

# **“Power Reactor Decommissioning Program Status and Challenges”**

Electric Power Research Institute  
Decommissioning and Low Level Waste Meeting  
Orlando, Florida  
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Decommissioning, Uranium Recovery and Waste Programs

# Decommissioning Topics

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- Experience with 1997 Regulations “License Termination Rule” and the current U.S. Decommissioning Process
- Actions to Prevent Legacy Sites – “Decommissioning Planning Rule”
- Recent Reactor Shutdowns Impacts and the Transitioning from Operating to Decommissioning
- Present Decommissioning Rulemaking Activities

NRC's mission is to ensure safety, is protective of public health and the environment whether the site is operating, or transitioning from operating to decommissioning, and through the entire decommissioning process until the site has been radiologically decommissioned and the license is terminated.

# Decommissioning Regulations Revised in 1997

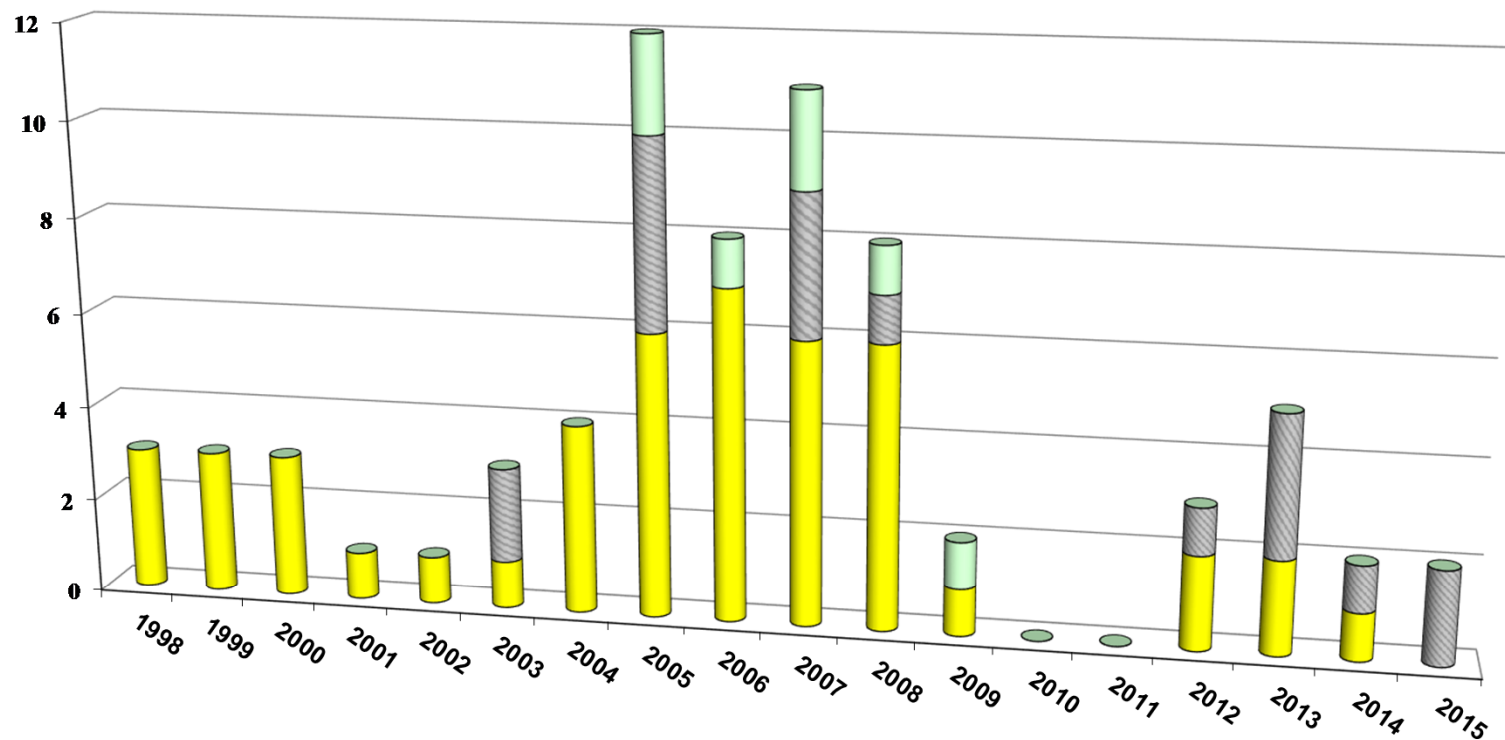
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Performance-Based and Risk-Informed  
Materials and Uranium Recovery Sites  
For Reactors, based on Lessons Learned from first 3  
Power Reactor Decommissionings  
Reactor Decommissioning actions start **5 years** before  
end of operating license.



