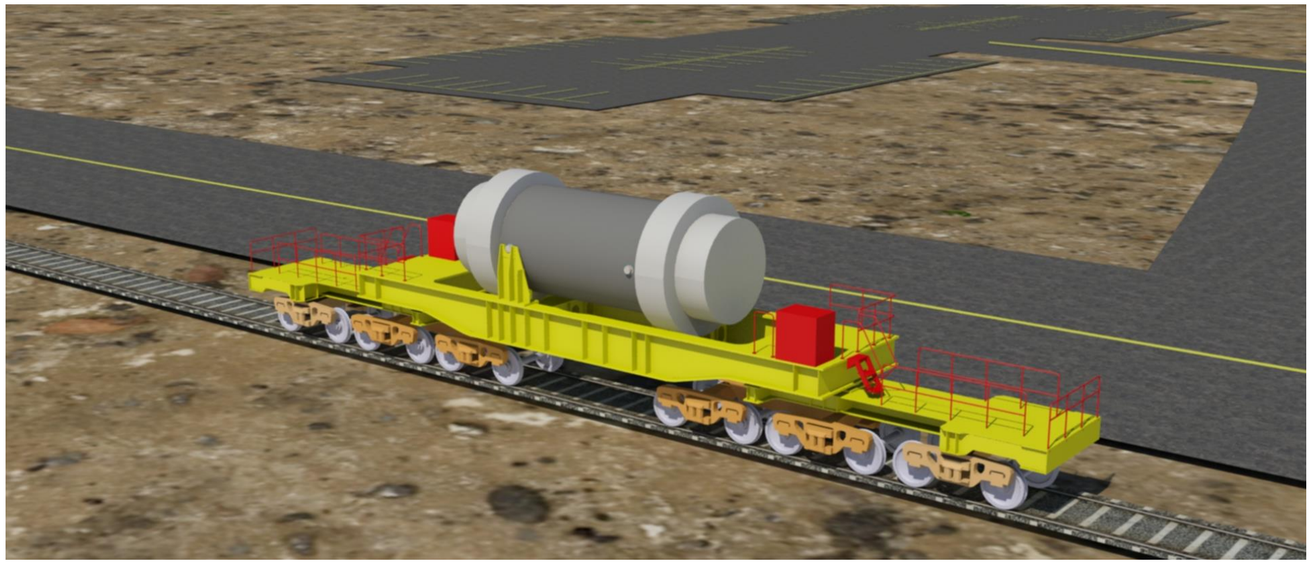
- Initial Storage Capacity: 500 canisters
- Total Storage Capacity: 10,000 canisters
- Facility utilizes 300 of 1,000 acres available
- Operations could commence in 2024

