



# NRC Webinar

## Dry Cask Storage of Nuclear Fuel at Pilgrim Nuclear Power Plant

Dec. 12, 2013



# Overview of Presentation

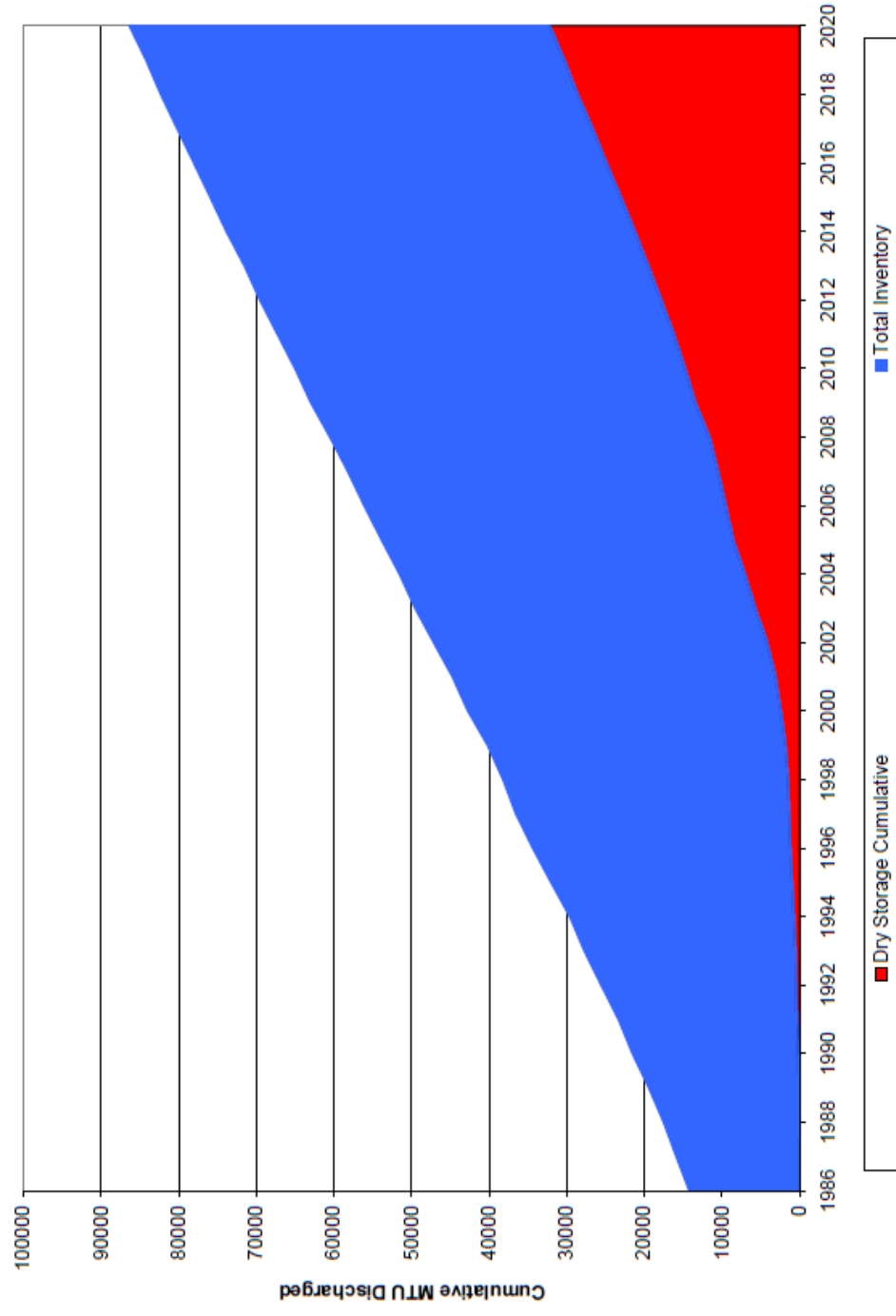
- Dry Cask Storage and How It Works
- Licensing & Certification Process
- NRC Inspection & Oversight
- Plans for Dry Cask Storage at Pilgrim
- Summary

# Why the Need for Dry Cask?

- Reprocessing of spent fuel not an option
- No national repository for spent fuel to date
- Pools meant for temporary storage encounter capacity issues

