

Overview of the Decommissioning of Research and Test Reactors regulated by the U.S. NRC

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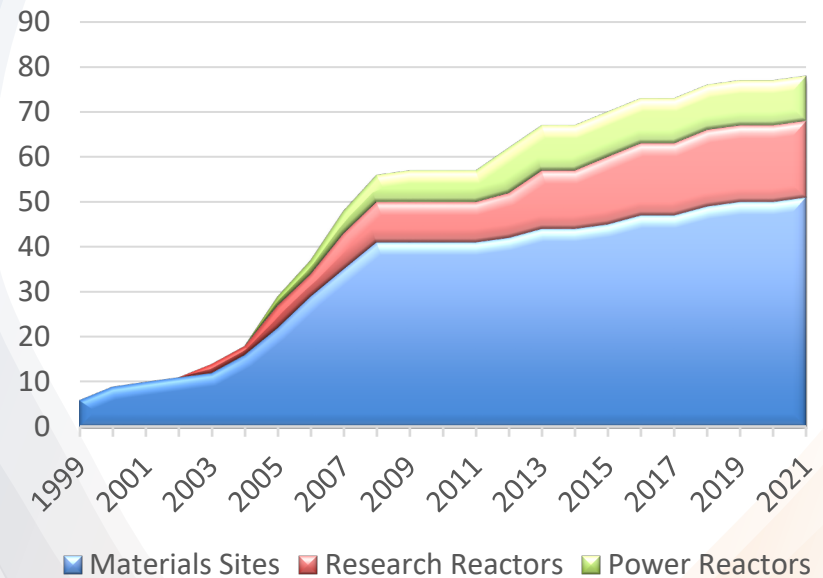
Topics

- The license termination process
- The regulatory transition from operation to decommissioning
- Non-power reactor license termination regulations and requirements
- Decommissioning planning requirements
- Decommissioning guidance & inspection

NRC RTR license termination experience

- To date, NRC has terminated the licenses of at least 27 RTRs
- Currently 2 RTRs are in decommissioning
 - GE Hitachi GETR
 - Aerotest Radiography & Research Reactor
- One more announced
 - GE Hitachi NTR

Completion of Decommissioning by Facility Type (1998-2021)



Basic license termination process

The decision to permanently shut down the reactor is communicated to the NRC

The permanent cessation of operations is communicated to NRC

Licensee applies for license termination and submits a decommissioning plan (DP) to NRC

Upon NRC approval the DP, dismantlement and remediation can begin, or the facility can be put into safe storage under certain circumstances

**Basic license
termination
sequence
cont'd**

Licensee performs surveys to demonstrate compliance with screening criteria or derived site-specific guidelines



NRC confirms that the approved criteria or guideline concentrations have been met



NRC approves the license termination request

Transition from operation to decommissioning

Regulatory requirements

10 CFR 50.82, Termination of license

- Upon permanent cessation of operations, the licensee must apply for license termination within 2 years and submit a proposed DP.
- When major dismantlement is delayed, the plans for decommissioning activities may be less detailed.
 - ❖ However, **prior to the start of major dismantlement activities**, updated detailed plans must be submitted and approved.
- For plans that delay decommissioning, a decommissioning cost estimate and an acceptable decommissioning funding plan is still required.

The transition from operation to decommissioning

Regulatory requirements, cont'd

10 CFR 50.82, Termination of license

- The proposed decommissioning plan must include—
 - The choice of alternative that completes decommissioning without significant delay

Delay **can only be** considered when it is necessary to protect the public health and safety

- A decommissioning health & safety plan;
- A final radiation survey plan;
- A decommissioning cost estimate and funding plan; and
- The decommissioning tech specs, QA and physical security plans.

The transition
from operation to
decommissioning

Regulatory
requirements,
cont'd

10 CFR 50.82, Termination of license

- The license can be terminated if:
 - ✓ The decommissioning has been performed in **accordance with the decommissioning plan**, and
 - ✓ The radiation survey results demonstrate that the facility and site meet the **criteria for decommissioning** in 10 CFR part 20, subpart E.

