

Frequently Asked Questions on the Decommissioning of Nuclear Facilities

1. Decommissioning Process

- a. What is decommissioning?
- b. What types of facilities are regulated?
- c. Who regulates decommissioning activities?
- d. What is the process for decommissioning?
- e. Does a facility have to decommission?
- f. Who decides how a facility should be decommissioned?
- g. What happens to the site after decommissioning is completed?
- h. Does the licensee have an NRC license during decommissioning?
- i. What is the cleanup criteria for sites undergoing decommissioning?
- j. How does a facility demonstrate that they meet the cleanup criteria for decommissioning?
- k. How does the NRC ensure that the licensee will have the money needed to decommission?
- l. Who makes the estimates of decommissioning costs?
- m. Is the licensee obligated to pay for costs that may exceed the financial assurance amount?
- n. Will the NRC have inspectors onsite during decommissioning?
- o. What are the goals of NRC's inspection program?
- p. Are inspection related documents associated with decommissioning activities available on the NRC's website?
- q. Will there be continued monitoring of the site and offsite areas to measure releases of radioactive materials?
- r. Can building structures, systems and components be left in place at the time of license termination?

2. Public Involvement

- a. How can the public participate in the decommissioning process?
- b. Where can the public get more information about the decommissioning program?

3. Decommissioning Power Reactors

- a. What is the process for decommissioning a power reactor?
- b. What are the regulations for decommissioning?
- c. When does decommissioning end and who decides that decommissioning is complete?
- d. Are there documents from the NRC pertaining to decommissioning funding?

4. Decommissioning Research and Test Reactors

- a. What is the process for decommissioning?
- b. What are the regulations for decommissioning?
- c. When does decommissioning end and who decides that decommissioning is complete?
- d. Are there documents from the NRC pertaining to decommissioning funding?

5. Decommissioning Materials Facilities

- a. What is the process for decommissioning?
- b. What are the regulations for decommissioning?
- c. Are all materials facilities required to submit a DP?
- d. When does decommissioning end and who decides if it is complete?

e. **Are there documents from the NRC pertaining to decommissioning funding?**

6. **Decommissioning Uranium Recovery Facilities**

a. **What is the process for decommissioning?**

b. **What are the regulations for decommissioning?**

c. **Are all uranium recovery facilities required to submit a DP?**

d. **When does decommissioning end and who decides if it is complete?**

e. **Are there documents from the NRC pertaining to decommissioning funding?**

1. **Decommissioning Process**

a. ***What is decommissioning?***

Decommissioning is the process of removing a facility or site safely from service and reducing the residual radioactivity to a level that permits release of the property. It involves determining the amount of contamination at the site, developing and implementing cleanup plans, including health and safety procedures, developing surveys and cleanup levels, and conducting cleanup activities. Throughout the decommissioning process, steps are taken to ensure the protection of public health and safety, and the environment.

NRC regulations provide criteria for decommissioning sites without restrictions on future use (unrestricted use) and, under limited circumstances, for decommissioning sites with restrictions to protect public health and safety (restricted use).

b. ***What types of facilities are regulated?***

The following facilities are regulated by the U.S. Nuclear Regulatory Commission's Decommissioning Program:

- Nuclear power reactors- commercial nuclear power plants that generate electricity
- Research and test reactors- small nuclear reactors; typically used for educational purposes
- Certain fuel cycle facilities- facilities that mill, enrich, convert, or fabricate fuel elements out of uranium
- Uranium recovery facilities- conventional and In-Situ Leach (ISL) facilities that extract uranium from the ground
- Nuclear materials facilities- facilities that use radioactive material, such as hospitals

c. ***Who regulates decommissioning activities?***

NRC's Office of Federal and State Materials and Environmental Management Programs (FSME) is the lead for regulating the decommissioning activities at uranium recovery facilities, nuclear materials facilities, and certain fuel cycle facilities. FSME regulates the decommissioning of power reactors and research and test reactors after certain licensing actions are completed, that make the site more like an industrial facility, rather than an operating reactor.

