

COMMUNICATION PLAN FOR IMPLEMENTATION OF THE DECOMMISSIONING PLANNING FINAL RULE

PURPOSE

This Communication Plan outlines the process for communicating key messages to internal and external stakeholders about the requirements of the Decommissioning Planning Rule (DPR) published in the *Federal Register* on June 17, 2011.

Decommissioning involves safely removing a facility from service and reducing residual radioactivity to a level that allows the NRC licensee to close out its license and safely release part or all of its property for other purposes. The DPR requires current licensees to 1) conduct their operations to minimize the introduction of residual radioactivity at their sites, and 2) perform scoping surveys to determine whether residual radioactivity is present in subsurface areas, and keep records of these surveys with records important for decommissioning. Materials licensees will need to report additional financial details in their decommissioning cost estimates and may need to adjust funding based on expected conditions at their sites at the time of license termination. Power reactor licensees being decommissioned will need to report additional information on the costs of decommissioning and spent fuel management. There are no significant changes to funding or reporting requirements for licensees of operating reactors.

KEY MESSAGES

I. FOR GENERAL AUDIENCES:

- The NRC has amended its regulations to improve decommissioning planning and reduce the likelihood that licensed facilities will become “legacy sites.”
 - Decommissioning involves safely removing a facility from service and reducing residual radioactivity to a level that allows the licensee to close out its license and safely release part or all of its property for other purposes.
 - Legacy sites are facilities in decommissioning with complex issues and an owner that can't complete the decommissioning work for technical or financial reasons.

- The revised regulation clarifies and builds on existing NRC requirements.
 - Licensees are already required to maintain radioactive releases and worker exposures as low as reasonably achievable (ALARA). This requires licensees to evaluate potential radiological hazards during facility operations and minimize and control waste generation. The revised rule clarifies that all licensees must also conduct their operations to minimize the introduction of residual radioactivity into their sites. (Residual radioactivity is radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the licensee's control. This includes radioactivity from spills and leaks, but doesn't include background radioactivity from natural sources or fallout from accidents or atmospheric weapons testing.)

- Licensees are also already required to conduct radiation surveys that are “reasonable under the circumstances” to evaluate the “magnitude and extent of radiation levels,” “concentrations or quantities of radioactive material,” and “potential radiological hazards.” The new rule clarifies this existing requirement by replacing its undefined term "radioactive material" with "residual radioactivity." If a site has residual radioactivity significant enough to require remediation before the site can be released for unrestricted public use, the licensee must also perform surveys to monitor the extent of contamination. These surveys will enable the licensee to determine whether additional measures are needed before the planned end of site operations, and whether these actions can be taken while maintaining releases and worker exposures ALARA.
- For both radioactive materials and reactor licensees, this final rule creates an incentive to take immediate action to remove residual radioactivity rather than risking a potentially large increase in the licensee’s financial assurance obligation for decommissioning.
- The final rule will go into effect on December 17, 2012, 18 months after its publication in the *Federal Register*. ([ML103500503](#))

II. FOR TECHNICAL AUDIENCES:

- The NRC has amended its regulations to improve decommissioning planning and reduce the likelihood that licensed facilities will become “legacy sites.” Legacy sites are facilities in decommissioning with complex issues and an owner that can’t complete the decommissioning work for technical or financial reasons. The final rule will go into effect on December 17, 2012, 18 months after its publication in the *Federal Register*. ([ML103500503](#))
- Licensees are already required by existing regulations to apply operating procedures and controls during facility operations to evaluate potential radiological hazards and minimize and control waste generation. The amended regulations clarify what licensees must do during operations to perform scoping surveys for significant residual radioactivity, including that in the subsurface.
- The new rule clarifies that maintaining releases and occupational exposures as low as reasonably achievable (ALARA) under existing 10 CFR part 20 regulations requires all licensees to conduct their operations to minimize the introduction of residual radioactivity into their sites, including subsurface soil and ground water.
- Licensees are also already required under Part 20 to conduct radiation surveys that are “reasonable under the circumstances” to evaluate the “magnitude and extent of radiation levels,” “concentrations or quantities of radioactive material,” and “potential radiological hazards.” The new rule clarifies this existing requirement by replacing its undefined term "radioactive material" with "residual radioactivity," a term already defined in Part 20 to include subsurface contamination.
- Most licensed sites do not have residual activity significant enough to require remediation. The new rule will likely require some materials licensees to perform subsurface scoping surveys to determine the extent of significant residual radioactivity in subsurface soil and groundwater. Records of site surveys to determine the presence or extent of significant residual radioactivity must be kept with records important for decommissioning.

