

# INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS

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# Topics to be Discussed

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- Dry cask storage overview
- Licensing requirements
- HI-STORM safety review by NRC
- NRC oversight of fuel storage installations

# Dry Cask Storage Overview

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## Nuclear Waste Policy Act

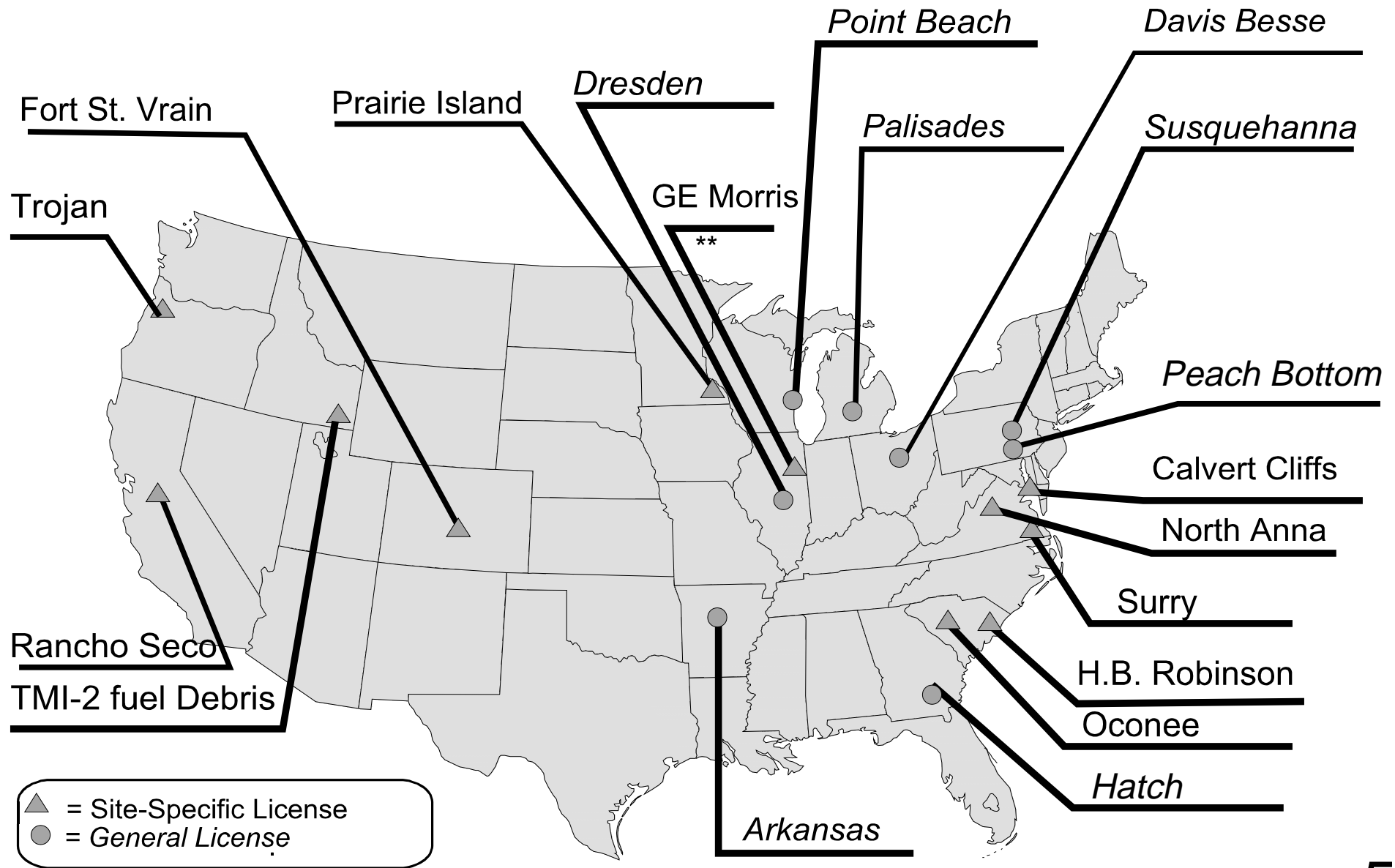
- Required DOE to accept spent nuclear fuel for disposal
- Directed DOE to develop dry storage alternatives for spent nuclear fuel
- Directed NRC to develop a streamlined certification process to minimize the need for site-specific NRC approvals