NRC's Office of Nuclear Reactor Regulation regulates the decommissioning of most power and research and test reactors during the early stages of decommissioning.

NRC's Office of Nuclear Materials Safety and Safeguards regulates the fuel cycle facilities undergoing partial decommissioning.

NRC regional offices in Atlanta GA, Lisle IL, Arlington TX, and King of Prussia PA, execute established NRC policies and assigned programs relating to inspection, licensing, investigation, and enforcement of decommissioning activities.

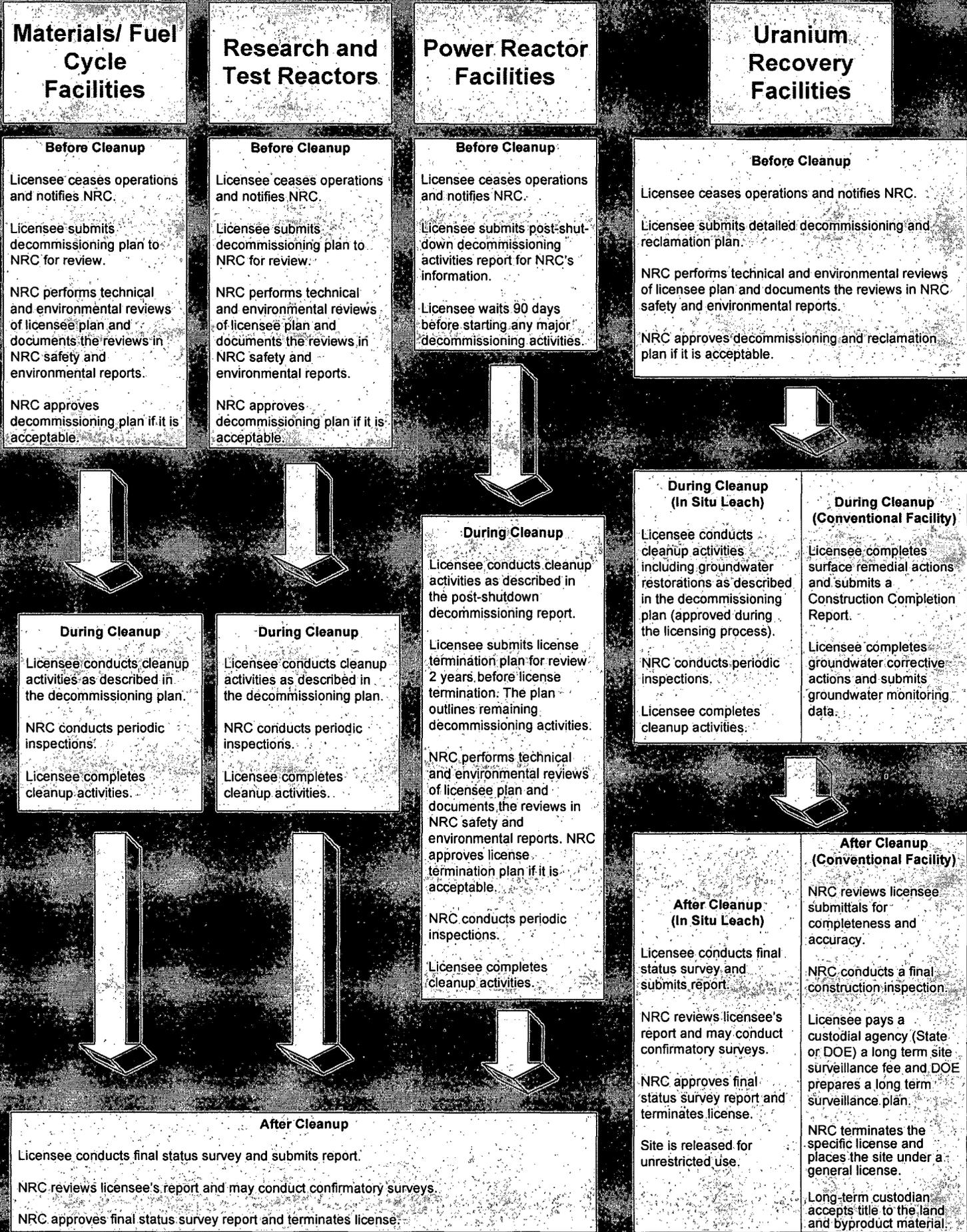
Agreement States implement and enforce the regulations for the decommissioning of source, byproduct, and small quantities of special nuclear material at facilities and sites in their States.

