“POWER REACTOR DECOMMISSIONING PROGRAM CHALLENGES AND ISSUES”

REG CON 2019
SEPTEMBER 17, 2019

BRUCE A. WATSON, CHP
Chief, Reactor Decommissioning Branch
Division of Decommissioning, Uranium Recovery and Waste Programs
Office of Nuclear Material Safety and Safeguards
Decommissioning Topics

- Decommissioning Program
- Decommissioning Rulemaking Activities and Guidance
- Reactor Decommissioning Business Models
- Stakeholder Input and Feedback
- Current Issues
NRC’s Decommissioning Mission

NRC’s decommissioning mission is to ensure safety, protect public health and the environment until the site has been radiologically decommissioned and the license terminated.
Decommissioning Experience

- The NRC’s current decommissioning regulations are performance-based and risk-informed
- Extensive decommissioning experience
- A total of 10 power reactor sites have completed decommissioning and had the reactor licenses terminated for unrestricted use
Recent Power Reactor Shutdowns

- **Kewaunee** 2013
- **San Onofre 2, 3** 2013
- **Crystal River** 2013
- **Vermont Yankee** 2014
- **Fort Calhoun** 2016
- **Oyster Creek** 2018
- **Pilgrim** 2019
- **TMI – 1** Sept 2019

United States Nuclear Regulatory Commission
Protecting People and the Environment
Decommissioning Rulemaking SECY 14-0118

• The Commission directed the staff in 2014 to proceed with reactor decommissioning rulemaking with a completion goal of 2019 (now 2021) to improve efficiency of the transition from operations to decommissioning, including:
  - license amendments
  - emergency plan exemptions
  - security plans

• Evaluate the roles of the States and the 60-year requirement to complete Reactor Decommissioning
Decommissioning Rulemaking Process

- **Dec 2014**: Rulemaking Trigger: Commission direction (SRM-SECY-14-0118)
- **Nov 2015**: Public involvement: ANPR published for comment (120 days)
- **March 2017**: Public involvement: Draft Regulatory Basis published for comment (120 days)
- **Nov 2017**: Regulatory Basis published
- **May 2018**: Draft Proposed Rule provided to Commission for vote
- **TBD**: Publish proposed rule and draft guidance for comment (75 days)
- **TBD**: Staff evaluates public comments and revises rule and guidance
- **Goal: mid 2020**: Commission review and approval of draft final rule
- **Goal: 2021**: Publish final rule
- **Rule takes effect**
- **Compliance date**
Comprehensive Rulemaking

1. Emergency preparedness
2. Physical security
3. Cyber security
4. Drug and alcohol testing
5. Certified fuel handler definition and elimination of the shift technical advisor
6. Decommissioning funding assurance
7. Offsite and onsite financial protection requirements and indemnity agreements
8. Environmental considerations
9. Record retention requirements
10. Low-level waste transportation
11. Spent fuel management planning
12. Application of the backfit rule
13. Foreign ownership, control, or domination
14. Clarification of the scope of the license termination plan requirement
Path Forward

• Proposed Rule/Draft Regulatory Guidance
  – Awaiting Commission direction
    • Public meeting will be held after Proposed Rule and Draft Regulatory Guidance are issued for public comment

• Final Rule/Final Regulatory Guidance
  – Provide to the Commission in mid 2021
    • Public meeting will be held to discuss implementation of the rule prior to delivering rule to the Commission for vote
The GEIS for Nuclear Power Reactors is a generic evaluation of the potential environmental impacts from decommissioning activities at nuclear power facilities.

The GEIS for Nuclear Power Reactors was published in 2002. NUREG-0586, Supplement 1, *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities*

- Reflects the 1996 Decommissioning rule changes
- Impacts supersede those described in 1988 GEIS

The NRC issued the supplement to:

- Further the purposes of NEPA
- Update information in the GEIS
- Provide additional information to public on decommissioning activities
- Establish envelope of environmental impacts that could be associated with decommissioning activities
Decommissioning Guidance

- NUREG 1757, Volume 2, “Consolidated Decommissioning Guidance”
- NUREG 1507, “Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions”
- NUREG 1757, Volume 1, “Decommissioning Process for Materials Licensees”
- Regulatory Guides
- Revised Inspection Manual Chapter 2561 and revising the Inspection Procedure
U.S. Reactor Decommissioning Business Models