- The new rule does not require licensees to remediate immediately contamination discovered during facility operations. At some sites, such remediation could compromise safe operation, particularly if the contamination is in the subsurface just below the facility. Although existing rules require remediation if necessary to permit unrestricted release of a site at license termination, they allow a materials licensee that detects subsurface contamination either to conduct immediate remediation or to plan for and provide funds in the form of financial assurance to conduct remediation at a later time, including at the time of decommissioning. A reactor licensee that detects subsurface contamination during operations may also conduct immediate remediation, but if the licensee meets the financial assurance requirements of [10 CFR 50.75](#)(b) and (c) for power reactors, under existing rules it is not required to provide any additional financial assurance information until 5 years before it ceases operation. Then it must submit “a preliminary decommissioning cost estimate [with] an up-to-date assessment of the major factors that could affect the cost to decommission.”
- Thus, for both materials and reactor licensees, this final rule creates a potential incentive for immediate remediation rather than risking an unplanned and potentially large increase in the licensee’s financial assurance obligation for decommissioning. Whenever the remediation occurs, however, the licensee is required to ensure that at the time of license termination the annual total effective dose equivalent (TEDE)¹ to an average member of the critical group² does not exceed 25 millirem (mrem) per year and that residual radioactivity has been reduced to ALARA levels. This final rule does not change or weaken that requirement.

GOALS

The key goals of this Communication Plan are: 1) to describe and explain to stakeholders and the interested public the new and amended NRC requirements to enhance decommissioning financial assurance; and 2) to enhance public confidence in NRC’s commitment and ability to regulate the decommissioning of nuclear facilities and licensed materials sites.

This communications plan will aid in the fulfillment of these goals by pursuing the following communications objectives:

1. Ensuring clear communications between NRC, other involved Federal and State agencies, NRC licensees, and the public; and

¹ Under [10 CFR 20.1003](#), *total effective dose equivalent (TEDE)* means “the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures). *Effective dose* is the product of the dose absorbed by the living tissue on or in the receptor’s body and a “quality factor” reflecting the fact that different types of radiation ionize tissue at different rates. This term also takes into account “all other necessary modifying factors [e.g., age and gender] at the location of interest [e.g., an organ or extremity of the subject’s body].” *Effective dose equivalent* is the sum of the products of the dose equivalent to the organ or tissue and the weighting factors applicable to each of the body organs or tissues that are irradiated (some organs are more susceptible to radiation damage than others). *Committed dose equivalent* accounts for the continuing internal dose from a long-lived radioactive material after it has been inhaled or ingested into the body. Committed dose equivalent is that dose to organs or tissues that will be received from an intake of radioactive material by an individual during the 50-year period following the intake. TEDE is the sum of external and committed internal effective dose equivalents.

² Under [10 CFR 20.1003](#), *critical group* is defined as “the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances.”

2. Increasing public understanding of the new requirements for monitoring and minimizing the release of residual radioactivity at licensed sites, and

3. Enhancing the assurance that sufficient funds will be available when needed for safe decommissioning and timely license termination of NRC- and Agreement State-licensed sites using byproduct and other radioactive materials. There are no changes to funding requirements for operating power or non-power reactor licensees.