# RC License Terminations



■ Materials Sites   ■ Research Reactors   ■ Power Reactors

# Decommissioning Processes

## Materials/Uranium Recovery Facilities

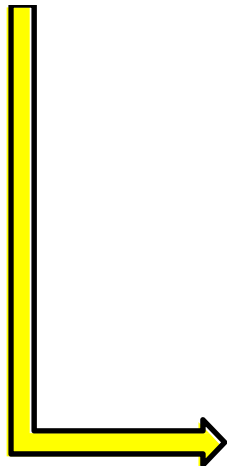
### ***Before Cleanup***

Licensee ceases operations and notifies NRC.  
Licensee submits decommissioning plan (DP) or reclamation plan (RP) to NRC for review. (1 year)  
NRC performs technical and environmental reviews of licensee plan and documents the reviews in NRC safety and environmental reports.  
NRC approves DP/RP if acceptable.



### ***During Cleanup***

Licensee conducts cleanup activities, as described in the DP/RP.  
NRC conducts periodic inspections.  
Licensee completes cleanup activities.



### ***After Cleanup***

Licensee conducts final status survey and submits report.  
NRC conducts confirmatory surveys and reviews licensee's report. NRC approves final status survey report and terminates license.

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*Uranium Recovery Sites: Custodial agency submits Long Term Surveillance Plan (LTSP) for NRC review. Upon NRC's acceptance of LTSP, the existing license is terminated and the title to the site is transferred to the custodian under general license.*

## Power Reactor Facilities

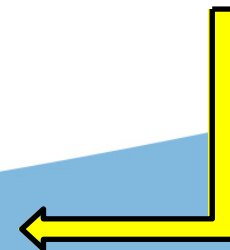
### ***Before Cleanup***

Licensee ceases operations and notifies NRC.  
**Licensee submits post-shutdown decommissioning activities report (PSDAR) for NRC's information.**  
Licensee waits 90 days before starting any major decommissioning activities.



### ***During Cleanup***

Licensee initiates cleanup activities, as described in the PSDAR.  
**60 years to complete the decommissioning**  
Licensee submits license termination plan (LTP) for review 2 years before license termination. The plan outlines remaining decommissioning activities.  
NRC performs technical and environmental reviews of the licensee plan and documents the reviews in NRC safety and environmental reports. NRC approves LTP if it is acceptable.  
NRC conducts periodic inspections.  
Licensee completes cleanup activities.



# Staff Initiatives from 1990's Reactor Decommissionings

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2000 - SECY-00-145 Integrated Rulemaking Plan for  
Nuclear Power Plant Decommissioning

September 11, 2001 Attacks

License Renewal

Commission direction to prevent future Legacy Sites



# DECOMMISSIONING PLANNING RULE (DPR)

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- 2004 Decommissioning Meeting with Industry
- The Decommissioning Planning Rule
  - Published June 2011 (76 *FR* 35512)
  - Effective Date December 2012
- Applicable to **OPERATING** Facilities
  - ALL LICENSE TYPES
  - Nuclear Power Plants, NEI-07-07 Voluntary Initiative meets the DPR

# Decommissioning Planning Rule (DPR)

- 10CFR20 Radiation Protection Standards
  - §20.1406(c) “MINIMIZATION OF CONTAMINATION” - Conduct **Operations** to minimize introduction of Radiological Contamination into the environment
  - §20.1501(a) “GENERAL” - Conduct reasonable surveys **INCLUDING the SUBSURFACE**
  - §20.1501(b) “GENERAL” - Record Subsurface Contamination
  - Regulatory Guide 4.22, “Decommissioning Planning During Operations”

# SECY - Prompt Remediation Decommissioning Issue

- “Follow on issue” to Decommissioning Planning Rule SRM-SECY-12-0046 (NRR: Options for Revising the Regulatory Approach to Ground Water Protection, May 2012)
- Mandating remediation during operations (prompt remediation) is an extension of the Decommissioning Planning Rule (DPR) that requires licensee to survey to identify contamination throughout the site. The DPR was issued in Jun 2011 and became effective on 17 Dec 2012
  - TI-2600/017 for inspectors
  - EGM-12-002 to allow licensees time to conduct complex surveys
- Regulatory Basis for draft prompt remediation rule accepted by DILR (Mar 2012)

# ECY - Prompt Remediation Decommissioning Issue

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May 2016 – Commission Direction to complete Prompt Remediation Evaluation