- License Self Performs
- Licensee manages a Decommissioning Contractor
- Temporary License Transfer to a Decommissioning Company and return of the land and spent fuel to the utility
- Asset Sale and license transfer – plant, decommissioning trust fund, and spent fuel are sold and permanent license transfer to a non-utility
- Crystal River – still different under review
Humboldt Bay – Decommissioning Contractor and Self Perform

Before

October 2018
2010 Zion License Transfer

2010 to ZionSolutions

April 2019
La Crosse Self Perform and 2016 License Transfer

March 2019
Asset Sale and License Transfer

- Vermont Yankee 2019
- Oyster Creek 2019
- Pilgrim 2019
- TMI – 2 2020
- Indian Point
- Palisades 2022
Active Decommissioning

San Onofre

N.S. Savannah
Active Decommissioning

Crystal River

Fort Calhoun
Future Shutdowns?

• To date, 5 plants made economically viable and continue to operate
• Three Mile Island – September 30, 2019
• Duane Arnold, Davis Besse, and Indian Point 2 – 2020
• Perry, Beaver Valley 1&2, Indian Point 3 – 2021
• Palisades – 2022
• Diablo Canyon 1&2 – 2024 and 2025
Reactor Decommissioning Public Interfaces

NRC Public Meetings

✓ Annual Assessments Meetings prior to ceasing operations
✓ Post Shutdown Decommissioning Activities Report Meetings
✓ License Termination Meetings
✓ Partial Site Release Meetings
Reactor Decommissioning Stakeholder Involvement

- Over 30 briefings to Senate/House staff
- Capitol Hill meetings with Senate and House staff
- Congressional Briefings and Town Hall Meetings
- Native American Tribes
- **Community Advisory Boards**
Decommissioning Issues of Stakeholders

- Asset sale license transfer applicants
- Decommissioning funding & adequacy
- Decommissioning strategies: Prompt vs. Deferred – Decommissioning – 60 Years
- Economic losses to the local community
- Future uses of the site
- Emergency Response Reductions
Decommissioning Issues of Stakeholders

- Safety of Spent Fuel Pools versus Dry Spent Fuel Storage in storage casks
- Long Term Spent Fuel Waste Storage due to thin walled casks
- Transportation
- Security of the Facility
Current NRC Issues

- Managing a growing decommissioning reactor program

- Rightsizing the NRC with an aging workforce, consolidating organizations at HQ and Region Offices

- NRC being more Innovative, becoming more efficient and Risk-Informed Decision Making
Current Decommissioning Issues

• Nuclear Energy Innovation and Modernization Act of January 2019
  ➢ Conduct a Minimum of 10 Public Meetings
• Managing the transitioning of the plants shutting down and public meetings and concerns
• GE Vallecitos’ Exemption request to exceed 60 years to complete decommissioning
• DOE Naval Reactors potential support for surface ship decommissioning
GE Vallecitos – Request to Exceed 60-Year Completion Requirement
Potential NRC Oversight Role for Naval Reactors Surface Ships

**Surface Ship Support Barge (SSSB)**
Notational Framework Meeting and Solicitation of Interest, Memorandum of Understanding Drafted.
New Decommissioning Licensee Management Challenges

- Are the new licensees Compliance driven? Safety Culture?
- Near-Misses and Preventable safety events
- Weaknesses observed in licensing and health physics/rad safety
- The License Termination Plan is a license amendment
- Decommissioning Fund Reporting
- Work Control Issues
- Following NRC Guidance – MARSSIM
- Are there enough qualified personnel to perform the decommissioning?
- Qualifications of Personnel
NRC’s 2019 Decommissioning Program

• With Three Mile Island Unit 1 shutting down, 23 Power Reactors will be in decommissioning, 9 more Power Reactors have announced ceasing operations by 2025
• 13 Power Reactors in Active Decommissioning, 10 in SAFSTOR
• Humboldt Bay, La Crosse and Zion 1, 2 license terminations expected in 2020
• 3 Research Reactors, with the 2 General Atomics license terminations expected in 2020
• 4 Complex Materials Legacy Sites
• 11 Uranium Sites in Decommissioning/Remediation
• 28 Mill Tailing Sites in Long-Term Monitoring
• 1 Operating InSitu Uranium Recovery Site (Wyoming Agreement State in 2018)
Questions?