

“POWER REACTOR DECOMMISSIONING PROGRAM CHALLENGES AND ISSUES”

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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

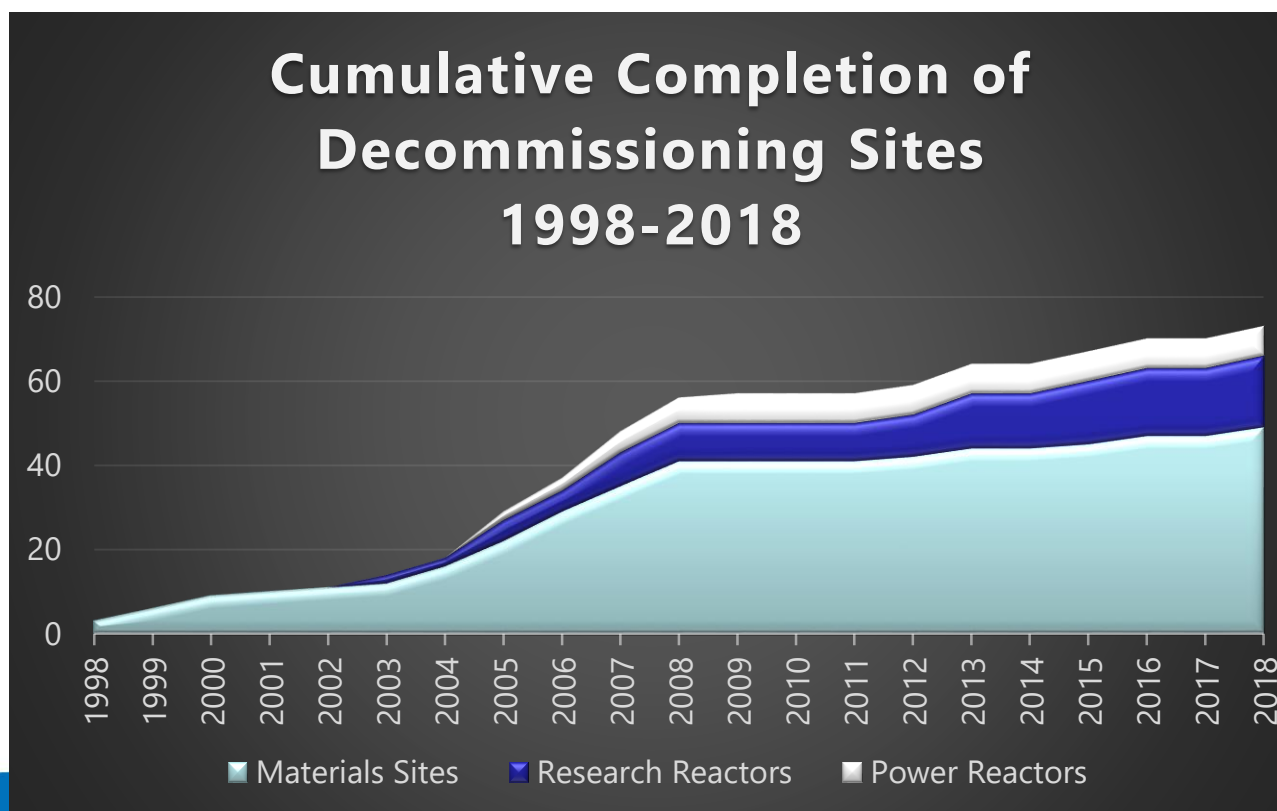
- Decommissioning Program
- Decommissioning Rulemaking Activities and Guidance
- Reactor Decommissioning Business Models
- Stakeholder Input and Feedback
- Current Issues

