



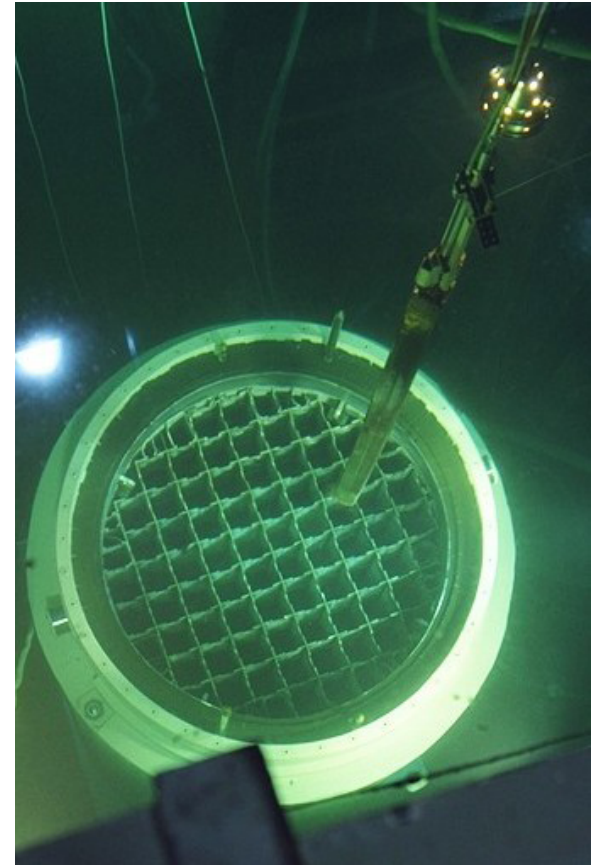
# **Spent Fuel Storage and Transportation - Regulatory Perspectives -**

**Michael D. Waters**  
**U.S. Nuclear Regulatory Commission**

**2012 ANS Annual Meeting**  
**- June 26, 2012 -**

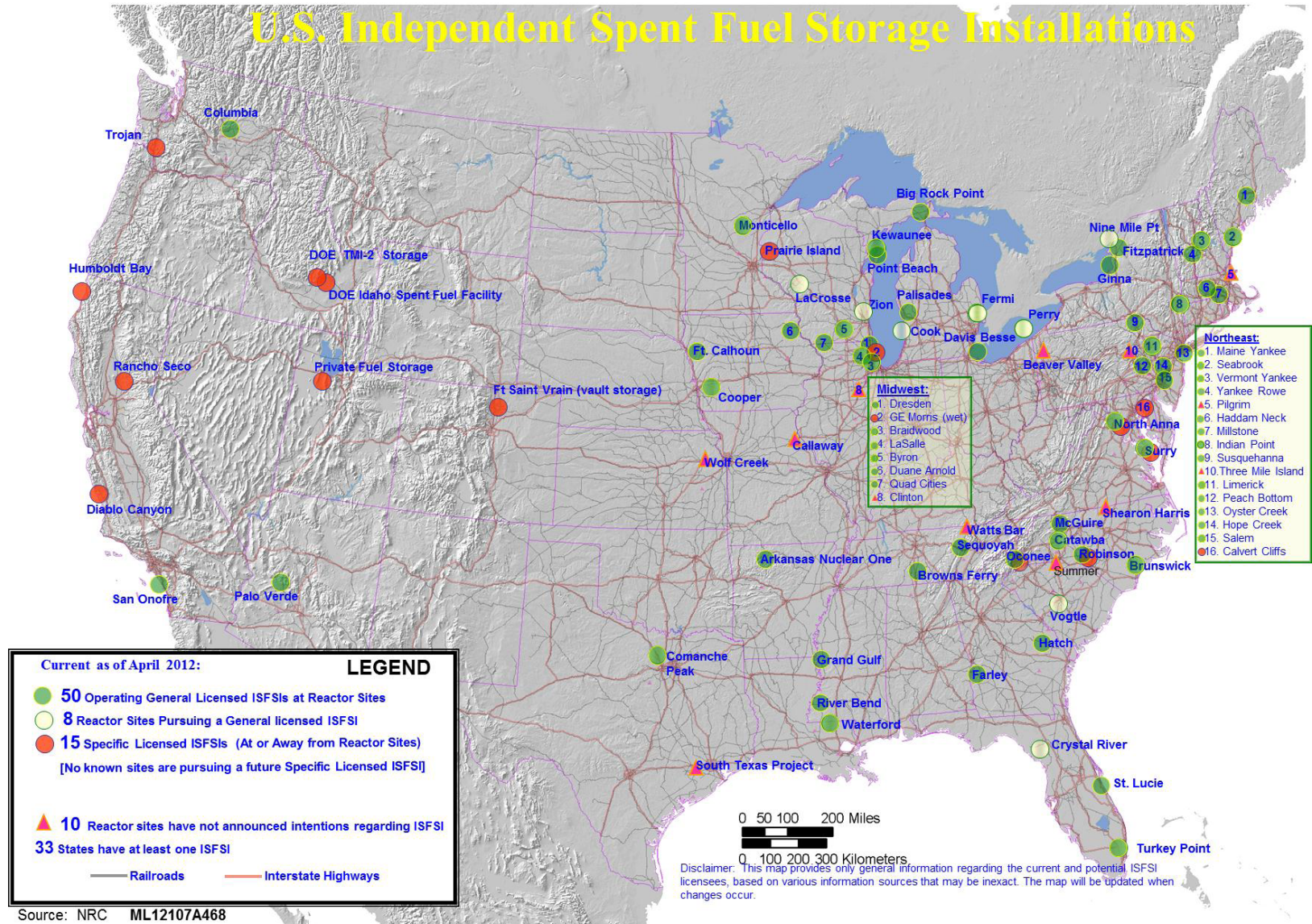
# NRC Oversight of Commercial Spent Fuel\*