September 2016 Commission Paper

Evaluating Groundwater Reports from all licenses and  
Changes in Decommissioning Fund Estimates

July 2016 Webinar to obtain Stakeholder input





# 2013 and 2014, Premature Power Reactor Shutdowns





# 3 Decommissioning Transition Working Group

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- Ensure Office-wide Staff Coordination and Communications
- Focal point to address immediate and emergent issues and recommend the long term solutions
- NRR Focus on Licensing Activities
- NMSS Focus on Public Meetings, Media and Congressional Inquiries
- Point of Contact for Nuclear Energy Institute
- Issue Final Report to Management

# Regulatory Impacts on Reactor Decommissioning Transition Issues

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00 - SECY-00-145 Integrated Rulemaking Plan for Nuclear Power Plant  
Decommissioning

September 11, 2001 Attacks

License Renewal

08 – SECY-08-0024 Delegation of Commission Authority to Staff to Approve  
Deny Emergency Plan Changes that Represent a Decrease in Effectiveness

Requires Commission Approval

11 - Fukushima Daiichi

New Orders

A decorative graphic at the bottom of the slide, consisting of a blue gradient background with white and light blue abstract shapes, including a large circle and intersecting lines, resembling a stylized atomic structure or a modern architectural design.

# Managing Premature Reactor Permanent Shutdowns

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- Regulatory Approach - Established Precedent
- Licensing Basis is Unchanged after Shutdown
- Lessons Learned and Experience from Plant Shutdowns in 1990s
- Significant Events since 2000
  - September 11, 2001 Attacks, Security and Emergency Response - Orders
  - March 11, 2011 Tōhoku Earthquake and Tsunami – Post Fukushima Orders

# Transition Licensing Actions

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Approximately 23 Licensing Actions PER SITE have been identified from the premature shutdowns

- 8 License Amendments
- 8 Exemptions
- 7 Site Specific Requests; amendments, exemptions, and rescinding Orders

## Lesson Learned

- Submit requests prior to shutdown
- Learn from the recent licensees

# Licensing Action Requests During Transition to Decommissioning

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## Typical Exemption Requests

- Emergency Preparedness
- Security
- Decommissioning Trust Fund
- Liability and Property Insurance

## Typical Amendment Requests

- Staffing, Training, and Qualifications
- Defueled Emergency Plan
- License Conditions
- Defueled Technical Specifications

## Other Licensing Actions

- Order Rescissions
- Security Plan 50.54(p) Reviews
- Post-Shutdown Decommissioning Activities Report Meeting and Review

# Lessons Learned

- Licensees should engage NRC staff as early as possible after announcing intent to cease operations
  - Coordinate licensing action submittals and schedules
  - Pre-submittal meetings
- Licensees should submit decommissioning licensing actions well ahead of permanent cessation of operation - to the extent possible
- Licensees should use established precedent, when appropriate
  - Communicate early and often on licensing actions that are unique or substantially deviate from precedent
- Public and intergovernmental meetings and outreach
  - Licensees should establish a local community advisory panel
  - Communicate with public, state and local community stakeholders on issues important to the community
- NRC staff long-term solution is rulemaking
  - Codify a well-defined regulatory framework that assures adequate protection of health and safety throughout the decommissioning transition process, while minimizing inefficiencies and unnecessary resource impacts

## Commission Direction in NRC 14-0118

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In response to Duke Energy's emergency plan exemption request, the Commission directed the staff December 30, 2014 to:

- Proceed with reactor decommissioning rulemaking

- Completion goal of 2019

- Continue to process amendments and exemptions until complete



Commission Briefing  
March 15, 2016

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NRC Staff History and Rulemaking Status  
Presenters: Industry, Public and States  
Diversity of Comments  
Diversity of Opinions on Regulations  
Bifurcation or Comprehensive Rulemaking  
Roles of the States  
Community Involvement