# Dry Cask Storage Overview

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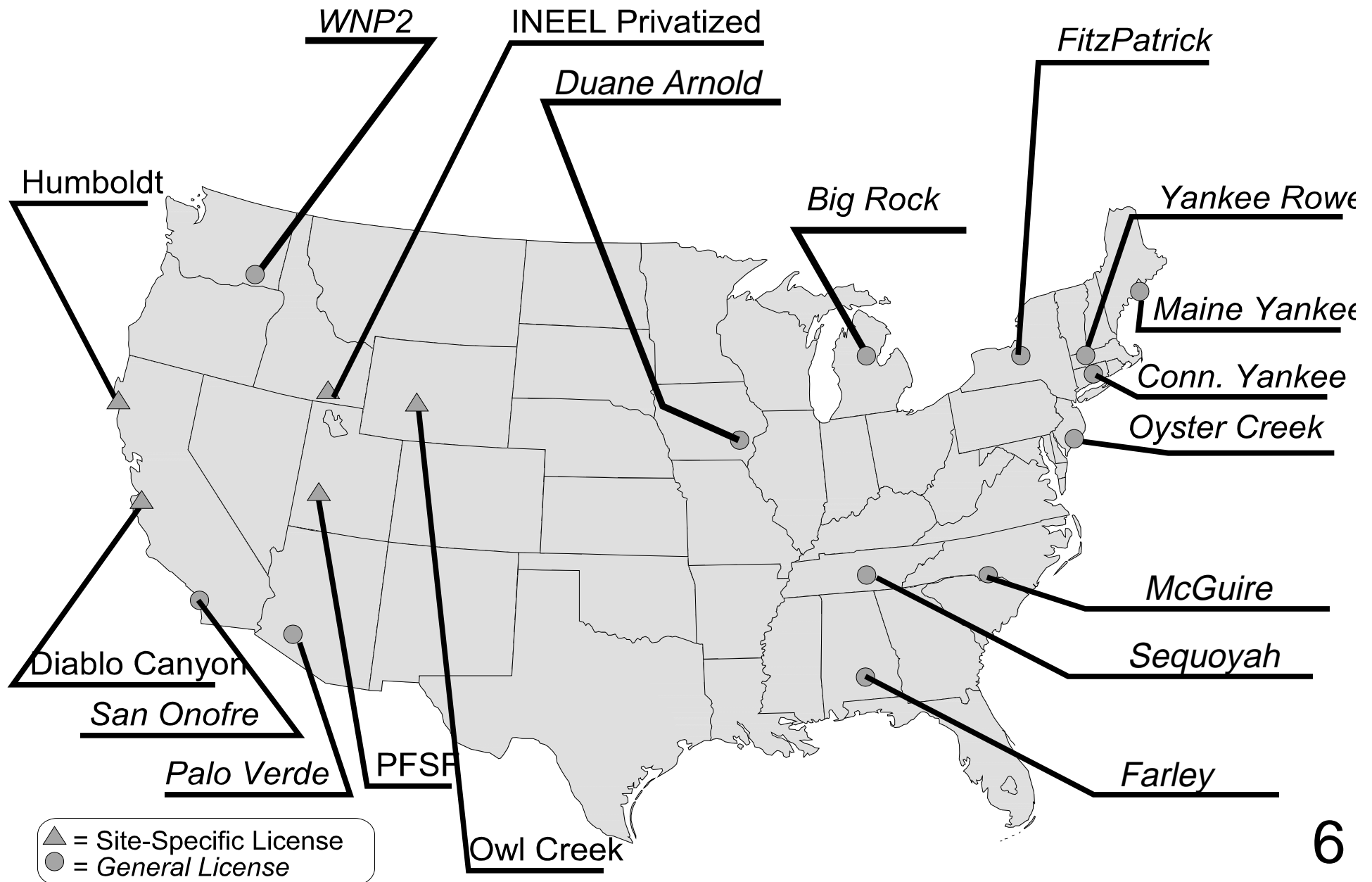
- Increasing need for storage of spent fuel
- Development of independent spent fuel storage installations (ISFSIs)
- Site-specific licensing of spent fuel storage casks
- General licensing of spent fuel storage casks

