Overview of Spent Fuel Storage Safety and Security

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Overview

- History of Independent Spent Fuel Storage Installations (ISFSIs)
- Status of Independent Spent Fuel Storage Installations
- Safety and Security of Spent Fuel Storage
- Licensing Requirements of Spent Fuel Storage
- Regulatory Environment of Spent Fuel Storage
- Changes to National Strategy in Spent Fuel Management
- Status of Private Fuel Storage (PFS)

History of Independent Spent Fuel Storage Installations (ISFSI)

- 10 CFR Part 72 promulgated in 1980
- G. E. Morris licensed in 1982 as first away-from-reactor ISFSI (wet storage)
- Surry Nuclear Power Plant ISFSI licensed in 1986 as first dry storage ISFSI
- Part 72 General License Authorized in 1990
- Multipurpose canister concept developed in early to mid 1990s
- 12 ISFSIs licensed by 1999
- Over 50 ISFSIs projected by 2010 as power plants continue to need expanded spent fuel storage capacity

Status of Independent Spent Fuel Storage Installations

- 43 Licensed ISFSIs in 27 States
- 13 announced plans for new ISFSIs
- Over 800 loaded dry casks
- 15 approved storage cask designs
- 8 dual purpose (storage & transportation) cask designs

ISFSI Safety Record

- First cask placed in service July 1986
- Typical operating power plant loads 3-5 casks per refueling outage.
- Continued NRC inspection and monitoring of cask loading activities.
- Outstanding safety record - No spent fuel storage cask releases
- Passive systems of dry cask storage pose small risk

Spent Fuel Storage Safety Achieved Through:

- Established legal and regulatory framework
- Regulations, guidance and orders provide framework for safe management
- Rigorous technical and regulatory review
- Inspections, audits, surveys, and continued questioning attitude confirm safe practice
- Collaborative research with DOE and industry on evolving technical issues
- Constant focus on public outreach efforts

Spent Fuel Storage Security

- Following 9/11, NRC issued advisories and orders for increased security measures at spent fuel storage sites, including, for example:
  - Increased guards and patrols
  - Augmented security forces and capabilities
  - Installation of additional barriers
- NRC conducted security assessments of spent fuel storage casks
- NRC has enhanced coordination with Federal, State and local response and law enforcement organizations

Spent Fuel Storage Modes: Wet vs. Dry Storage

- Spent fuel can be safely stored in wet storage (pools) and dry storage (casks), and both are reliable options for spent fuel storage
- Wet storage is an essential component of safe spent fuel management
- NRC views dry storage as an accepted method for supplementary storage at operating plants

ISFSI Licensing Requirements

- Site Specific Licensing
  - Available to Part 50 (reactor) licensees and other applicants
  - 15 site-specific licenses issued
  - Application Submitted to NRC
    - Safety Analysis Report
    - Environmental Report
  - Opportunity for Hearing Provided

ISFSI Licensing Requirements

- General Licensing
  - Applicable only to Part 50 (reactor) licensees
  - 28 generally-licensed ISFSIs
  - Requires use of NRC-certified casks
  - No further NRC license review required
  - Requires licensee site evaluation for compatibility with cask design

Regulatory Environment of Spent Fuel Storage

- Nuclear power plants reaching pool capacity
- Increasing complexity of storage cask design applications
- Uncertainty about timing and availability of disposal
- Significant public interest in storage and transportation of spent fuel
- New proposals for spent fuel management

Changes to National Strategy for Spent Fuel Management

- Global Nuclear Energy Partnership
- Transport, Aging and Disposal Canister
- Possible Consolidation of Interim Storage Facilities

Integral Spent Fuel Management Strategy

- Need to preserve flexibility and alternatives for spent fuel management
- Final choice complex because of societal, political, and resource issues
- Regulatory processes must be ready to consider all realistic alternatives
- Requires investment of national resources