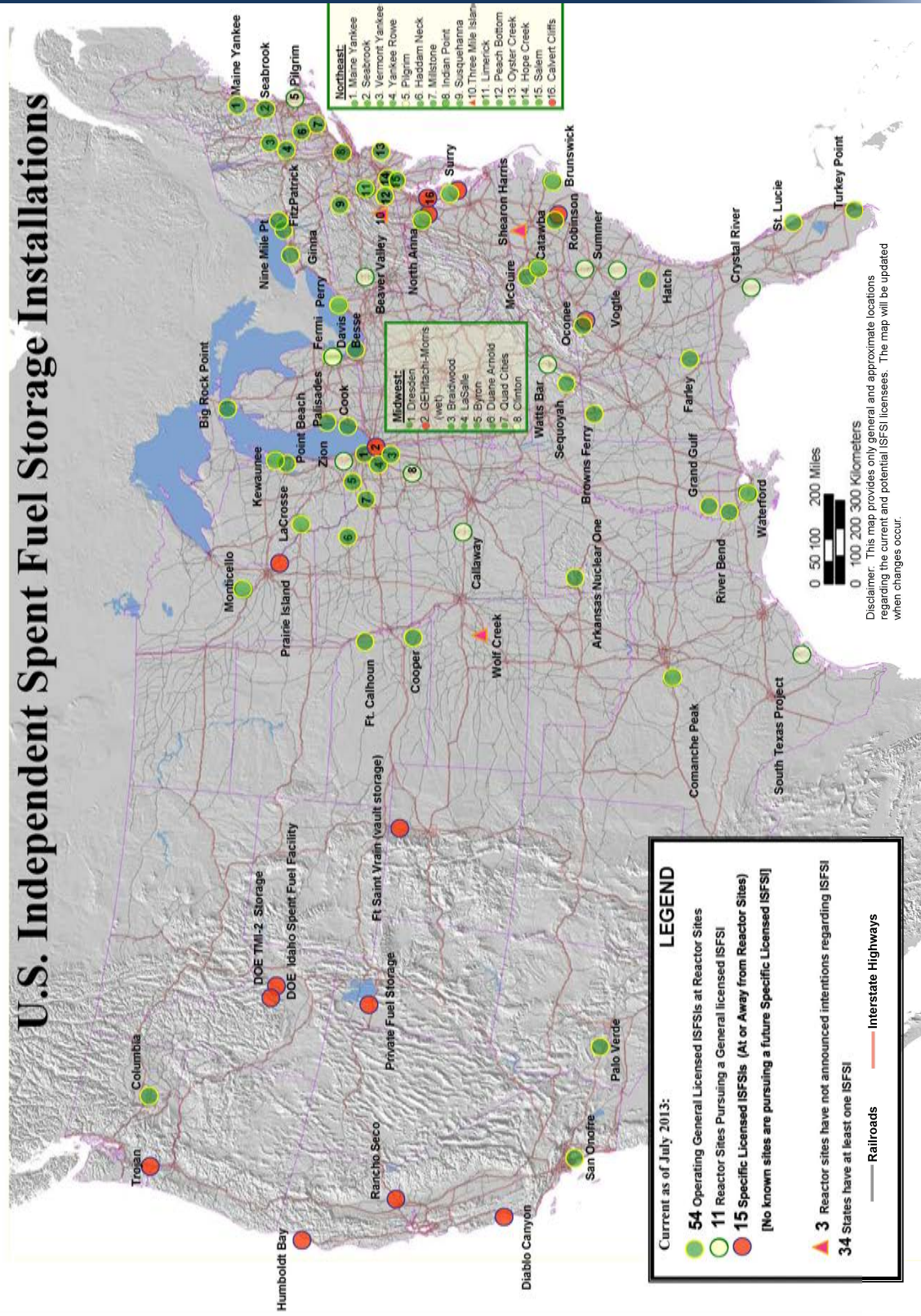


# Historical and Projected SNF Discharges



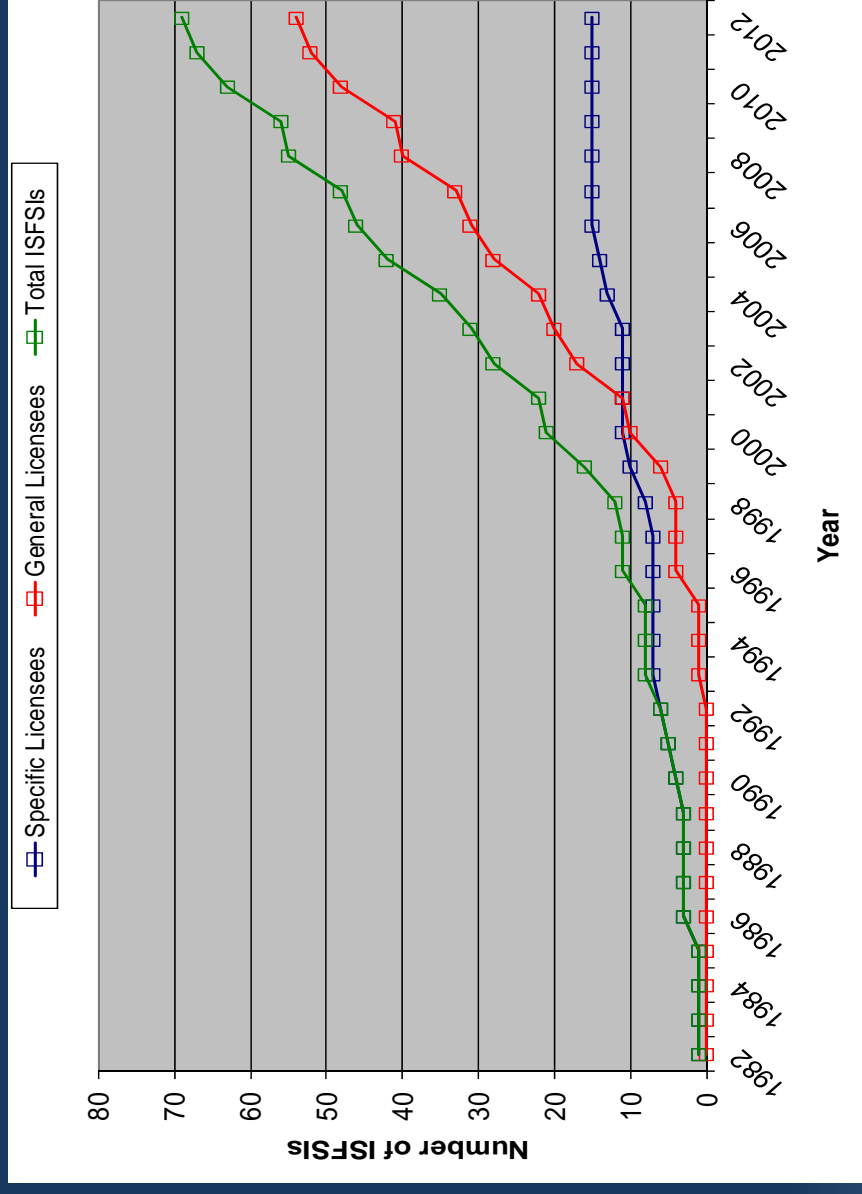