NRC will consult with EPA if: there is ground water contamination in excess of EPA's maximum contaminant levels, the radioactive soil concentrations exceed table 1 of the NRC/EPA Memorandum of Understanding, or when restricted release or the use of alternate criteria for license termination is contemplated. There are also sites that are undergoing decommissioning that are under the jurisdiction of other Federal agencies. The Department of Energy consults with NRC on many of its' sites. Additionally, the Army Corps of Engineers has responsibility for the cleanup of some sites under the Formerly Utilized Sites Remedial Action Program (FUSRAP). Finally, the Department of Defense has responsibility for defense related decommissioning under the Formerly Utilized Defense Sites (FUDS) program.

d. *What is the process for decommissioning?*

Please see the chart below.

General Decommissioning Process



Materials/ Fuel Cycle Facilities

Research and Test Reactors

Power Reactor Facilities

Uranium Recovery Facilities

Before Cleanup

Licensee ceases operations and notifies NRC.

Licensee submits decommissioning plan to NRC for review.

NRC performs technical and environmental reviews of licensee plan and documents the reviews in NRC safety and environmental reports.

NRC approves decommissioning plan if it is acceptable.

Before Cleanup

Licensee ceases operations and notifies NRC.

Licensee submits decommissioning plan to NRC for review.

NRC performs technical and environmental reviews of licensee plan and documents the reviews in NRC safety and environmental reports.

NRC approves decommissioning plan if it is acceptable.

Before Cleanup

Licensee ceases operations and notifies NRC.

Licensee submits post-shutdown decommissioning activities report for NRC's information.

Licensee waits 90 days before starting any major decommissioning activities.

Before Cleanup

Licensee ceases operations and notifies NRC.

Licensee submits detailed decommissioning and reclamation plan.

NRC performs technical and environmental reviews of licensee plan and documents the reviews in NRC safety and environmental reports.

NRC approves decommissioning and reclamation plan if it is acceptable.

During Cleanup

Licensee conducts cleanup activities as described in the decommissioning plan.

NRC conducts periodic inspections.

Licensee completes cleanup activities.

During Cleanup

Licensee conducts cleanup activities as described in the decommissioning plan.

NRC conducts periodic inspections.

Licensee completes cleanup activities.

During Cleanup

Licensee conducts cleanup activities as described in the post-shutdown decommissioning report.

Licensee submits license termination plan for review 2 years before license termination. The plan outlines remaining decommissioning activities.

NRC performs technical and environmental reviews of licensee plan and documents the reviews in NRC safety and environmental reports. NRC approves license termination plan if it is acceptable.

NRC conducts periodic inspections.

Licensee completes cleanup activities.

During Cleanup (In Situ Leach)

Licensee conducts cleanup activities including groundwater restorations as described in the decommissioning plan (approved during the licensing process).

NRC conducts periodic inspections.

Licensee completes cleanup activities.

During Cleanup (Conventional Facility)

Licensee completes surface remedial actions and submits a Construction Completion Report.

Licensee completes groundwater corrective actions and submits groundwater monitoring data.

After Cleanup

Licensee conducts final status survey and submits report.