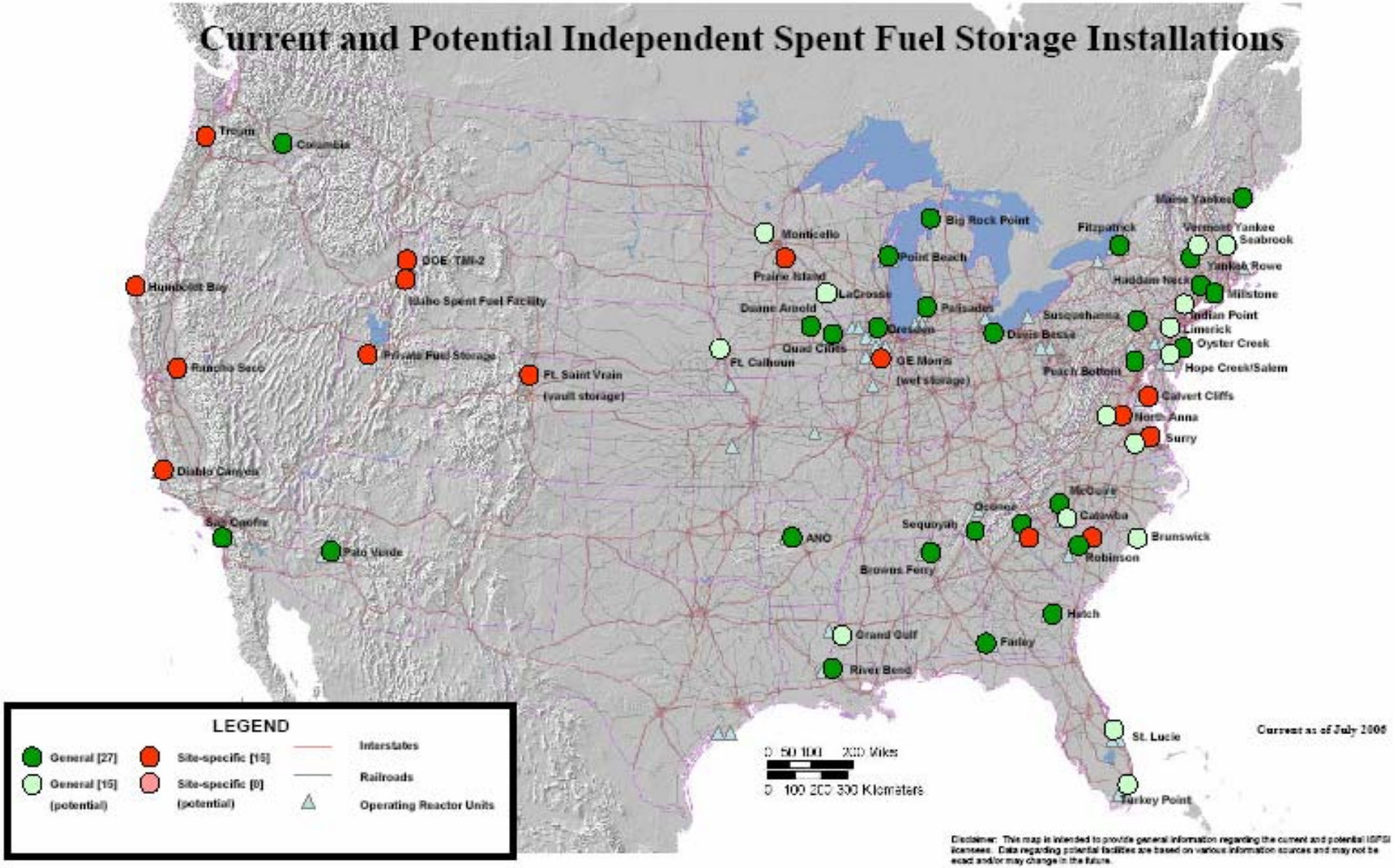
Status of Private Fuel Storage

- Application received: June 1997
- NRC Staff's Final Safety Evaluation Report and Final Environmental Impact Statement issued: December 2001
- Hearing held before Atomic Safety and Licensing Board in 2000-2005
- NRC issued the PFS license 2/21/06
- The State of Utah filed a Petition before the U.S. Court of Appeals, District of Columbia Circuit, for review of NRC's decision to authorize the PFS license
- PFS is required to obtain BIA final approval of lease and BLM approval of right-of-way for rail line