# U.S. Independent Spent Fuel Storage Installations

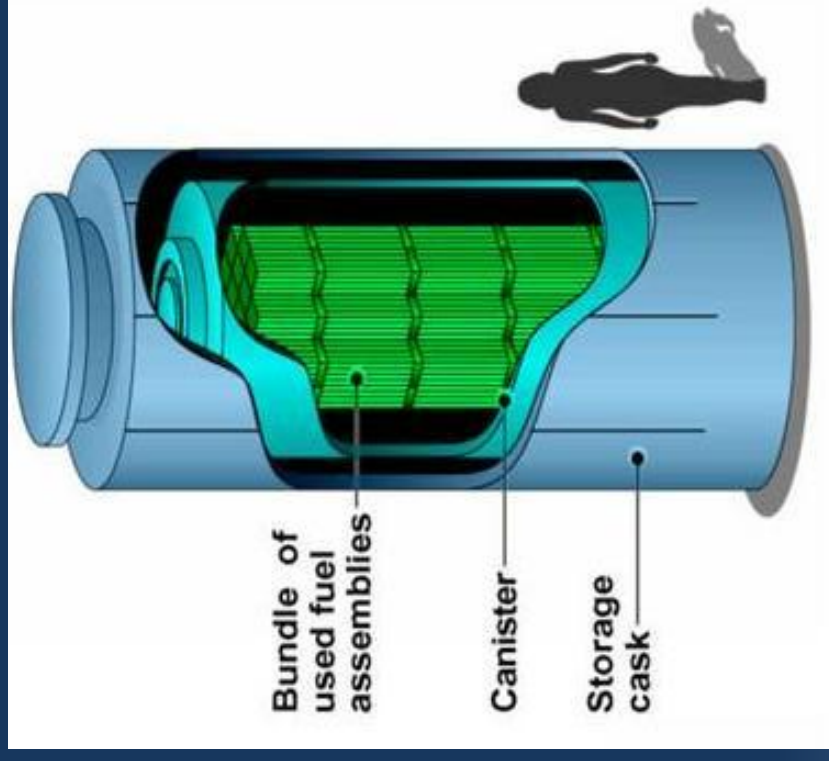
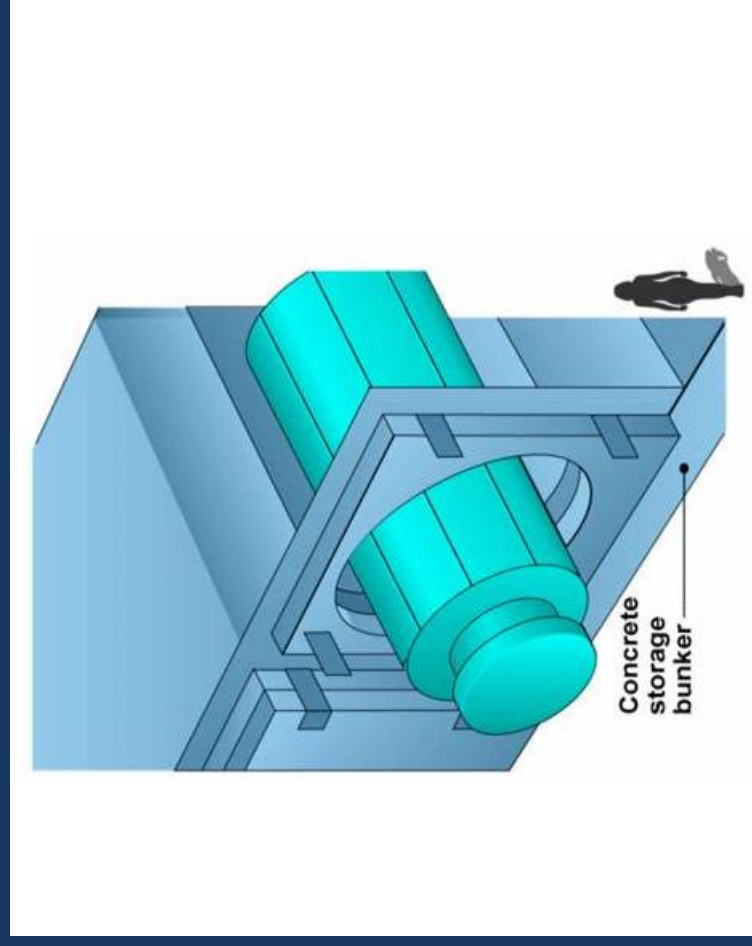