BACKGROUND

In 1997, the Commission published as 10 CFR 20 subpart E a related final regulation on Radiological Criteria for License Termination for all licensees. Known as the License Termination Rule (LTR), it also required license applicants for new or amended licenses to address in their applications specific radiological criteria to allow termination of a license based on removing residual radioactivity. For unrestricted release of a site, public doses must be reduced to 25 mrem per year or less and be ALARA.

In 2002, the Commission directed the staff to conduct an analysis of LTR implementation issues, and the staff presented results and recommendations in May, 2003. ([SECY-03-0069](#)) Among these recommendations was a set of measures to prevent future legacy sites, defined as facilities in decommissioning with complex issues and owners who cannot complete the decommissioning work for technical or financial reasons. The Commission approved the staff's recommendations in November, 2003, and authorized development of a technical basis to support a proposed rule to implement them. ([ML033210595](#))

In 2005 and 2006, several nuclear power plant operators reported inadvertent and unmonitored radioactive liquid releases, primarily tritium contained in water. In some instances, the licensee did not recognize the release until years after it apparently began. A Task Force chartered by the Executive Director for Operations (EDO) conducted a lessons-learned review of these incidents, and identified the need to clarify existing requirements to ensure that licensees are achieving ALARA public and occupational exposures during the life cycle of the facility, including the decommissioning phase. ([ML062650312](#)) This information was factored into the rulemaking.

In developing the technical basis for the proposed rule, the NRC conducted two public interactions to gather stakeholder comments. It held a 2-day public workshop in April, 2005, to solicit public comments covering changes in licensee operations and financial assurance for materials licensees. A 1-day public roundtable meeting in January 2007 solicited public comments on specific topics in the technical basis for the proposed rule. NRC also presented papers on the technical basis scope of the rulemaking at American Nuclear Society conferences in 2004, 2005, and 2006, and at other stakeholder forums.

In October, 2007, the staff requested approval to publish a proposed rule consistent with the Commission's November, 2003, Staff Requirements Memorandum (SRM) and the public comments from the workshop and roundtable meeting. ([ML072390153](#)) The Commission approved the staff's request in December, 2007, ([ML073440549](#)), and the proposed rule was published for comment in the *Federal Register* in January, 2008. ([73FR3812](#))

As a result of public comments, one planned revision to financial assurance requirements was removed from the proposed rule: that parent companies providing guarantees for any or all of

the decommissioning fund become jointly and severally liable for the entire cost of decommissioning. After conducting a November 2008 public meeting to discuss this change in the scope of the final rule ([ML082960390](#)), NRC staff submitted a revised draft final rule to the Commission in March, 2009. ([ML090490280](#)) The Commission approved publication of the final rule on December 1, 2010 ([ML103350034](#)), and it was published on June 17, 2011. ([76 FR 35512](#))

COMMUNICATIONS TEAM

NRC Points of Contact

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EXTERNAL AUDIENCES

These are stakeholders external to NRC that have an interest in, or are affected by, our regulatory programs and decisions on decommissioning planning. They include: licensees; applicants; other Federal, State, Tribal, and Local Governments; industry groups; members of the public; environmental and business organizations; civic and public interest groups; Congressional representatives; and the media. The staff’s communications strategy is to enable more informed stakeholders to communicate accurately and effectively with other interested parties.

OPA staff has posted on NRC’s e-mail listserv an electronic copy of the press release on the *Federal Register Notice*, and FSME staff has begun issuing e-mail notices to the following organizations:

American Nuclear Society (ANS)
Beyond Nuclear
Conference of Radiation Control Program Directors (CRCPD)
Environmental Council of the States (ECOS)
Health Physics Society (HPS)
Institute of Nuclear Materials Management (INMM)
National Association of Insurance Commissioners (NAIC)
National Association of Regulatory Utility Commissioners (NARUC)
National Congress of American Indians (NCAI)
National Organization of Test, Research, & Training Reactors (TRTR)
Nuclear Energy Institute (NEI)
Nuclear Information and Resource Service (NIRS)
Organization of Agreement States (OAS)
State Liaison Officers (SLOs)
Union of Concerned Scientists (UCS)

INTERNAL AUDIENCES

Stakeholder organizations within NRC include: the Commission; the Office of the Executive Director for Operations (OEDO); the Office of Nuclear Materials Safety and Safeguards (NMSS); NRR; OPA; OCA; NRC Regional Offices, the Office of the General Counsel (OGC); the Advisory Committee on Reactor Safeguards (ACRS); and the Advisory Committee on Medical Uses of Isotopes (ACMUI). Upon publication of the final rule, the press release and this Communications Plan will be provided to the appropriate contacts in each of these organizations.