10 CFR Part 20,
Subpart E

Radiological
Criteria for
License
Termination

§ 20.1402 Radiological criteria for unrestricted use

A site will be considered acceptable for unrestricted use if the residual radioactivity results in a TEDE to an average member of the critical group that does not exceed **0.25 mSv (25 mrem) per year from all dose pathways** and is ALARA

Decommissioning Planning

10 CFR Part 20, Subpart E

§ 20.1406 Minimization of contamination

(c) Licensees shall, to the extent practical, conduct operations to **minimize the introduction of residual radioactivity into the site**, in accordance with the operating radiation protection requirements and the radiological criteria for license termination

Decommissioning Planning

10 CFR Part 20, Subpart F, Surveys and Monitoring § 20.1501 General

- Licensees shall survey areas, **including the subsurface**, that:
 - May be necessary for the licensee to comply with the regulations in this part; and
 - To evaluate -
 - The magnitude and extent of radiation levels;
 - Concentrations or quantities of residual radioactivity; and
 - The potential radiological hazards of the radiation levels and residual radioactivity detected.
- Records of the surveys describing **subsurface residual radioactivity** identified at the site must be kept with records important for decommissioning (§ 50.75(g)).

Decommissioning Planning

10 CFR 50.75 Reporting and recordkeeping for decommissioning planning

§ 50.75(f)(4): Each non-power reactor licensee shall submit a **preliminary DP** about 2 years prior to the projected end of operations, containing:

- A decommissioning cost estimate
- An up-to-date assessment of the major factors that could affect planning for decommissioning

Factors to be considered in the preliminary plan include:

- The decommissioning alternative;
- Major technical actions necessary to carry out decommissioning safely;
- The current situation regarding disposal of high- and low-level radioactive waste;
- Residual radioactivity criteria;
- Other site-specific factors which could affect decommissioning planning and cost.

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Decommissioning Planning

10 CFR 50.75
Reporting and
recordkeeping for
decommissioning
planning.

§ 50.75(g): Records important to the safe and effective decommissioning of the facility shall be kept by the licensee until the license is terminated. Including records of:

- ❖ **Spills or other unusual occurrences** involving the spread of contamination in and around the facility or site
- ❖ Locations in structures where radioactive materials were used and/or stored
- ❖ Descriptions of the licensed site area or other property used
- ❖ Records of surveys used to release of any property before decommissioning
- ❖ Decommissioning cost estimates and funding methods

Challenges

Identifying, and keeping accessible, records important to decommissioning

Knowledge management

Guidance

RTR Decommissioning

- Chapter 17, “Decommissioning and Possession-Only License Amendments” of NUREG-1537, Part 2, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-power Reactors”
- Interim Staff Guidance Augmenting NUREG-1537, Parts 1&2, dated October 30, 2012
- NUREG-1757, Vol 1, Rev 2, “Decommissioning Process for Materials Licensees”
- NUREG-1757, Vol 2, Rev 2, “Consolidated Decommissioning Guidance - Characterization, Survey, and Determination of Radiological Criteria”
- NUREG-1757, Vol 3, Rev 1, “Consolidated NMSS Decommissioning Guidance - Financial Assurance, Recordkeeping, and Timeliness”

Decommissioning Planning

- Reg Guide 4.21, “Minimization of Contamination and Radioactive Waste Generation: Life-cycle Planning”
- Reg Guide 4.22, “Decommissioning Planning During Operations”

Inspection

RTR Decommissioning Inspection

IP-69002# (after POL but before DP approval) addresses:

- Staffing and audits
- Operator (or Fuel Handler) requalification and active license status
- Radiological surveys
- Surveillances
- Emergency preparedness

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IP-69013* (after DP approval) focus on active decommissioning actions:

- Work and change controls
- Health physics
- Effluent controls and environmental monitoring
- Waste management and transportation

*ML040710157

Questions?