# Dry Cask Storage

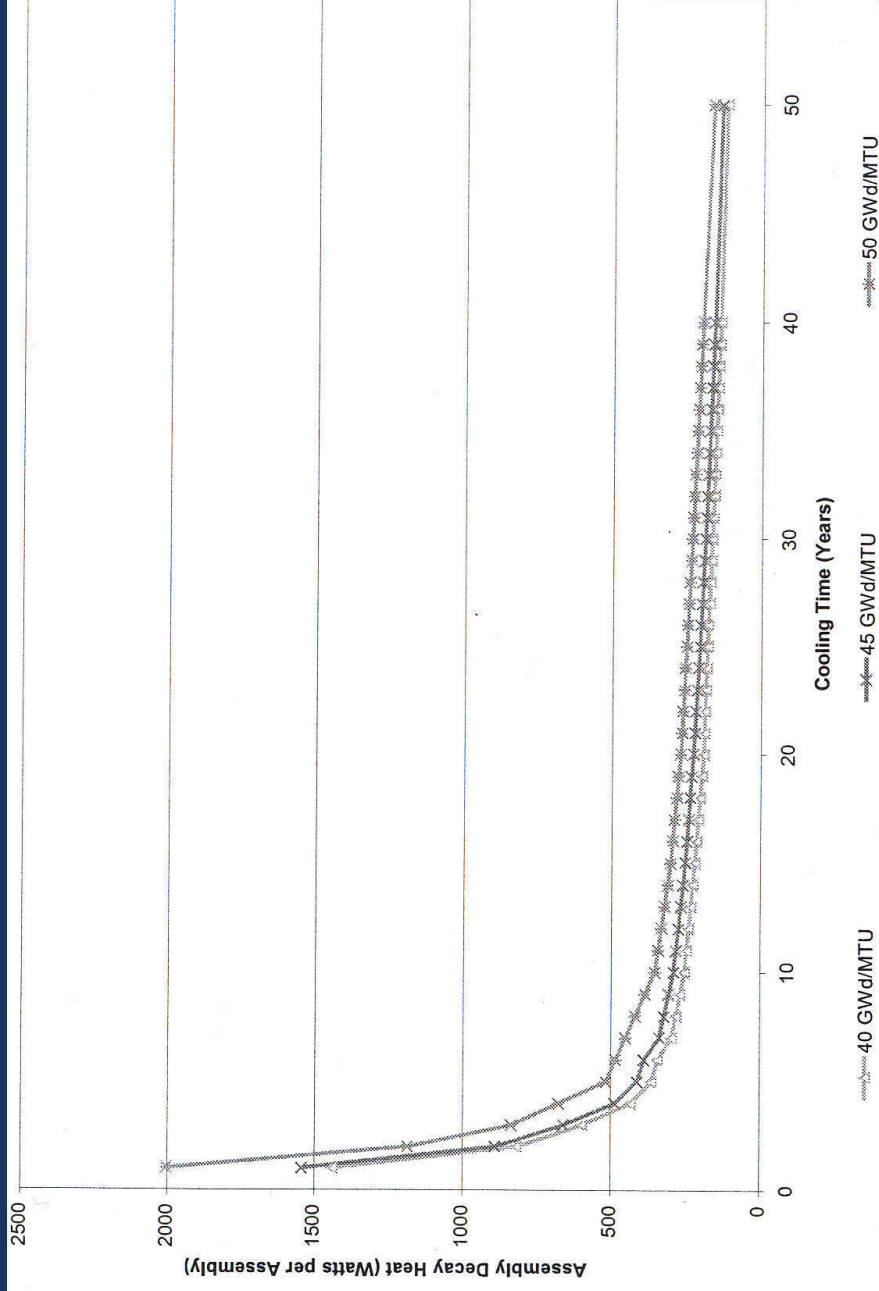
- 65 licensed ISFSI sites in the U.S.
- More than 1,160 loaded dry casks