TOOLS

Internal NRC Web Site – To make this communications plan available to all interested NRC stakeholders, it will be posted on our website for communications plans.

External NRC Web Site – The public NRC website on decommissioning, <http://www.nrc.gov/about-nrc/regulatory/decommissioning.html>, provides extensive background material on the subject. This web page will be updated to provide information and reference documents on the final rule. One update will be a link to the Qs&As in Attachment 1 of this Plan. Other links will direct the reader to available guidance on the financial assurance provisions of the rule, and plans for development of guidance for site surveys and monitoring.

Workshop on Survey and Monitoring Guidance – DWMEP staff will conduct a workshop for interested members of the public to solicit written comments on the Draft Guidance DG-4014. An NRC staff summary, transcript, and any written post-workshop comments by external attendees will be made available afterward on the NRC external web page.

Category 3 Public Webinar – The NRC staff is planning to host a web-based seminar to present new and amended regulations in the final rule, and to answer questions about the rule's implementation. The webinar will be announced in advance on NRC's web page for upcoming public meetings, and FSME staff will notify affected industry and public interest stakeholder organizations in time to permit them to participate. An NRC staff summary, transcript, and any written post-webinar comments by external attendees will be made available afterward on the NRC external web page.

Regional State Liaison Officers Monthly Teleconference –These NRC regional representatives will be informed via teleconference of the final rule’s publication.

Regional inspectors will be provided the regulatory guide for their use in conducting inspections of licensee implementation of the final rule.

Meetings of Affected Stakeholder Organizations – The NRC staff will explore the possibility of providing briefings or papers on the key elements of the decommissioning planning rule at currently-planned meetings of stakeholder organizations. Table 1 below provides a list of such meetings with their currently-planned dates and locations over the remainder of the 2011 calendar year. An NRC staff summary will be made available afterward on the NRC external web page.

**Table 1.
Planned NRC or Stakeholder Organization Conferences
As Potential Venues for Outreach to Industry Parties
Potentially Affected by the
Final Decommissioning Planning Rule**

NRC Responsible Office	Conference Dates	Conference	Conference Location	NRC-Regulated Industry/Groups And other Stakeholders
TBD	Oct 30 – Nov 3	2011 ANS Winter Meeting and Nuclear Technology Expo	Washington, DC Omni Shoreham Hotel	Reactor licensee and related support organizations
NRR	1. June 28-30	1. RETS/REMP* Workshop	1. Marriott Oak Brook Chicago, Illinois	1. Environmental compliance managers
	2. July 12	2. Nuclear Fuel Supply Forum	2. W Hotel Washington, D.C.	2. Fuel Cycle, SFST**, Cask suppliers/vendors/ certificate holders/ licensees
	3. August 15 – 18	3. NEI Health Physics Information Forum	3. Seattle, WA	3. Power Reactor Health Physics managers
	4. October, TBD	4. Licensing Information Forum	4.TBD	

NMSS	1. June 7–8	1. Fuel Cycle Information Exchange	1. Legacy Hotel & Meeting Centre Rose Hill Ballroom, 1775 Rockville Pike, Rockville, MD	1. Fuel Cycle, SFST, Cask suppliers/vendors/certificate holders/licenseses
FSME	1. Public Workshop on guidance for DPR surveying and monitoring 2. August 22-25 (Call for papers 4/30)	1. FSME/DWMEP 2. Organization of Agreement States 2011 Annual Meeting	1. TBD (Fall 2011) 2. OMNI Hotel, Richmond, VA	1. Environmental compliance managers for Power Reactors, RTRs, Fuel Cycle, SFST licensees, suppliers, vendors 2. State and Federal radiation protection agencies

*Radiological Environmental Monitoring Program/Radiological Environmental Technical Specifications

** Spent Fuel Storage and Transportation

DECOMMISSIONING PLANNING RULE: ADAMS ML103500503.