NRC reviews licensee's report and may conduct confirmatory surveys.

NRC approves final status survey report and terminates license.

After Cleanup (In Situ Leach)

Licensee conducts final status survey and submits report.

NRC reviews licensee's report and may conduct confirmatory surveys.

NRC approves final status survey report and terminates license.

Site is released for unrestricted use.

After Cleanup (Conventional Facility)

NRC reviews licensee submittals for completeness and accuracy.

NRC conducts a final construction inspection.

Licensee pays a custodial agency (State or DOE) a long term site surveillance fee and DOE prepares a long term surveillance plan.

NRC terminates the specific license and places the site under a general license.

Long-term custodian accepts title to the land and byproduct material.

e. Does a facility have to decommission?

NRC's regulations require decommissioning at the end of the operating period. The alternative to decommissioning is "no action," implying that a licensee abandons or leaves a facility after ceasing operations. This is not a reasonable alternative to decommissioning.

f. Who decides how a facility should be decommissioned?

The licensee decides how to decommission their site. The process for decontamination and dismantlement may vary from site to site. Factors that are used to make these decisions include: cost, worker dose, availability of a waste site, and the layout and structure of buildings. For example, at some sites with large radioactive components, such as at a reactor, it may make more sense to segment the reactor vessel before removing it from the reactor building; in other cases, it would be appropriate to remove the reactor vessel through a hole cut in the side of the containment building and ship the reactor vessel intact.

g. What happens to the site after decommissioning is completed?

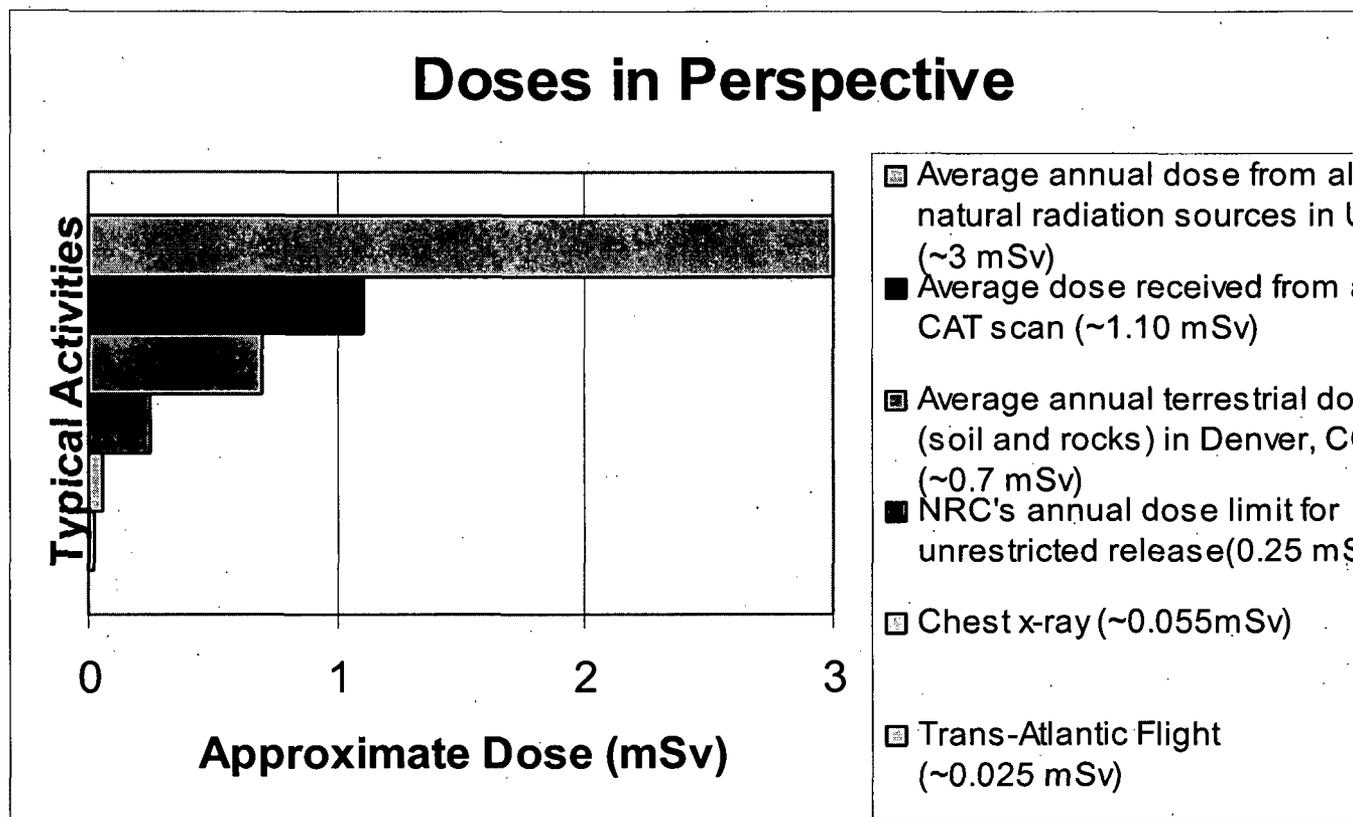
After the decommissioning process is completed, the license is usually terminated. For a license that is terminated under the unrestricted release criteria, no further restrictions are imposed on the future use of the site. For a site that is decommissioned under restricted release criteria, institutional controls will be imposed, to reduce exposures of people to the residual radioactivity remaining on the site. Additionally, for conventional uranium recovery facilities a custodial agency may take ownership of the land and byproduct material at the end of the decommissioning process.