# Reactor Decommissioning Proposed Rulemaking

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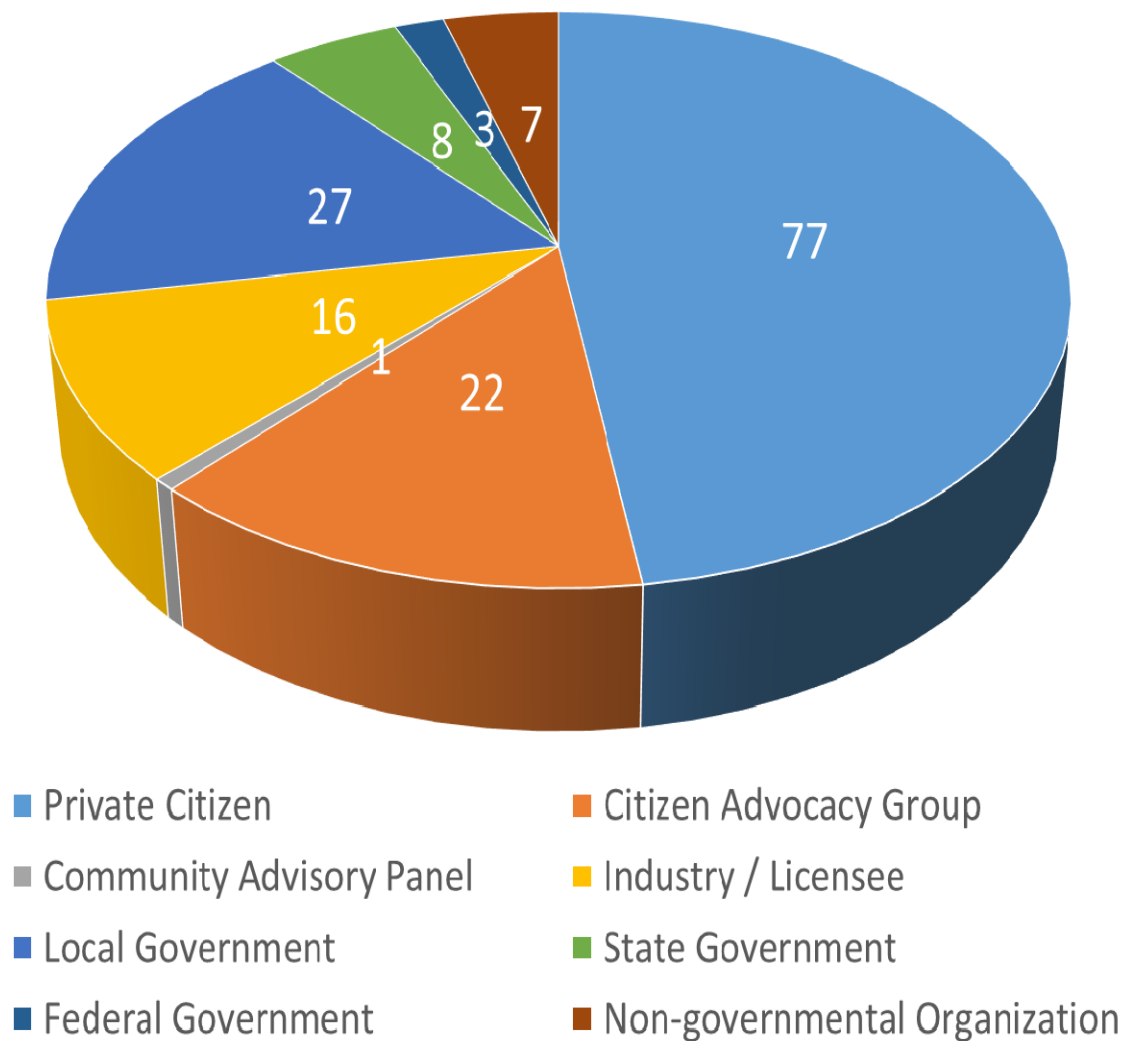
- New Regulations by 2019 to improve efficiency of the transition from operations to decommissioning, including:
  - license amendments
  - emergency plan exemptions
  - security plans
- Re-evaluate the present regulations including the States Role and 60 years to complete decommissioning

# Opportunities for Public Participation in Rulemaking

- The NRC is interested in feedback from State partners, the nuclear industry, and all members of the public:
  - Comment opportunities (Advanced Notice for Proposed Rulemaking, Draft Regulatory Basis, Proposed Rule)
  - ANPR public comment period closed on March 18, 2016
  - Planned public meetings throughout the Rulemaking Process

# Public Comments

Distribution of Public Comments by Source



# NPR Public Comments

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- Against relaxation of requirements with fuel still in the pool / transfer fuel to ISFSI ASAP
- Increase involvement of State and local governments and public groups
- Require Citizen Advisory Boards
- Against SAFSTOR / 60 years is too long
- NRC should approve PSDAR
- Increase decommissioning funding oversight
- Supportive with specific suggestions

# Rulemaking Schedule

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## Regulatory Basis Phase – November 2016

- Draft will go out for public comment
- Public meeting during comment period
- Final regulatory basis published in June 2017