ATTACHMENT 1

Questions and Answers

Questions and Answers

Decommissioning Planning Final Rule

1. What is decommissioning?

To decommission means to remove a facility or site safely from service and reduce residual radioactivity to a level that permits either: (1) release of the property for unrestricted use and termination of the license; or (2) release of the property under restricted use and termination of the license. Restricted conditions mean that the licensee or its successor must control access by the public, using such means as fences, guards, alarms, and signs. A key objective of the decommissioning planning rule is to require licensees to document the extent of residual radioactivity at their sites.

2. What is residual radioactivity?

As defined in existing NRC radiation protection regulations ([10 CFR 20.1003](#)), residual radioactivity means radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the licensee's control. This includes radioactivity from all licensed and unlicensed sources used by the licensee, but it excludes background radiation from cosmic sources, naturally occurring radioactive material, and global fallout from the testing of nuclear explosive devices or from past nuclear accidents such as Chernobyl that are not under the licensee's control. Residual radioactivity also includes radioactive materials remaining at the site as a result of routine or accidental releases of radioactive material and previous burials at the site, even if those burials were made in accordance with NRC requirements at the time.

3. When does residual radioactivity become “significant” for decommissioning planning purposes?

The NRC considers “significant” residual radioactivity to be a quantity of radioactive material that would later require remediation during decommissioning to meet the unrestricted use criteria of [10 CFR 20.1402](#). Under these criteria, a site will be acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE)³ to an average member of the critical group⁴ that does not

³ Under [10 CFR 20.1003](#), *total effective dose equivalent (TEDE)* means “the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures). *Effective dose* is the product of the dose absorbed by the living tissue on or in the receptor's body and a “quality factor” reflecting the fact that different types of radiation ionize tissue at different rates. This term also takes into account “all other necessary modifying factors [e.g., age and gender] at the location of interest [e.g., an organ or extremity of the subject's body].” *Effective dose equivalent* is the sum of the products of the dose equivalent to the organ or tissue and the weighting factors applicable to each of the body organs or tissues that are irradiated (some organs are more susceptible to radiation damage than others). *Committed dose equivalent* accounts for the continuing internal dose from a long-lived radioactive material after it has been inhaled or ingested into the body. Committed dose equivalent is that dose to organs or tissues that will be received from an intake of radioactive material by an individual during the 50-year period following the intake. Thus, as the sum of external and committed internal effective dose equivalents, TEDE is the most comprehensive measure of radiation doses.

exceed 25 mrem (0.25 mSv) per year, and the residual radioactivity has been reduced to levels that are ALARA. This total includes doses from groundwater sources of drinking water.

A quantity of radioactive materials that constitutes “significant” residual radioactivity will be different from site to site, because the conditions that would affect the total dose calculation, such as climate, topography, soil characteristics, proximity to surface water, and subsurface geology and hydrology, differ at each site. Thus, each licensee with residual radioactivity onsite will need to determine whether this radioactivity is significant enough to require remediation before the site can be released for unrestricted use at license termination. To make this determination, licensees may compare their ground water or soil samples to pre-established benchmark values such as those in:

- NUREG 1757, *Consolidated Decommissioning Guidance*, [Volume 2](#), Appendix H, Screening criteria
- 10 CFR Part 20, Appendix B, [Table 2](#)
- License termination conditions for [previously decommissioned reactors](#)

4. What are financial assurances?

Financial assurances are arrangements provided by a licensee to ensure that adequate funds for decommissioning will be available when needed. Each NRC licensee has a regulatory obligation to decommission its facility properly. All nuclear power reactors and about 7 percent of NRC materials licensees must provide decommissioning financial assurance. This financial assurance may be in the form of funds set aside by the licensee or a guarantee that funds will be available when needed. The guarantee may be provided by a qualified third party or, upon passage of a financial test, by the licensee. The third party may be the parent company of the licensee, which is the case for about 10 percent of the NRC materials licensees who are obligated to have decommissioning financial assurance.