h. Does the licensee have an NRC license during decommissioning?

Yes. The NRC license is not terminated until the licensee can demonstrate that it meets the criteria for site release in the regulations.

i. What is the cleanup criteria for sites undergoing decommissioning?

NRC's decommissioning regulations provide for the release of a site for unrestricted use and, under certain conditions, for restricted use. The criteria for license termination are provided in the Code of Federal Regulation, Title 10, Part 20, Subpart E. For unrestricted use, NRC has established a dose limit of 0.25 mSv/year [25 mrem/year] to an average member of the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity (the critical group). For restricted use, the dose to the average member of the critical group cannot exceed 0.25 mSv/year [25 mrem/year] with restrictions in place and cannot exceed 1 mSv/year [100 mrem/year] or in some rare instances 5 mSv/year [500 mrem/year] if the restrictions fail. Additionally, the residual radioactivity levels at the site must be as low as reasonably achievable. Please see the following chart for a perspective of different doses.



j. How does a facility demonstrate that they meet the cleanup criteria for decommissioning?

Licensees have two options for demonstrating that they meet the cleanup criteria for decommissioning. The first option allows the licensee to have derived concentration guideline levels pre-approved by NRC prior to site cleanup. After cleanup activities are completed, the licensee needs to prove to NRC that the site has been cleaned to previously approved standards. The second option for the licensee is to complete cleanup of the site and demonstrate that the site meets the cleanup criteria by calculating the dose resulting from the residual radiation.

Licensees use various scenarios, with NRC approval, in the dose assessments performed to demonstrate that they meet the cleanup criteria. Scenarios allow the licensees to examine the various pathways that doses could be received by future site occupants. The resident farmer scenario, which is the most conservative scenario, assumes that a farmer will live on the site, grow vegetables on the site, drink the site's water, eat livestock raised on the site, and go fishing on the site. For a more realistic scenario that matches the site conditions, the licensee will need to look at the land use for similar properties in the region. Shown below is a table of the different scenarios used to demonstrate that the site meets the cleanup criteria.