- Spent fuel pools at 65 reactor sites in 31 States
  - ~175,000 fuel assemblies
- Dry storage casks loaded at 60 storage facilities
  - Over 60,000 fuel assemblies
  - Over 1500 loaded dry storage casks
  - Over 50 approved cask design variations



\* Sources: NRC Digest, Gutherman Technical Services, UxC Storefuel, NEI, 2011

# Dry Storage in the U.S. \*



\* GE Morris Facility in Illinois is the only licensed independent pool (wet) ISFSI

# Regulatory Framework

- Governing Legislation
  - Nuclear Waste Policy Act of 1982
  - Atomic Energy Act of 1954
  - Administrative Procedure Act
  - National Environmental Policy Act
- NRC Storage and Transportation Regulations
  - 10 CFR Parts 71 and 72 – Safety
  - 10 CFR Part 73 – Security
  - 10 CFR Part 51 – Environmental
  - 10 CFR Part 2 – Proceedings
- Guidance
  - Regulatory Guides
  - Standard Review Plans



# NRC Activities

- Licensing Program Improvement Activities
  - Development of paper for stakeholder feedback
  - Potential Policy Issues for Commission consideration
  - New guidance or potential update to Part 71 and 72
- Extended Storage and Transportation Program
  - Identification of EST technical gaps
  - Research and collaboration on SNF and aging management strategies
- NRC Waste Confidence

# Licensing Program Improvements

- Cladding Integrity Requirements
- Storage and Transportation Compatibility
- Applicability of Site-Specific and General License Requirements
- Administration of Cask Certificates
- Regulation of Stand-Alone Storage Facilities (Decommissioned Reactor Sites)

NRC Licensing Program Workshop: August 16, 2012

Storage and Transportation Regulatory Conference: September 12-13, 2012

# Extended Storage and Transportation (EST)

- EST Program Plan
  - Identification of Extended Storage Technical Gaps
  - Implement Regulatory Research
  - Examine Improvements to Regulatory Framework
- Coordination Activities
  - Participate in EPRI Collaboration Program
  - Participate in DOE Cask Demonstration Program
  - Participate in International Research Activities

Draft Report for Comment - Identification and Prioritization of EST Technical Information Needs

SECY-12-0078 "Annual Status Report: Activities Related to EST and Long-Term WC Update

# Long-Term Storage

- Basic Regulatory Framework -

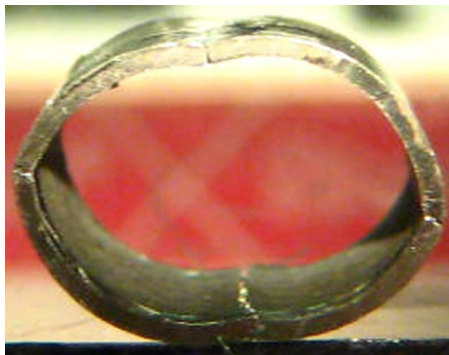
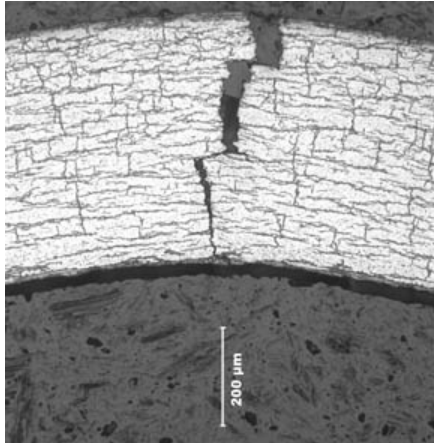
- Forty-year License Periods
- Aging Management Plan
  - Time-Limited Aging Analyses
  - Prevention
  - Monitoring
  - Maintenance
  - Mitigation
  - Corrective Actions