Summary

- NRC ensures that spent fuel storage, regardless of method (wet or dry), is safe and secure
- Process for licensing spent fuel storage facilities is well understood and practiced
- NRC continues to monitor the changes to the national strategy for spent fuel management
- First away-from-reactor ISFSI (PFS) is example of process for licensing consolidated interim storage site

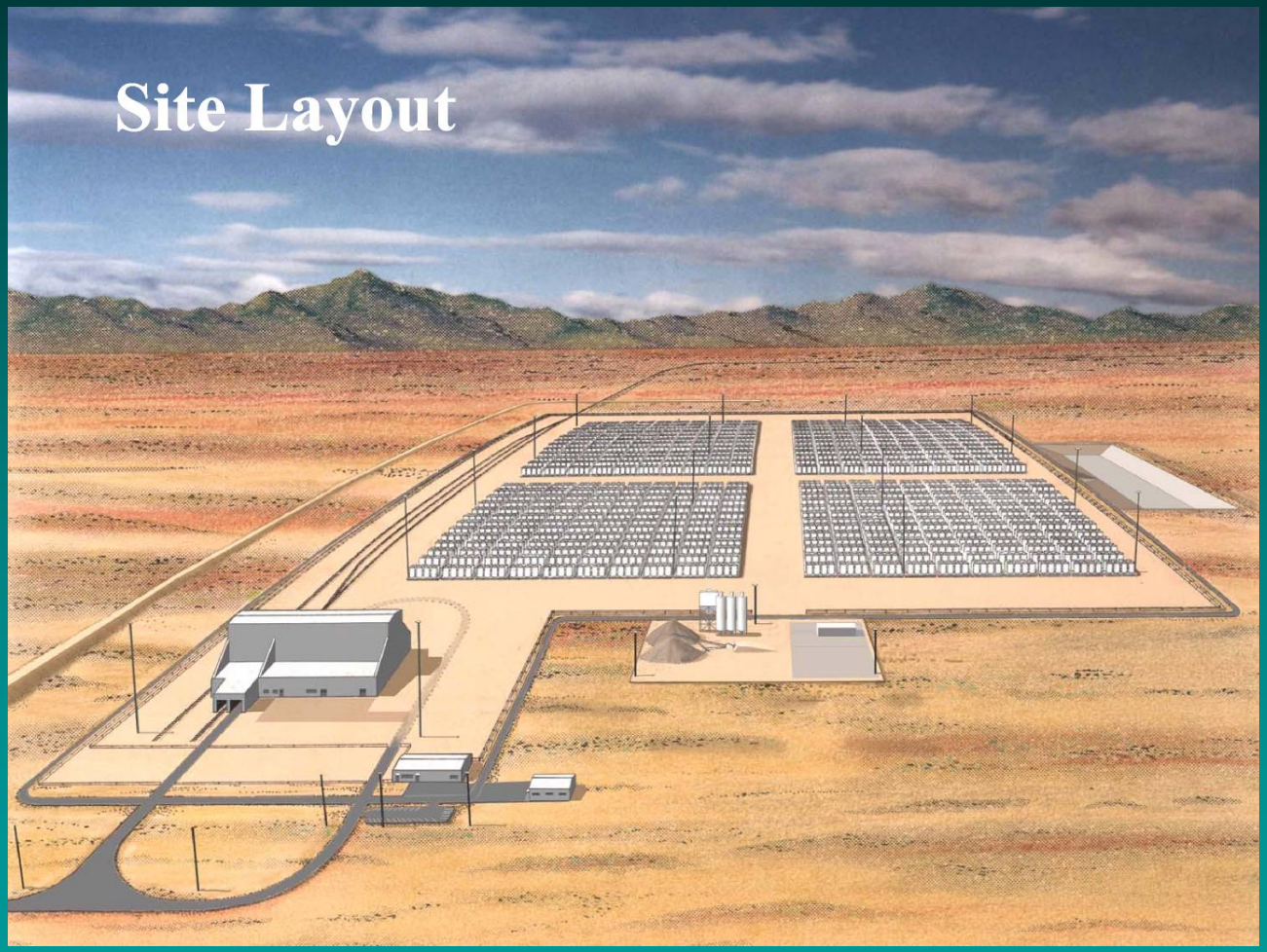
Background Slides


Current and Potential Independent Spent Fuel Storage Installations
Trojan
Columbia
Humboldt Bay
DOE: TMI-2
Idaho Spent Fuel Facility
Private Fuel Storage
Rancho Seco
FL Saint Vrain
(vault storage)
Diablo Canyon
San Onofre
Palo Verde
Monticello
Prairie Island
LaCrosse
Duane Arnold
Quad Cities
FL Calhoun
Big Rock Point
Point Beach
Oconee
Palisades
Oyster Creek
GE Morris
(wet storage)
Davis Besse
Susquehanna
Peach Bottom
Fitzpatrick
Maine Yankee
Vermont Yankee
Seabrook
Yankee Rowe
Haddam Neck
Millstone
Indian Point
Limerick
Hope Creek/Salem
Calvert Cliffs
North Anna
Surry
McGuire
Catawba
Brunswick
Robinson
Sequoyah
ANO
Browns Ferry
Hatch
Grand Gulf
Farley
River Bend
St. Lucie
Turkey Point
LEGEND
General [27]
General [15] (potential)
Site-specific [15]
Site-specific [0] (potential)
Interstates
Railroads
Operating Reactor Units
0 50 100 200 Miles
0 100 200 300 Kilometers
Current as of July 2006
Disclaimer: This map is intended to provide general information regarding the current and potential ISFSI licensees. Data regarding potential facilities are based on various information sources and may not be exact and/or may change in the future.