## Proposed Rule Phase – April 2018

- Proposed rule out for 75-day public comment period
- Public meeting during comment period
- Draft regulatory guide(s) out for comment with proposed rule

## Final Rule Phase – Targeted for 2019

- Regulatory guide(s) issued with final rule

# Commission Briefing

## March 15, 2016

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### Staff Reactor Decommissioning History

- NRC Role is an Independent Safety Regulator – Community Advisory Boards
- 2000 Proposed Rulemaking – **Priorities**
- SECY-08-0024 Commission **denied** Authority to Staff to approve decreases for EP Effectiveness
- Present Regulations are adequate, **All 29 NPPs** did not operate till end-of License
- States regulate commerce and deregulated the energy market **without** decommissioning requirements

## 10.82 (a) (3) – Power Reactor Decommissioning in 60 Years

Decommissioning will be completed within 60 years of permanent cessation of operations. Completion of decommissioning beyond 60 years will be approved by the Commission **only when necessary to protect public health and safety**. Factors that will be considered by the Commission in evaluating an alternative that provides for completion of decommissioning beyond 60 years of permanent cessation of operations include **unavailability of waste disposal capacity and other site-specific factors affecting the licensee's capability to carry out decommissioning, including presence of other nuclear facilities at the site.**



# San Onofre Site





# tes in SAFSTOR



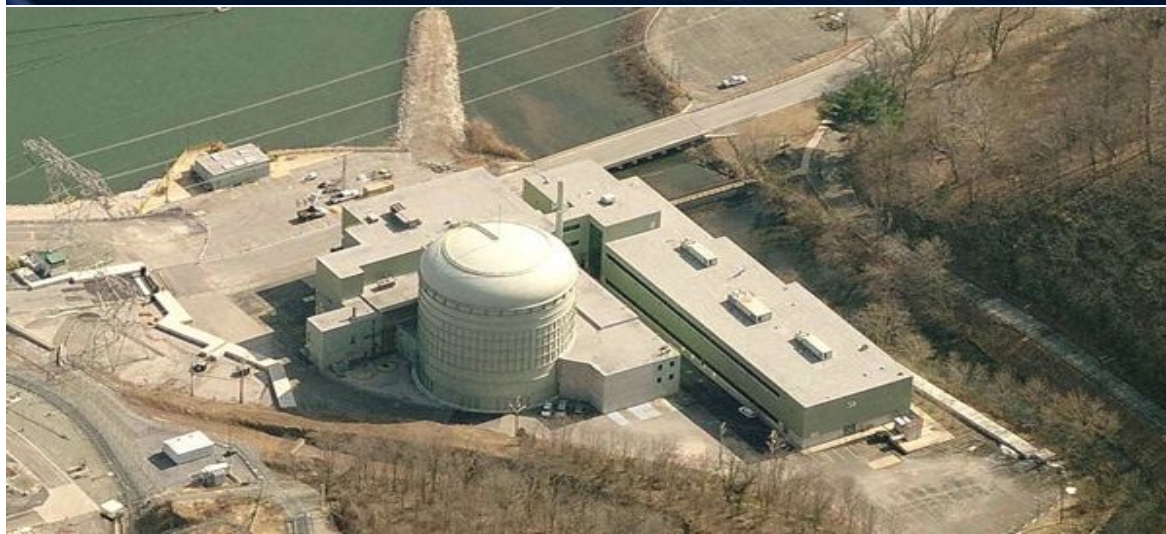
- Dresden – 1

- Indian Point -  
1

# tes in SAFSTOR



- Millstone – 1



- Peach Bottom - 1

# Power Reactors in Decommissioning

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## **SAFSTOR**

- Fermi -1
- TMI – 2
- Vermont Yankee
- NS Savannah
- Kewaunee
- Crystal River
- GE VBWR + EVSER
- SONGS 1

## **DECON**

- Humboldt Bay
- Zion 1, 2
- SONGS 2, 3
- LaCrosse

## **NEXT ?**

- FitzPatrick
- Fort Calhoun
- Pilgrim, Oyster Creek



# C's Decommissioning Program

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- 19 Power Reactors, 3 more Power Reactors as early as 2017/2019
- 5 Power Reactors in DECON, 14 in SAFSTOR
- 6 Research Reactors, 2 more expected
- 5 Complex Materials Legacy Sites
- 11 Uranium Sites in Decommissioning/Remediation
- 28 Mill Tailing Sites in Long Term Monitoring
- 5 Operating UR ISLs, 18 Applications

Questions?

## Reactor Decommissioning Branch



**Carpe Cesium**

AKA,

*The Dead Reactor Society*