Nuclear power reactors have financial assurance obligations that are different from materials licensees. The minimum amount of financial assurance for reactors is defined in [10 CFR 50.75](#), and this rulemaking does not change this required minimum amount. Acceptable financial assurance mechanisms for power reactors are defined in § 50.75(e)(1). An external sinking fund (discussed in Question 19 below) is used to provide financial assurance for about 90 percent of the reactors. The remaining 10 percent of reactors have assurance through prepaid funds and/or guarantees.

5. What is the purpose of the Decommissioning Planning Rule?

The purpose of the regulation is to improve licensee planning for completing site decommissioning and terminating the license, and thereby reduce the likelihood that any currently operating facility will become a legacy site – a site with complex decommissioning issues for which the licensee lacks adequate financial assurance to complete decommissioning to radiologically safe and environmentally acceptable levels.

⁴ Under [10 CFR 20.1003](#), *critical group* is defined as “the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances.”

6. How would you summarize what the Decommissioning Planning Rule requires?

The amended regulations require licensees to conduct their operations to minimize the introduction of residual radioactivity into the site, which includes the site's subsurface soil and ground water. Licensees also may be required to perform site surveys to determine whether significant residual radioactivity is present in subsurface soil or water. The amended regulations require licensees to keep records of these surveys with records important for decommissioning, and for materials licensees to provide additional details in their decommissioning cost estimates (DCEs). For materials licensees, the escrow account and line of credit are eliminated as approved financial assurance mechanisms, and the rule modifies other financial assurance requirements. Materials licensee must update decommissioning cost estimates annually and adjust their financial assurance accordingly. In addition, the amended regulations require decommissioning power reactor licensees to report additional information on the costs of spent fuel management and decommissioning.

7. How would the new rule change existing NRC requirements for radiation protection?

The rule amends [10 CFR 20.1406](#)(c) to clarify that, "to the extent practical," licensees must conduct their operations to "minimize" the introduction of "residual radioactivity" (a term already defined in [10 CFR 20.1003](#), as noted in Question 2 above). The new 10 CFR 20.1406 also clarifies that "site" now includes the "subsurface," which includes soil, saturated soils, and groundwater.

The clarified language in 10 CFR 1406(c) is a logical extension of current requirements in 10 CFR 20 to maintain radiation doses to workers and the public that are as low as reasonably achievable. The current [10 CFR 20.1101](#)(b) requires each licensee to use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are ALARA. To achieve doses that are ALARA during facility operations and decommissioning, these operating procedures and controls must apply to potential as well as actual radiological hazards and to methods used by the licensee to minimize and control waste generation. Based on past NRC experience, significant concentrations or quantities of unmonitored contamination have been a major contributor to a site's becoming a legacy site and potential radiological hazard.

8. How would the new rule change existing NRC requirements for radiation surveys and monitoring?

Before this final rule, [§ 20.1501](#)(a) required licensees to perform surveys necessary to comply with Part 20 requirements, including surveys "reasonable under the circumstances" to evaluate potential radiological hazards. The amended rule requires radiological surveys reasonable under the circumstances (such as scoping surveys), sufficient to understand the extent of significant residual radioactivity, including that in the subsurface. The final rule does not add any new requirements regarding site characterization.

Slow and long-lasting leaks of radioactive material into the onsite subsurface may eventually produce radiological hazards and pose a risk for creation of a legacy site if contaminant characteristics are not identified when the facility is operating. The staff views radiological hazards as including those resulting from subsurface contaminating events, when these events produce significant residual radioactivity that would later require remediation during decommissioning to meet the unrestricted use criteria of [10 CFR 20.1402](#). An effective approach to understand the extent of subsurface residual radioactivity is through the use of radiological scoping surveys.