NRC's Decommissioning Mission

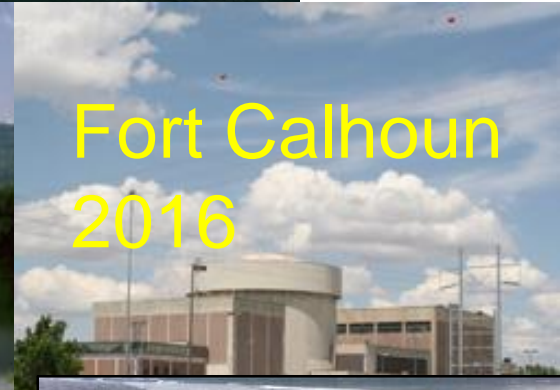
NRC's decommissioning mission is to ensure safety, protect public health and the environment until the site has been radiologically decommissioned and the license terminated.

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

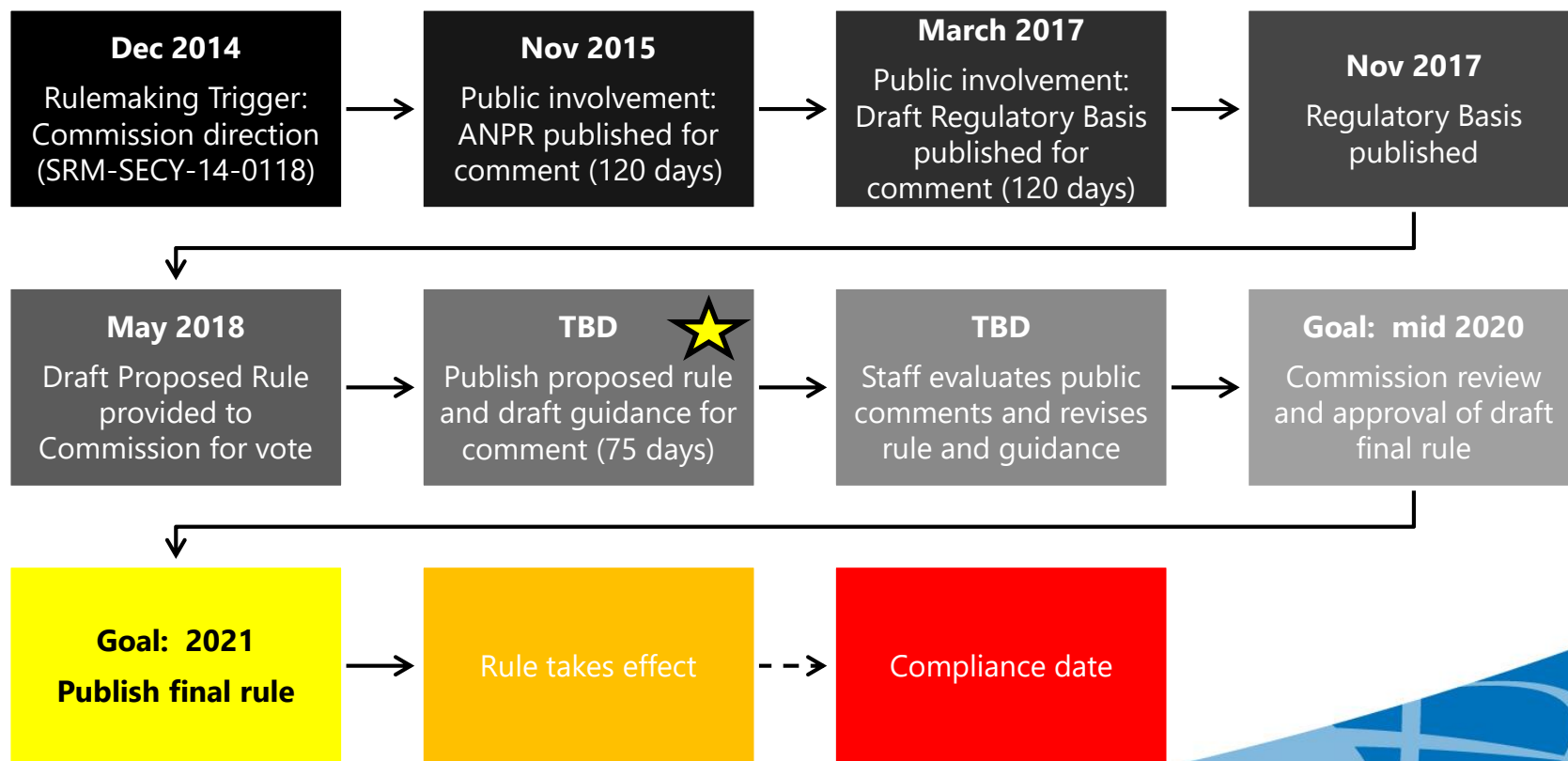


Decommissioning Rulemaking

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



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

Decommissioning Generic Environmental Impact Statement

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 1700, "Standard Review Plans for License Termination Plans"