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

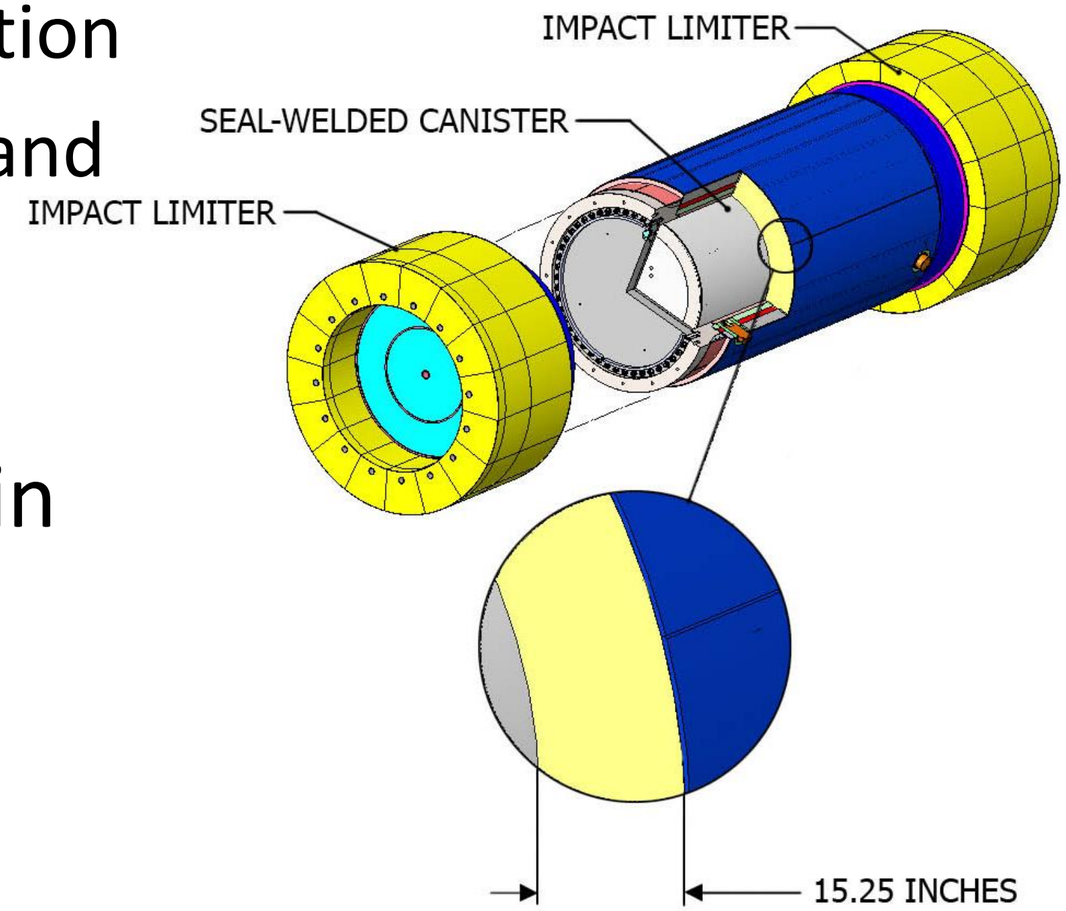


Transportation: Unit Train Consist

- 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



Holtec Transport Cask

- Inside cask SNF is contained in another sealed canister

- Fully loaded casks can weigh 125-210 tons

Atlas Rail Car with HI-STAR 190XL

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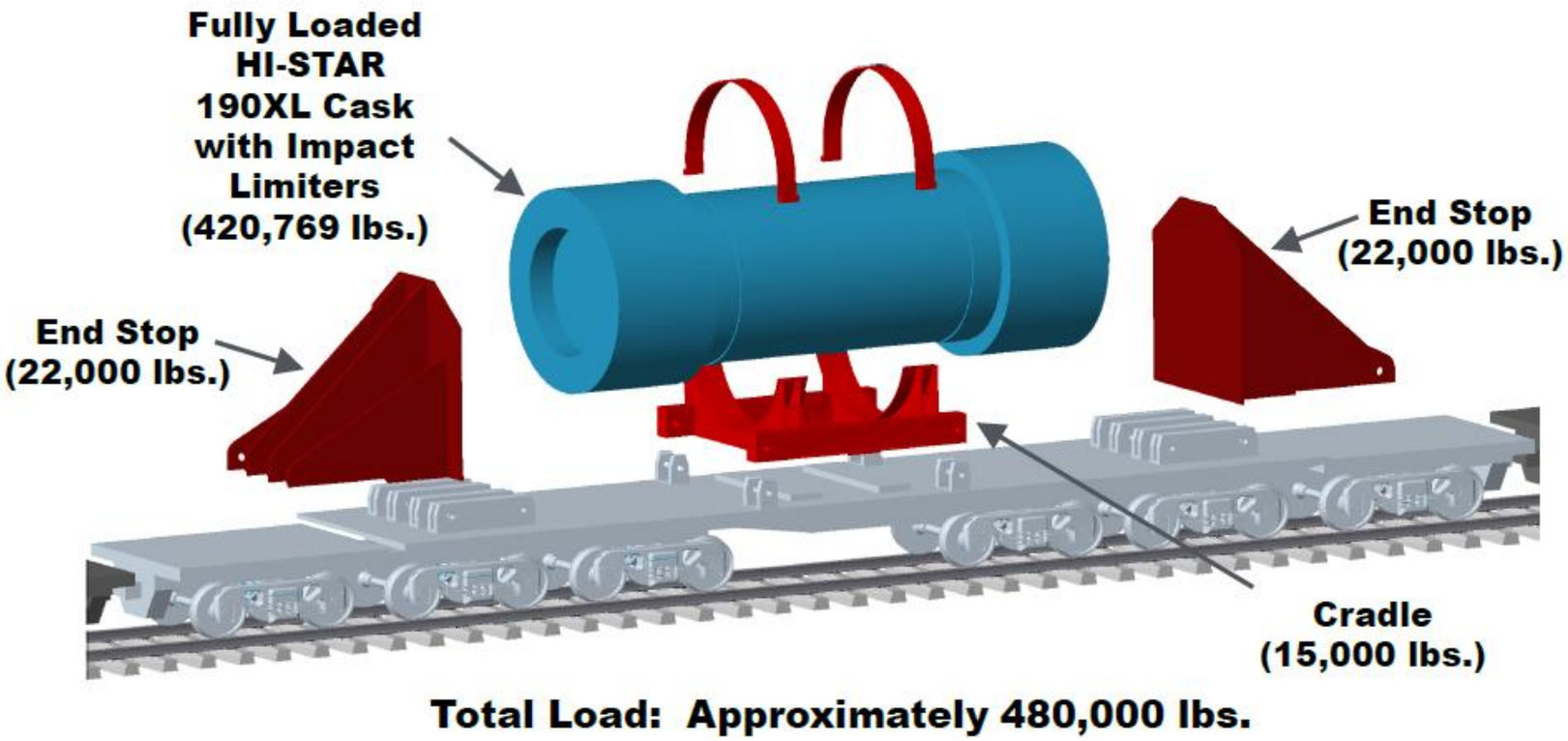
- Railcar with Cask
  - Cask w/transport package: 240 tons
  - Railcar: 97.5 tons
  - Total: 337.5 tons
  - 28 tons/axle
- Dash 9 GE-C44-9W
  - Total: 210 tons
  - 35 tons/axle
- E80 Rail Rating
  - 40 tons/axle