# Spent Fuel Storage Casks



# BWR Assembly Decay Heat Curve



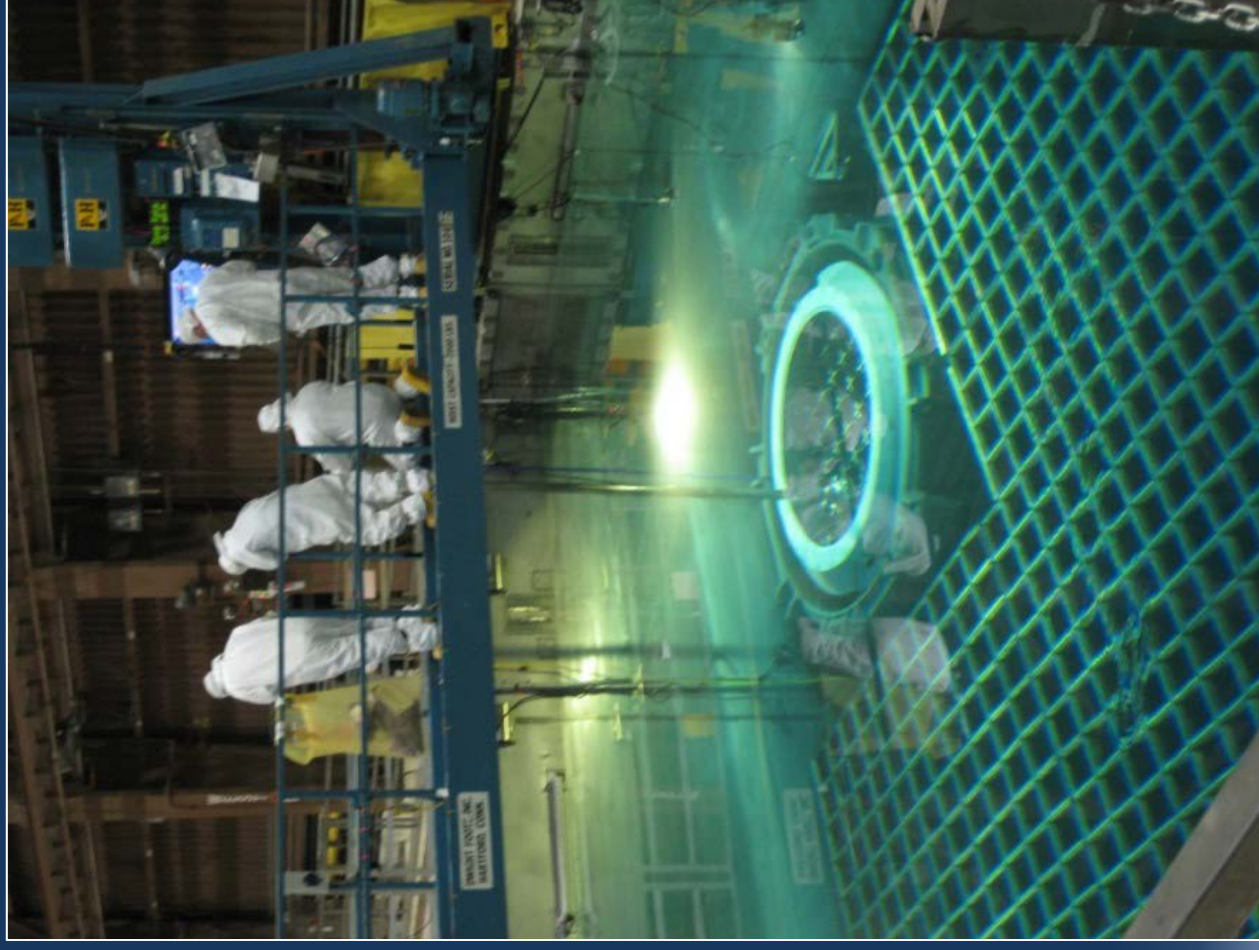
**Figure 2-3**  
**BWR SNF Assembly Decay Heat as a Function of Burnup and Cooling Time [NRC 1999, DOE 1992]**



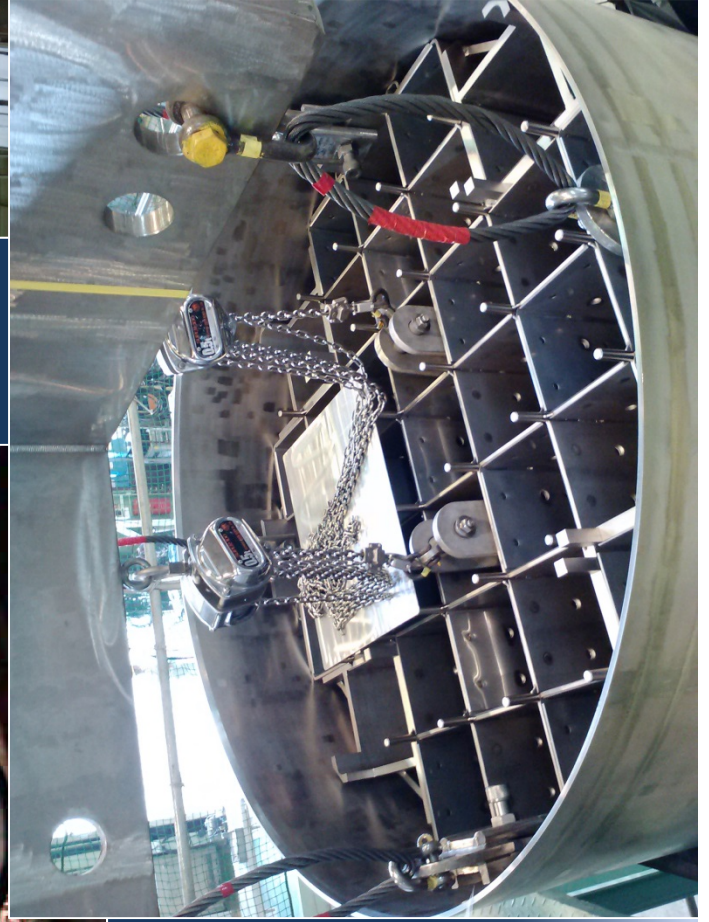
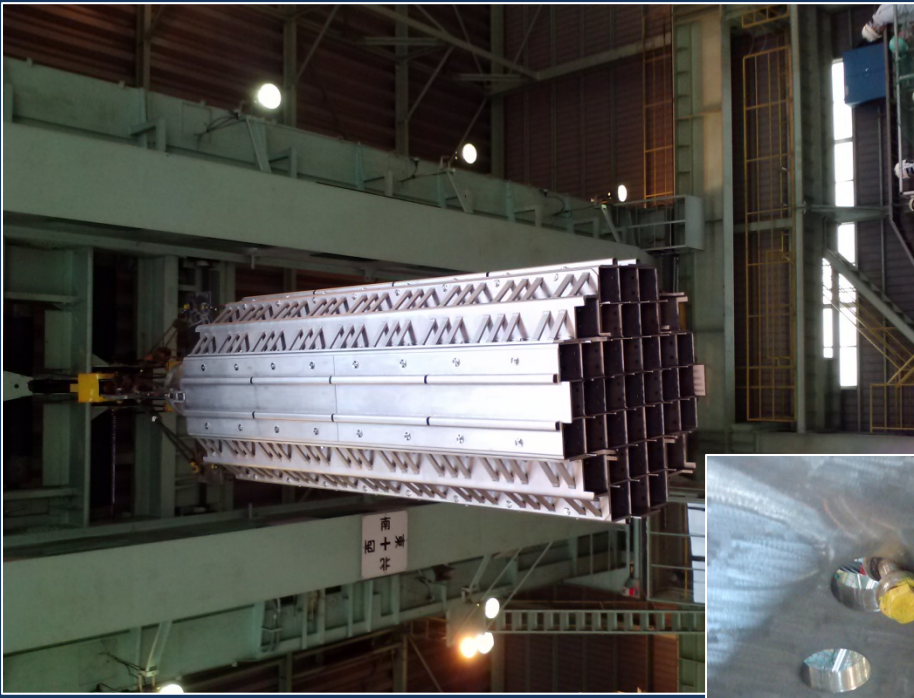
# The Loading Process