# Operating Spent Fuel Storage Sites (ISFSI)



\*\* GE Morris uses wet storage

# Potential Near-Term, New ISFSI Sites



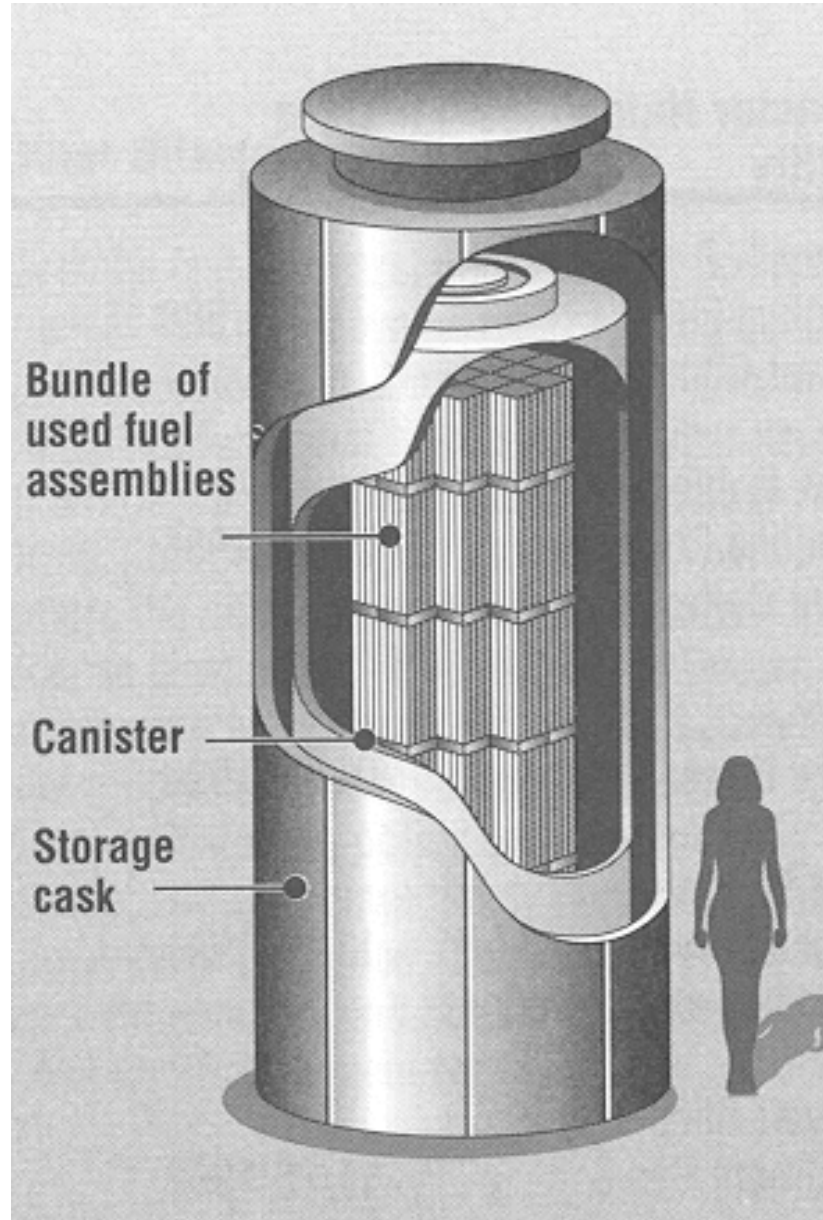
# Dry Cask Storage

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- Casks placed on separate concrete pad in protected area
- Passive system
- Multiple boundaries between fuel and environment
- Licensee performs periodic surveillance

# Typical Dry Cask

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# Typical Cask System/Pad



# Aerial View of Cask System/Pad



# Licensing Requirements

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- Certificate of Compliance process
- Site specific licensing process
- Safety reviews
- General licensing process
- Licensee evaluations

# Certificate of Compliance Process

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(1 of 2)

- A vendor submits a safety analysis report (SAR) for NRC approval
- Vendor application made available for public inspection
- NRC performs safety review
- If acceptable, NRC issues a draft safety evaluation, environmental assessment, and Certificate of Compliance

# Certificate of Compliance Process

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(2 of 2)

- Notice of proposed rulemaking is published in the *Federal Register*
- NRC reviews public comments
- NRC resolves public comments and notice of final rulemaking is published in *Federal Register*
- NRC issues final safety evaluation and Certificate of Compliance