- Building occupancy
- Residential farmer
- Urban construction
- Residential
- Recreational user
- Maintenance worker
- Hybrid industrial building occupancy
- Drinking water

Different scenarios may include some or all of the following pathways for the future site occupants to receive doses:

- External exposure from soil;
- Inhalation of (re)suspended soil;
- Ingestion of soil;
- Ingestion of drinking water from the site;
- Ingestion of plant products grown onsite and using the site water to supply irrigation needs;
- Ingestion of animal products grown onsite; and
- Ingestion of fish from a pond filled with water from the site.

NRC will review the licensee's submittal to verify that appropriate assumptions about the use of the site have been used. The licensee must consult with local land use authorities in developing realistic scenarios for the site.

To verify that the license can be terminated, the licensee submits a final status survey report, which is a report describing the radiological conditions of the site. The NRC verifies the licensee's final status survey by reviewing it and/or conducting a separate or confirmatory survey. In addition, the licensee must demonstrate that the facility has been decommissioned in accordance with the approved license-termination plan or decommissioning plan.

k. How does the NRC ensure that the licensee will have the money needed to decommission?

NRC requires that financial assurance for decommissioning be provided by the following methods:

- **Prepayment**

In this case, at the start of operations, the licensee deposits enough funds into an account to pay for the decommissioning costs.

- **External sinking fund**

An external sinking fund is a fund established and maintained by setting funds aside periodically into an account segregated from licensee assets and outside the licensee's administrative control.

- **Surety method, insurance, or other guarantee method**

A surety method may be in the form of a surety bond, letter of credit, or line of credit.

NRC maintains control and security of financial instruments. The staff follows NRC Management Directive 8.12, "Decommissioning Financial Assurance Instrument Program," to ensure security and control of the instrument. In the event a licensee defaults before completing the decommissioning, the management directive specifies the process for drawing on the financial assurance instrument.

l. Who makes the estimates of decommissioning costs?

Some sites need site specific cost estimates. For these sites, the licensee makes site specific estimates of the decommissioning costs. These site specific estimates are then reviewed by the NRC. For sites that do not need specific cost estimates, there are minimum decommissioning funding amounts specified in 10 CFR Parts 30.35, 40.36, and 50.75.

m. Is the licensee obligated to pay for costs that may exceed the financial

assurance amount?

Yes, the licensee is obligated to complete decommissioning.

n. Will the NRC have inspectors onsite during decommissioning?

Yes, inspections are performed by the NRC headquarters staff and NRC regional personnel. The extent of onsite presence at a facility will depend on the activities taking place. During active decommissioning, NRC personnel may be at a facility 2 or 3 weeks of the month. During low-activity phases of decommissioning, they could be present several times a year.

o. What are the goals of NRC's inspection program?

The goals of the inspection program at nuclear facilities undergoing decommissioning are to:

- Obtain sufficient information through direct observation and verification to determine if decommissioning is being conducted safely, if the materials at the site are being stored safely, and if activities at the site are being conducted in accordance with all applicable regulations and commitments;
- Determine if the administrative controls that the licensee has in place are adequate and in accordance with regulatory requirements (the controls include self-assessments, audits and corrective actions, design control, safety review, maintenance and surveillance, radiation protection, and effluent controls); and
- Identify any significant declining performance trends and verify that the licensee has taken actions to reverse any negative trend.

p. Are inspection related documents associated with decommissioning activities available on the NRC's website?

Yes, the inspection manual chapters are available from the NRC website (<http://www.nrc.gov/reading-rm/doc-collections/insp-manual/>). The inspection reports are available from the [Public Document Room](#) and from the [Electronic Reading Room](#).

q. Will there be continued monitoring of the site and offsite areas to measure releases of radioactive materials?

Yes, in certain situations. The type and duration of monitoring is based on many factors such as: site disruptive processes, barriers and the mobility of the radioactive material. Monitoring for a site with radionuclides may only be needed for a limited time period to confirm compliance with modeling assumptions or to reduce uncertainty, or might be needed up to 1000 years for restricted use terminations.

r. Can building structures, systems and components be left in place at the time of license termination?

