Overview of Reactor Decommissioning

Michigan Congressional Staff Briefing
Senator Stabenow
Representative Upton

December 2016
NRC’s Mission

• NRC’s mission is to ensure plant safety, whether the plant is operating, or transitioning from operating to decommissioning, and through the entire process until the plant has been radiologically decommissioned and the license is terminated.

Present Status

• 6 Power Plants in active decommissioning
• 14 Power Plants in SAFSTOR
• More shutdowns are anticipated
Reactor Decommissioning

- Reactor Decommissioning Background
- Decommissioning Process (10 CFR 50.82)
- Recent Power Reactor Shutdown News
- Decommissioning Topics of High Public Interest
- Transitioning from Operating to Decommissioning
- Decommissioning Trust Funds
- Summary
Reactor Decommissioning Background

• Current 1997 Decommissioning Regulations are performance-based and risk-informed
• Extensive Decommissioning Experience
• A total of 10 Power Reactor sites have completed decommissioning, had the reactor license terminated and released for unrestricted use
  - Ft Saint Vrain - DOE Ownership of the Fuel
  - Saxton - No fuel onsite
  - Shoreham - No fuel onsite
  - Pathfinder - No fuel onsite
  - Haddam Neck – General License ISFSI
  - Maine Yankee – General License ISFSI
  - Yankee-Rowe – General License ISFSI
  - Trojan – Specific License ISFSI
  - Big Rock Point – General Licensed ISFSI
  - Rancho Seco - Specific License ISFSI

![Graph](chart.png)
Decommissioning Process
10 CFR 50.82/Regulatory Guide 1.184

- Notification of Intent to Permanently Shutdown
- Submission of Certifications of Permanent Shutdown and Permanent Removal of Fuel from Reactor Vessel
- Submittal of Post Shutdown Decommissioning Activities Report (PSDAR) and NRC Public Meeting
- Decommissioning must be completed within 60 years of permanent cessation of operations.
- License Termination Plan is submitted 2 years prior to requesting license termination and NRC Public Meeting
- NRC terminates the license by letter
Reactor Decommissioning Process

Phase 1

• Reactor is permanently shutdown and nuclear fuel is transferred to the spent fuel pool

• Plant is prepared for decommissioning

• Modifications are typically made to facilitate decommissioning
Phase 1 (Continued)

Post Shutdown Decommissioning Activities Report (PSDAR) (Reg Guide 1.185)

- Decommissioning Strategy – DECON or SAFSTOR - 60 years to complete decommissioning
- Site Decommissioning Funding Status
- Affirmation of the Environmental Review

NRC holds Public Meeting for comments

NRC does not approve the PSDAR
Reactor Decommissioning Process

Phase 2 – Decommissioning Phase
• DECON - immediate dismantlement
• SAFSTOR – deferred dismantlement
• 60 years to complete (50 years for radioactive decay + 10 years to dismantle)

Phase 3 – last 2 years
• License Termination Plan (License Amendment)
• NRC holds a Public Meeting
Reactor Decommissioning Inspection Program

• Continues until the license is terminated
• Inspection Manual Chapter 2561
• 40 inspection procedures
• Minimum Annual Inspection - 12 Core procedures are required each year
• Resident Inspector up to 1 year after shutdown, but can be extended
• Inspection Reports are publically available
Rancho Seco
Big Rock Point
Yankee Rowe
Maine Yankee
Connecticut Yankee
Recent Power Reactor News

- **Recent Unplanned Reactor Shutdowns**
  - **Kewaunee Power Station** - Kewaunee Wisconsin (2013)
  - **Crystal River Unit 3** - Crystal River, Florida (2013)
  - **San Onofre Nuclear Generating Station, Units 2 & 3** - San Clemente, California (2013)
  - **Vermont Yankee Nuclear Power Station** Vernon, Vermont (2014)
  - **Fort Calhoun** – Omaha, NE October 24, 2016

- **Future Planned Reactor Shutdowns**
  - **Pilgrim** – Plymouth, MA (Announced Shutdown 2019)
  - **Oyster Creek** - Forked River, NJ (Announced Shutdown for Late 2019)
  - **Clinton** – Springfield, IL June 2017, **Quad Cities 1, 2** – Quad Cities, IL June 2018 granted rate relief by Illinois December 2016
  - **James A. FitzPatrick** – Scriba, NY (Announced Shutdown for Early 2017. August 9 press announcement to be sold to Exelon)
Decommissioning Topics of High Public Interest

- Economic losses to the local community
- Community Involvement - Advisory Groups
- Future use of the site
- High Level Waste Time in Storage and Transport
- Interim Spent Fuel Storage Installations (ISFSI)
- Reactor Decommissioning – Timeliness - 60 years to complete
- Reductions in Emergency Plans
- Decommissioning Fund Adequacy
Transitioning from Operation to Decommissioning

- License Amendments
  - Permanently Defueled Technical Specifications
  - Revised Emergency Plan and Emergency Action Level Scheme
- Exemptions from Title 10 Code of Federal Regulations
  - Emergency Preparedness (Part 50, Appendix E)
  - Security Plan and Procedures (CFR Part 73)
  - Decommissioning Trust Fund (CFR 50.82)
  - Insurance and Financial Protection (CFR 50.54 and Part 140)
- Requests to Rescind or Relax Orders
- Certified Fuel Handler Training Program
- NRC to issue lessons learned report with emphasis on decommissioning licensing and oversight activities
Reasonable Assurance of Decommissioning Funding

• Initial Certification of Financial Assurance.
• Maintains the NRC MFA throughout the life of the reactor.
• Uses one or more funding methods specified in the regulation.
• Monitoring and Updating of Decommissioning Funding -
  ➢ Operating Licensee provides Decommissioning Fund Status Report to the NRC (every 2 years).
  ➢ Licensee must Provide SSCE 5 years prior to permanent cessation of operations & in PSDAR.
Fermi -1 in SAFSTOR
Monroe, Michigan
Palisades

- **Location:** Covert, MI (5 miles S of South Haven, MI) in Region III
- **Operator:** Entergy Nuclear Operations, Inc.
- **Operating License:** Issued - 02/21/1971
- **Renewed License:** Issued - 01/17/2007
- **License Expires:** 03/24/2031
- **Docket Number:** 05000255

- **Reactor Type:** Pressurized Water Reactor
- **Licensed MWt:** 2,565.4
- **Reactor Vendor/Type:** Combustion Engineering
- **Containment Type:** Dry, Ambient Pressure
Zion 1 & 2 - Progress and Expected End Point
University of Michigan
Ford Research Reactor
License Terminated April 2, 2015
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