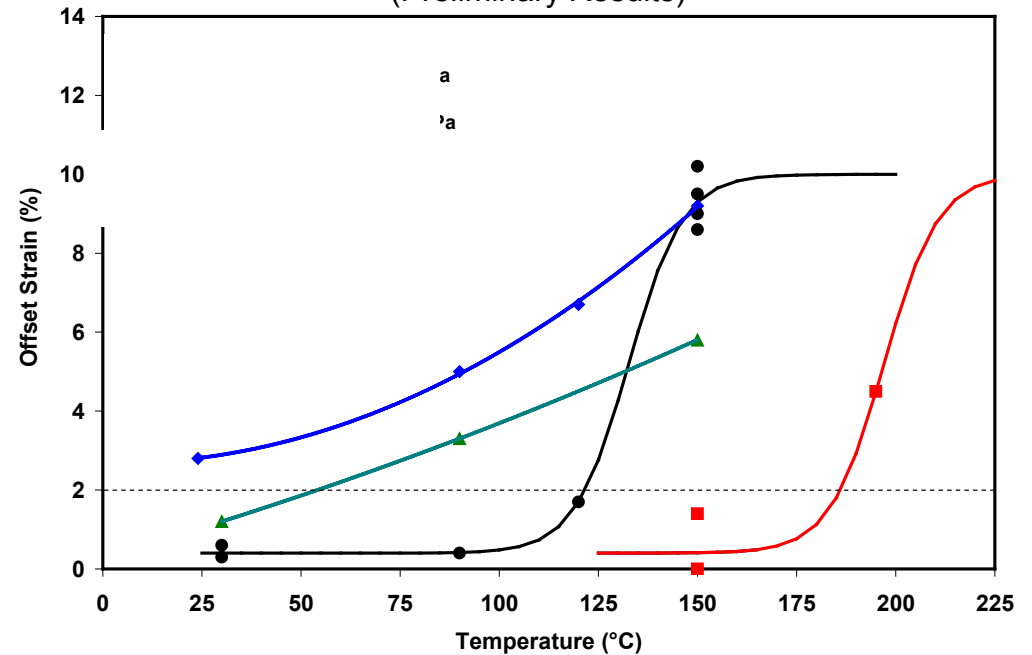


# Cladding Integrity

High Burnup Cladding - Ring Compression Tests



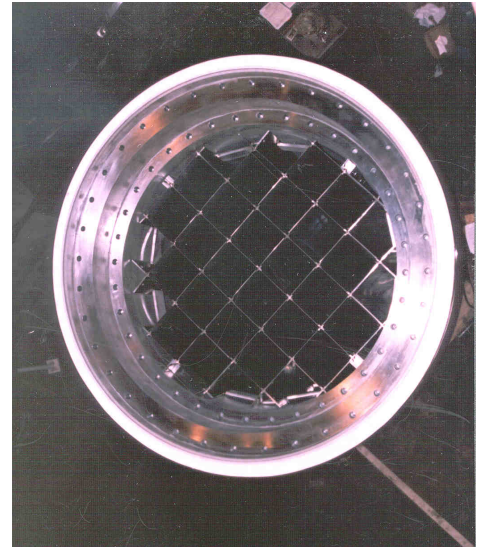
High Burnup Cladding - Ductile-Brittle Transition (Preliminary Results)



Source: Argonne National Laboratory, "Radial-Hydride-Induced Embrittlement of High-Burnup ZIRLO Cladding Exposed to Simulated Drying Conditions" T.A. Burtseva, Y. Yan, and M.C. Billone, June 30 2010 (ML101620301)

# Canister Integrity

- Marine Environment  
Stress Corrosion Cracking
- Canister Dryness
- Long-Term Thermal  
Profiles



# Cask Systems

- Long-term Aging
- Monitoring and Inspection Capabilities
- Cask Demonstration Program



# NRC Waste Confidence

- Generic Environmental Policy
  - Streamlines environmental assessments for reactor and storage facility licensing
- 2010 NRC Waste Confidence Update
  - Waste can be stored safely at least 60 yrs after cessation of reactor operation
  - Repository available when necessary
- DC Court vacates 2010 Update (June 2012)
  - WC is a major federal action
  - Insufficient consideration of no-repository
- NRC currently assessing Court decision
- NRC staff developing EIS for long-term storage (prior to Court decision)





# Questions