- 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



Pilgrim 2019



TMI – 2 2020



Indian Point



Oyster Creek 2019



Palisades 2022



Active Decommissioning



N.S. Savannah

San Onofre



Active Decommissioning



Fort Calhoun

Crystal River



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

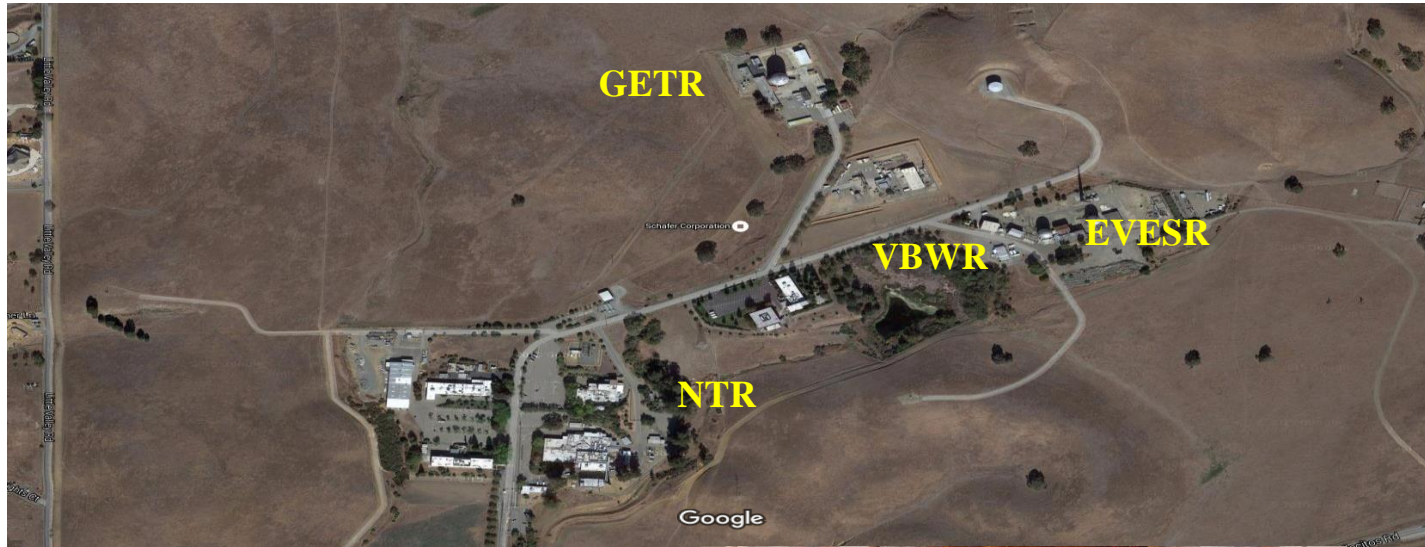
Current NRC Issues

- 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
 - Citizen Advisory Boards Best Practices Report to Congress by July 14, 2020.
- 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



- 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?