# Site Specific Licensing Process

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- Specified in 10 CFR Part 72, Subpart B
- Applicant submits a license application to NRC containing required information
- NRC issues a Notice of Proposed Action and Opportunity for Hearing
- NRC prepares Environmental Impact Statement or Environmental Assessment, as appropriate
- NRC completes safety evaluation and makes licensing determination

# **NRC Safety Reviews for Both Certificates and Site-Specific Licenses Include:**

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- Operating Procedures
- Accident Analysis
- Radiation Protection
- Quality Assurance
- Emergency Planning
- Physical Security
- Structural
- Thermal
- Shielding
- Criticality
- Confinement
- Materials

# Types of Hazards Considered

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- Off-normal events

- ▶ Include temperature, pressure and partial air flow blockage

- Accidents

- ▶ Include earthquakes, fires, floods, lightning, tornado, complete air flow blockage, and cask drop and tip-over



# General Licensing Process

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(1 of 4)

- General licensing provisions specified in 10 CFR Part 72, Subpart K
- Limited to 10 CFR Part 50 reactor licensees
- No application or issuance of licensing document required

# General Licensing Process

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(2 of 4)

- Use of NRC-certified casks only
- User is responsible for assuring approved cask design and site requirements are compatible
- Extends reactor licensee experience, qualifications, and programs to ISFSI activities

# General Licensing Process

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(3 of 4)

- Reactor (Part 50) license holder informs NRC 90 days prior to first planned loading
- Performs and documents detailed evaluations demonstrating that the NRC approved cask is compatible with specific facility
- NRC inspects pre-operational testing and evaluations

# General Licensing Process

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(4 of 4)

- User loads casks
- User registers each cask with the NRC within 30 days
- User maintains individual cask records
- User maintains casks in accordance with Certificate of Compliance

# Licensee Evaluations

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(1 of 2)

- Evaluates the cask Safety Analysis Report, the NRC Safety Evaluation Report and Certificate of Compliance to ensure that the approved cask is compatible with the selected site. For example,
  - Soil
  - Tornado missiles
  - Earthquake intensity
  - Cask transfer route

# Licensee Evaluations

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(2 of 2)

- Dose assessment to demonstrate compliance with the off-site dose limits
- Evaluate and modify existing programs to support the ISFSI in the following areas:
  - Quality assurance, physical security, emergency planning, training, health physics, procurement and other programs

# HI-STORM 100 Cask System

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- Licensing history
- Physical description