Stainless-steel cask  
is placed into pool

Technicians move  
spent fuel  
assemblies into the  
cask

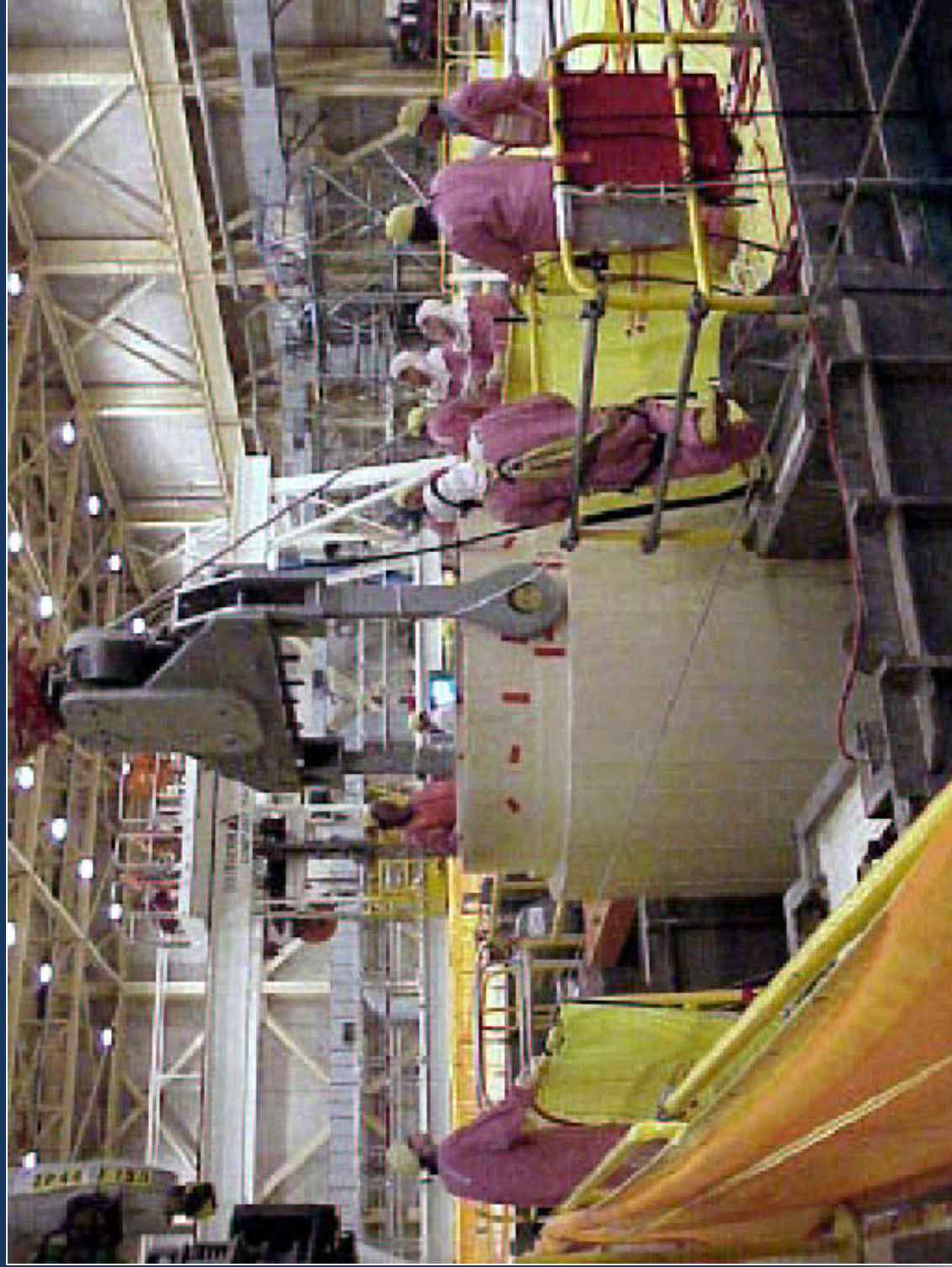














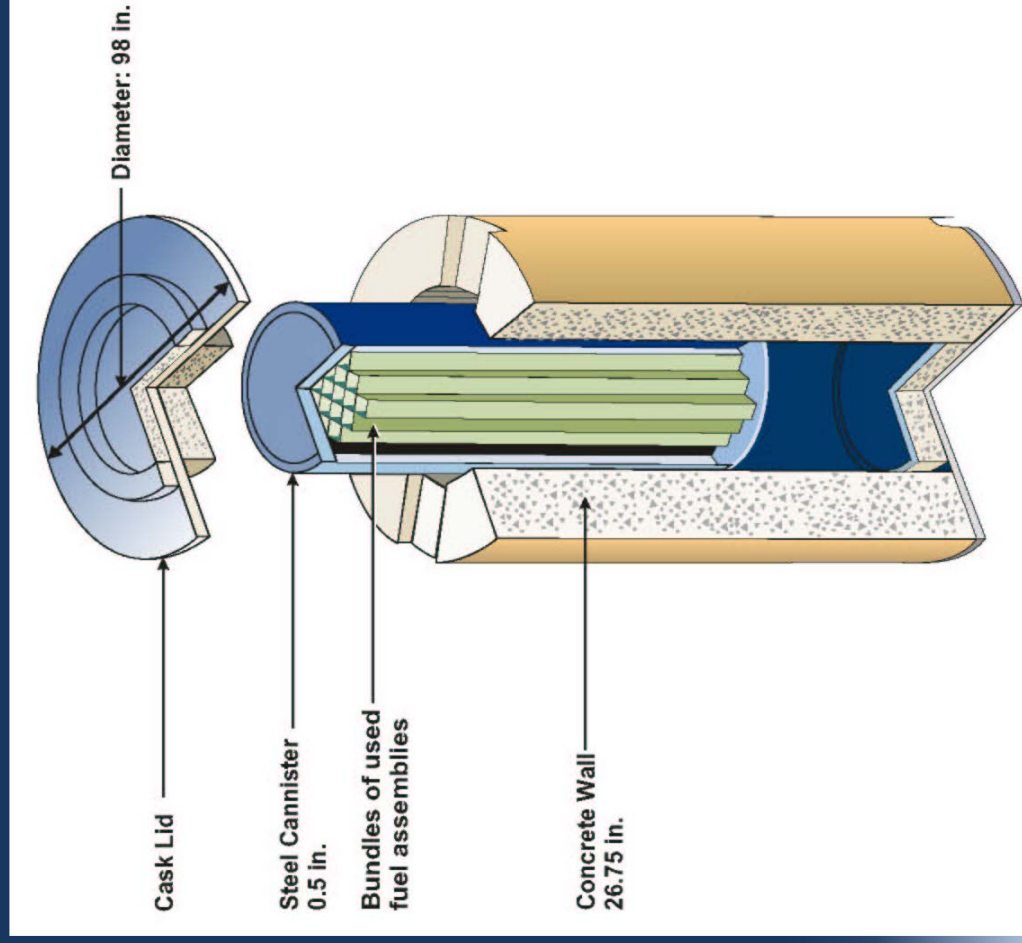


# Transfer of Cask into Overpack





# Welded Canister – Overpack System











# Video of Dry Cask Storage Process



<http://www.youtube.com/watch?v=mLvWVgsgfU>









# ISFSI Licensing Options

Regulated under 10 CFR Part 72

## Two Licensing Options:

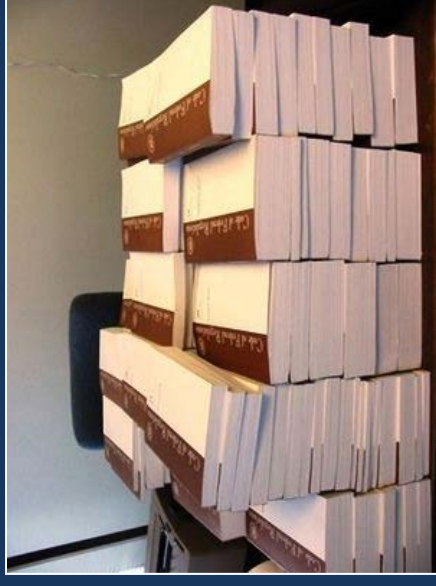
### Site-Specific License:

- Available to any applicants
- Required for away-from-reactor sites
- Application submitted to NRC for approval
- Opportunity for Hearing

### General License (10 CFR Part 72, Subpart K):

- Added in 1990 in response to Nuclear Waste Policy Act of 1982
- Available only to nuclear reactor (Part 50/Part 52) licensees
- Requires use of storage cask certified by NRC through rulemaking (72.214)
- Requires site evaluation for compatibility with cask design, subject to inspection (72.212)