Spent Fuel Storage Facilities

Sector	Type	Number of Facilities	Inventory (MTHM)
Government	Pool Storage	2	52
	Dry Cask Storage	11	2,399
	Research and Test Reactors	6	1
Commercial	University Research Reactors	30	1
	Other Research and Test Reactors	5	<1
	At-Reactor Storage Pools	99	49,000
	Independent Spent Fuel Storage Facilities (ISFSI)	42	6,200

PFS Facility



How Many Yucca Mountains?

Number of Repositories Needed at 70,000 Metric Tons Each*

Nuclear Futures		Existing License Completion	Extended License Completion	Continuing Level Energy Generation	Continuing Market Share Generation	Growing Market Share Generation
Cumulative discharged fuel in the year 2100 (metric ton)		100,000	120,000	250,000	600,000	1,400,000
		Existing Reactors Only		Existing and New Reactors		
No Recycle	Once-Through	2	2	4	9	20
	Once-Through, High Burnup Fuels	2	2	3	7	17
Reprocessing and Recycle	Limited Recycle, High Burnup Fuels	Recycle Not Recommended		2	5	10
	Transitional and Sustainable Recycle			1	1	1

Extended License Completion – Nuclear plants are retired after 60 years

Continuing Level Energy Generation – Replacement plants are built as current plants retire

Continuing Market Share Generation – Replacement plants and additional plants are built to maintain nuclear energy's 20% electricity market share (1.8% growth)

Growing Market Share Generation – Nuclear market share grows, both for electricity and for hydrogen production (3.2% growth)

*This data was obtained from DOE (2006).