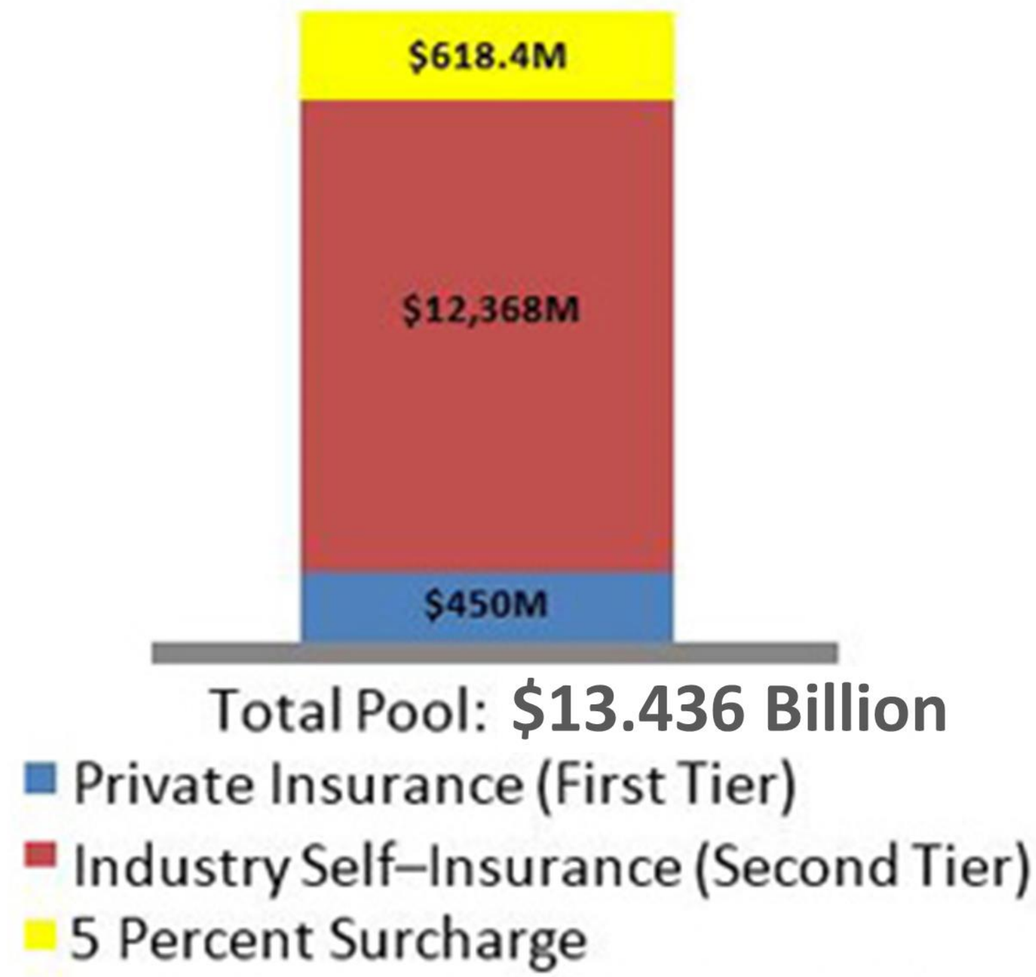


Cask Design Robust & Safe

- 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

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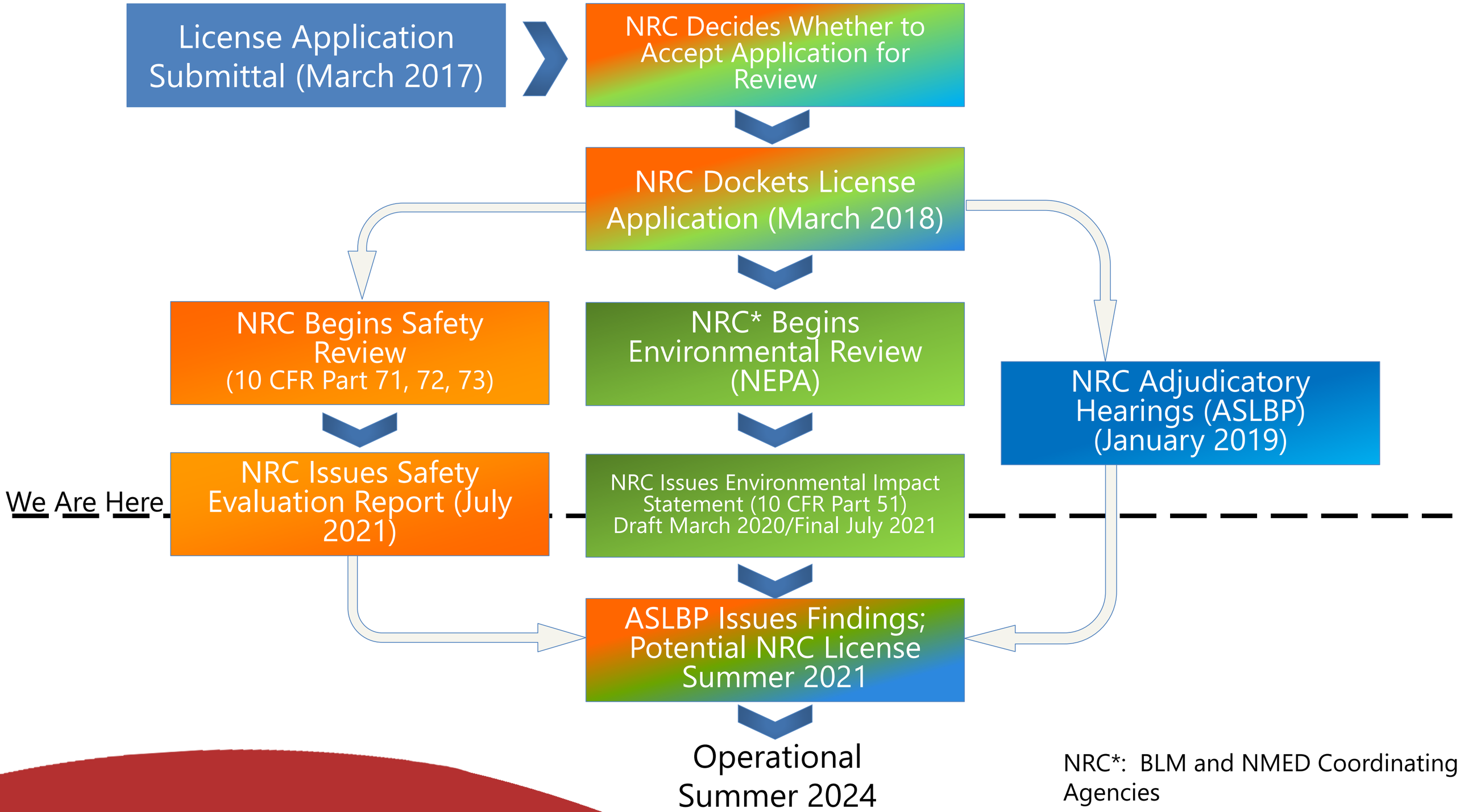
- Decommissioning Fund
  - $24M for Phase 1 - 500 Canisters
  - Regulated by U.S. NRC
  - $840/ton of spent nuclear fuel placed in fund
  - Initial funds plus earnings over life of facility cover cost for complete decommissioning
  - Cost estimate updated every three years
    - Reviewed by U.S. NRC
    - 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



NRC*: BLM and NMED Coordinating Agencies

ASLBP: Atomic Safety and Licensing Board Panel

Questions?

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