**This is the option that Entergy is pursuing for Pilgrim**





# Storage Cask Licensing & Certification Process

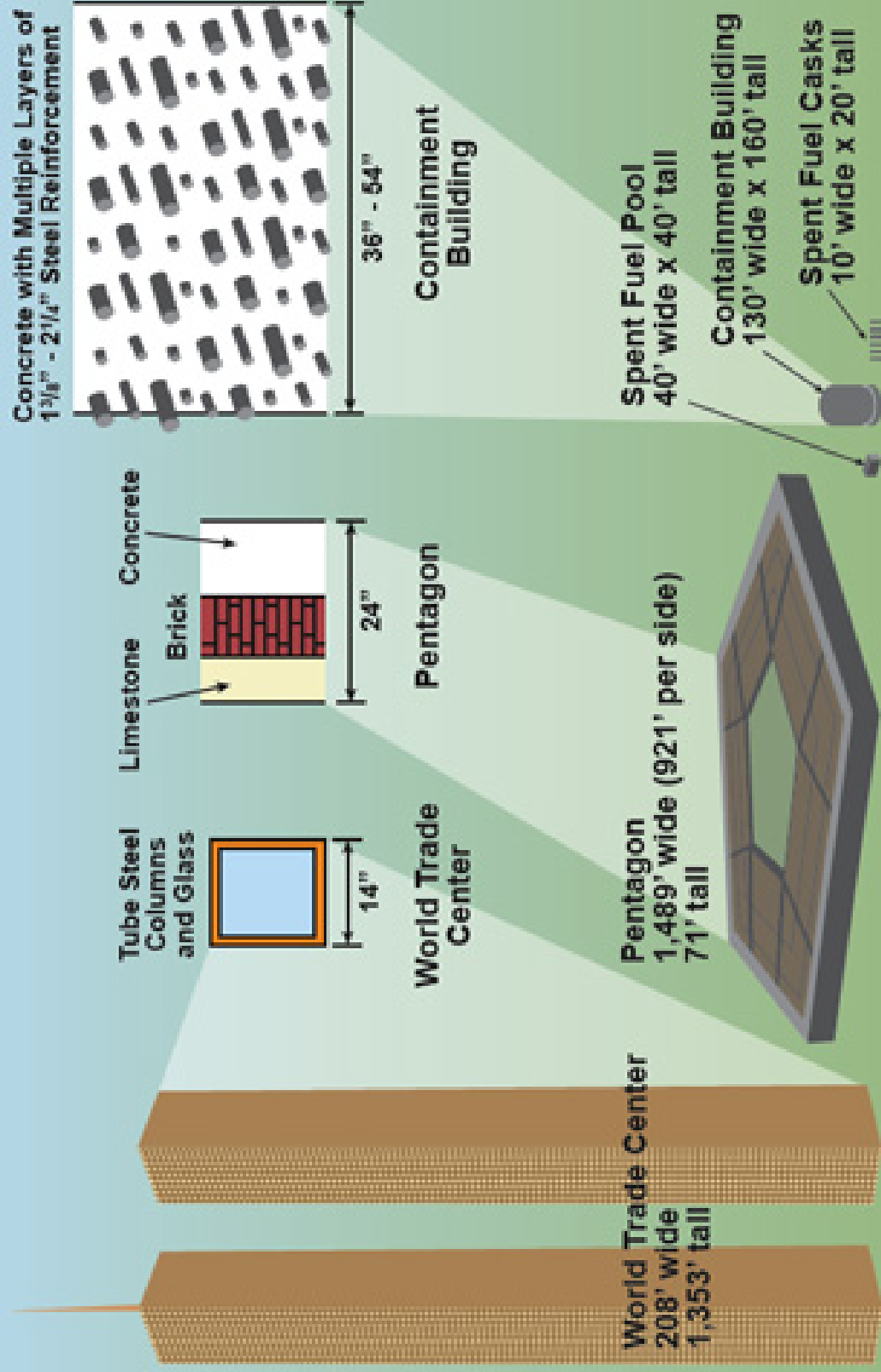
- Technical Areas Considered:
  - Structural - Thermal
  - Shielding - Criticality
  - Confinement - Materials
  - Quality Assurance
- Accidents Considered:
  - Earthquakes - Fires
  - Floods - Lightning
  - Tornado – Air Flow Blockage
  - Cask Drops – Cask Tip-Over

# Flooding Evaluation for Dry Cask Storage



- Casks must be designed to withstand severe flooding

## Comparing Sizes and Construction







# NRC Inspection & Oversight

- Vendor design and fabrication programs inspected every 3 years by headquarters inspectors
- Initial ISFSI operations program inspected by headquarters and regional inspectors during pad construction through first cask loading
- ISFSI operations program inspected every 2 years by regional inspectors
- Resident Inspectors perform day-to-day oversight of plant operations





# Pilgrim Dry Cask Storage Plans

- General License (10 CFR Part 50 & 72)
- 18th ISFSI in Region I
- Plant Modifications & Construction in Fall 2013-Spring 2014
- Cask Loading in Summer/Fall 2014
- Initial Campaign - 3 Casks



## Summary

- Since the late 1980s, plant owners have effectively demonstrated that they can safely load spent fuel into dry cask storage systems and transfer loaded casks to ISFSIs
- Pilgrim plans to construct and operate an ISFSI in accordance with the NRC's General License requirements
- NRC has extensive experience in the regulation and oversight of ISFSIs and plans to perform ongoing and comprehensive inspection activities at Pilgrim



# Questions

Questions may  
also e-mailed to  
[opa1@nrc.gov](mailto:opa1@nrc.gov)