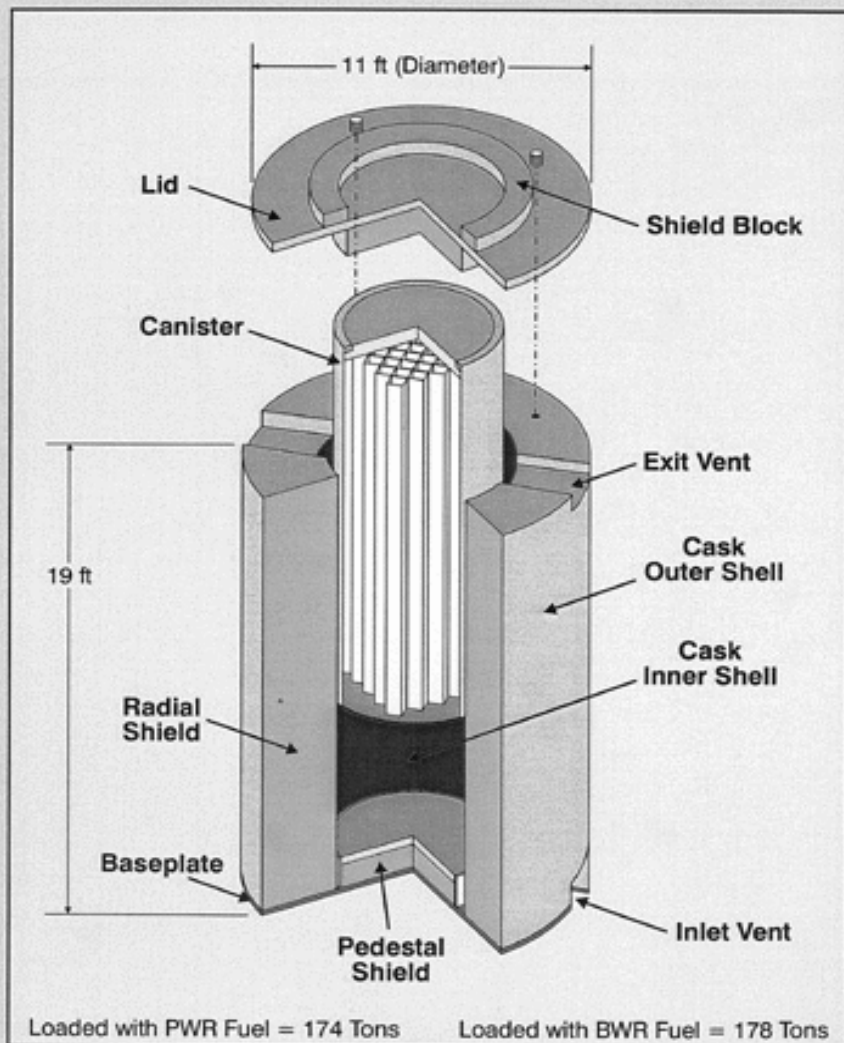
# HI-STORM 100 Cask System

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- Licensing process began with Holtec International submittal on October 26, 1995
- Certificate of Compliance issued by NRC on May 4, 2000 (effective date was May 31, 2000)
- NRC detailed Safety Evaluation Report included with Certificate of Compliance
- Authorization granted for handling and storage of spent fuel using the HI-STORM 100 System at an ISFSI at a reactor site operating with a 10 CFR Part 50 license



# Holtec Hi-Storm® Storage Cask



## Containers for Spent Nuclear Fuel

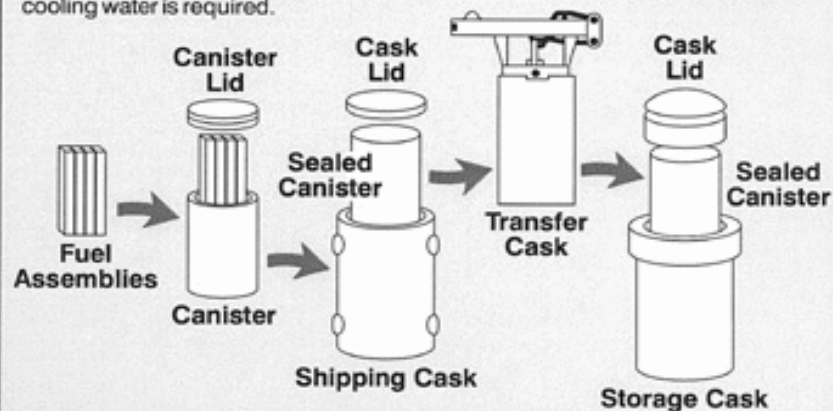
Several types of containers for nuclear fuel are discussed in this DEIS. These include:

**Canisters** are thick-walled, steel cylinders used to package and contain SNF assemblies. Canisters are hermetically sealed by welding them shut. This DEIS discusses "dual-purpose canisters" that can be used for shipping and storing of SNF. That is, once the SNF is sealed into the dual-purpose canister, it would never need to be removed from the canister during interim storage.

**Shipping Casks** are thick-walled, steel cylindrical packages certified by the NRC to transport nuclear fuel.

**Transfer Casks** are radiation-shielded, open-bottomed cylinders used to transfer SNF assemblies from shipping cask into storage casks. All transfer operations would be conducted inside a special room, or "transfer cell," within a closed building. SNF assemblies would be lifted out of the shipping cask into the transfer cask, moved while inside the transfer cask to a position over the storage cask, and then lowered from the transfer cask into the storage cask.

**Storage Casks** are thick-walled, steel or steel and concrete containers certified by the NRC for storing SNF. The types of storage casks discussed in this DEIS are vertical, cylindrical structures that provide radiological shielding. They are equipped with vents and channels that provide cooling by passive, natural convection processes; hence, they require very little maintenance other than periodic inspections. They are sometimes called "dry casks" because no cooling water is required.





# NRC Inspections

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- Pre-operational testing
- First cask loaded
- Each loading campaign
- Periodic review of ISFSI activities

# WWW.NRC.GOV

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- 10 CFR Part 72
- Dry Cask Storage Standard Review Plan (NUREG-1536)
- Standard Review Plan for Spent Fuel Storage Facilities (NUREG-1567)
- Description of Process for "Generally Licensed" Casks
- Radioactive Waste: Production, Storage, Disposal (NUREG/BR-0216)
- NRC Information Digest, NUREG-1350