Yes, the NRC staff finds the following approaches acceptable to determine what materials may be left in buildings at the time of license termination.

- Materials left onsite meet previously approved release criteria- Building structures and systems and components may be left in place if residual radioactivity in all materials is within the licensee's previously approved criteria for releases of solid materials for unrestricted use.
- Materials left onsite meet "few millirem per year"- Building structures and systems and components may be left in place if residual radioactivity in all materials is volumetrically distributed (not surficial) and if the potential dose from offsite use scenarios is no greater than a few mrem per year.
- Materials left onsite meet 25 mrem/yr- Building structures may be left in place if the potential dose from the residual radioactivity in or on the structures and the land at the site are within the applicable dose criteria for the License Termination Rule (LTR).
- Alternate approaches- Licensees also may propose alternative approaches, which the staff will review on a case by case basis.

For all approaches, the residual radioactivity in building structures, systems and components, and all other media at the site (e.g. solid or groundwater) must be in compliance with the applicable criteria of the LTR.

2. Public Involvement

a. How can the public participate in the decommissioning process?

The public has many opportunities to participate in the decommissioning process:

- When a power reactor licensee submits a post-shut-down decommissioning activities report (PDSAR), and subsequently when a licensee submits a license termination plan (LTP), NRC will hold a public meeting in the vicinity of the facility after the submittal.
- When a materials licensee submits a decommissioning plan (DP), NRC may hold a public meeting in the vicinity of the facility if public interest is high.
- When a research or test reactor submits a DP, NRC may hold a public meeting in the vicinity of the facility if public interest is high.
- When a licensee begins preparing a DP proposing the restricted release decommissioning option, the licensee is required by the LTR to involve the affected parties to inform them of decommissioning options, seek their advice, and document their advice in the DP. The licensee's consideration of the advice of the affected parties is also documented in the DP.
- When NRC holds a technical meeting with a licensee, members of the public are allowed to observe the meeting (except when the discussion involves proprietary, sensitive, safeguards, or classified information).
- The public has an opportunity to provide comments whenever a licensee submits an environmental assessment, PDSAR, LTP, DP, or other license amendment request.
- There is an opportunity for a hearing whenever a licensee submits a request for a license amendment, which includes the submittal of DPs or amendments to DPs.
- Whenever NRC prepares an environmental impact statement (EIS), notice of availability of the draft EIS is published in the *Federal Register* and the draft is placed on the NRC's website for

public comment.

b. *Where can the public get more information about the decommissioning program?*

The public can use any of the following resources to learn more about the NRC's decommissioning program:

- <http://www.nrc.gov/about-nrc/regulatory/decommissioning.html>
- [NUREG 1757, "Consolidated Decommissioning Guidance"](#)
- [Fact Sheets and Brochures](#)
- Office of Public Affairs
Phone: 301-415-8200
E-mail: OPA@nrc.gov

3. Decommissioning Power Reactors

a. *What is the process for decommissioning a power reactor?*

Please see the [Decommissioning Process Chart](#).

b. *What are the regulations for decommissioning?*

Please go to <http://www.nrc.gov/about-nrc/regulatory/decommissioning/reg-guides-comm.html> for a comprehensive list of decommissioning regulations and guidance.

c. *When does decommissioning end and who decides that decommissioning is complete?*

The licensee may achieve license termination by successfully demonstrating implementation of their license termination plan, as approved by NRC. Please refer to the question "[What is the cleanup criteria for sites undergoing decommissioning](#)" for more information about the cleanup criteria.

d. *Are there documents from the NRC pertaining to decommissioning funding?*

Yes, the documents that pertain to decommissioning funding are:

- [Standard Review Plan on Power Reactor Licensee Financial Qualifications and Decommissioning Funding Assurance \(NUREG-1577\)](#);
- [Standard Review Plan for Evaluating Nuclear Power Reactor License Termination Plans \(NUREG-1700\)](#); and
- [Report on Waste Burial Charges \(NUREG-1307\)](#).

4. Decommissioning Research and Test Reactors

a. *What is the process for decommissioning?*

Please see the [Decommissioning Process Chart](#).

b. *What are the regulations for decommissioning?*

Please go to <http://www.nrc.gov/about-nrc/regulatory/decommissioning/reg-guides-comm.html> for a comprehensive list of decommissioning regulations and guidance.

c. *When does decommissioning end and who decides that decommissioning is complete?*

Decommissioning ends when the licensee submits a final status survey report and the NRC staff verifies that the final status report demonstrates compliance with both the decommissioning plan and the cleanup criteria. The NRC staff decides when decommissioning is adequate to terminate the license. Please refer to the question "[What is the cleanup criteria for sites undergoing decommissioning](#)" for more information about the cleanup criteria.

d. *Are there documents from the NRC pertaining to decommissioning funding?*

Yes, a document that pertains to decommissioning funding is:

- [Report on Waste Burial Charges \(NUREG-1307\)](#).

5. Decommissioning Material Facilities

a. *What is the process for decommissioning?*

Please see the [Decommissioning Process Chart](#). Additionally, for the decommissioning of sites where there were no releases to the environment in excess of 10 CFR 20 limits and no activation of adjacent materials, a simplified decommissioning process is available.

b. *What are the regulations for decommissioning?*

Please go to <http://www.nrc.gov/about-nrc/regulatory/decommissioning/reg-guides-comm.html> for a comprehensive list of decommissioning regulations and guidance.

c. Are all materials facilities required to submit a DP?

A DP is required if the decommissioning involves procedures that have not been approved by NRC and the procedures could increase public or worker doses.

d. When does decommissioning end and who decides if it is complete?

Decommissioning ends when the licensee submits a final status survey report and the NRC staff verifies that the final status report demonstrates compliance the decommissioning plan and meets the cleanup criteria. The NRC staff decides when decommissioning is adequate to terminate the license. Please refer to the question "What is the cleanup criteria for sites undergoing decommissioning" for more information about the cleanup criteria.

e. Are there documents from the NRC pertaining to decommissioning funding?

Yes, a related materials licensee decommissioning funding document is:

- Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness (NUREG-1757, Vol. 3).

6. Decommissioning Uranium Recovery Facilities

a. What is the process for decommissioning?

Please see the Decommissioning Process Chart.

b. What are the regulations for decommissioning?

Please go to <http://www.nrc.gov/about-nrc/regulatory/decommissioning/reg-guides-comm.html> for a comprehensive list of decommissioning regulations and guidance.

c. Are all uranium recovery facilities required to submit a DP?

No, only ISL facilities need to submit a DP. The DP submitted by ISLs is originally submitted when a facility first applies for its' operating license. Conventional uranium recovery facilities need to submit a construction completion plan, a decommissioning report and groundwater monitoring data.

d. When does decommissioning end and who decides if it is complete?

For ISL facilities, decommissioning ends when the licensee submits a final status survey report and the NRC staff verifies that the final status report demonstrates compliance with the decommissioning plan

and meets the cleanup criteria.

For conventional uranium recovery facilities, ending decommissioning is a multiple step process. When NRC reviews the licensee's construction completion report, decommissioning report, and groundwater monitoring data for completeness and accuracy and approves the documents, the specific license is terminated. However, after the specific license is terminated, a general license is issued and a custodial agency takes title of the land and material left on the site.

e. *Are there documents from the NRC pertaining to decommissioning funding?*

Yes, related uranium recovery decommissioning funding documents are:

- Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness (NUREG-1757, Vol. 3); and
- Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978 (NUREG-1620, Final Rev. 1).