9. What kinds of licensees are likely to be affected by the new survey and monitoring requirements for decommissioning planning?

The vast majority of NRC materials licensees do not have processes that would cause subsurface contamination. NRC's expectation is that these licensees, including those that release and monitor effluents of short-lived radionuclides to municipal sewer systems, will not be affected by the new rule. The accumulation of radionuclides at municipal waste treatment facilities was the subject of an Interagency Steering Committee on Radiation Standards (ISCORS) study (NUREG-1775, November 2003, [ML033140171](#)), which concluded that, in general, these facilities do not have sufficient concentrations of long-lived radionuclides to require additional monitoring or long-term controls. Other classes of licensees that are generally not expected to introduce significant residual radioactivity into the subsurface include broad scope academic, broad scope medical, and small research and test reactor licensees. Draft Regulatory Guide DG-4014, to be issued for public comment after this final rule, proposes an acceptable method for these licensees to evaluate the subsurface residual radioactivity. ([ML111230072](#))

Several hundred NRC materials licensees possess radioactive material and have liquid processes that could cause subsurface contamination. These licensees generally are compliant with regulations that limit effluent release to the environment over a specified time. Some of these licensees may not have documented onsite residual radioactivity, such as spills, leaks and onsite burials that may be costly to remediate during decommissioning and should be considered in arriving at an accurate DCE. There have been instances of previously unidentified soil and ground-water contamination at uranium and rare-earth metal recovery sites undergoing decommissioning in several states, notably Colorado and Pennsylvania. The NRC believes that a small number of materials licensees will need to perform additional monitoring compared to their current practices because of significant residual radioactivity at their sites.

Power reactor licensees have exhibited a high level of ALARA discipline with respect to effluent release and known spills and leaks. Current NRC regulations in [§ 20.1301](#), [§ 20.1302](#), and [§ 50.36a](#) ensure that power reactor licensees maintain adequate monitoring and surveys of radioactive effluent discharges, with annual reporting requirements outlined in § 50.36a(2) that are made available to the public on the NRC web site. The NRC inspects power reactor licensees to assess whether they have completed and are maintaining their commitments to meet the industry's voluntary Groundwater Protection Initiative (GPI). This includes inspecting licensees' environmental and effluent reports under which they are required to document onsite ground water sample results for each calendar year. This information is publicly available in ADAMS and on the [NRC web site](#) on radioactive effluents and environmental reports.

10. How many "legacy sites" are there now?

Most of the several hundred materials licenses NRC terminates each year are routine actions, and the sites require little, if any, remediation to meet NRC's unrestricted use criteria. There are other sites, however, where more complex decommissioning actions are needed. At the end of 2010, there were 6 legacy sites among the complex materials sites undergoing decommissioning.

11. If there are so few legacy sites, why is NRC refining its radiation protection rules and applying new financial reporting requirements?

The short answer is that we want to keep it that way. We want to enhance our assurance to the public that there will be no new legacy sites that could have been avoided with this more risk-informed, performance-based regulation taking advantage of all that we've learned.

Based on past NRC experience, significant concentrations or quantities of undetected and unmonitored contamination have been a major contributor to a site's becoming a legacy site and a potential radiological hazard. Two contributing factors to the accumulation of unidentified subsurface contamination are: reluctance among some licensees to spend funds during operations to perform surveys and document spills and leaks that may later affect decommissioning; and reluctance to implement procedures for waste minimization. This rule addresses both.

Appropriate surveys are essential for determining the adequacy of financial assurance for materials licensees, and need to be done periodically on a limited basis during operations when the DFP and financial assurance can be adjusted while the licensee is still generating revenue. This is far superior to the current practice at some facilities of delaying even limited survey work at the site until after the facility has been shut down.

Another factor that may contribute to future legacy sites is the delayed identification of contamination on the site. Over a long time, contamination that migrates in subsurface soil or ground water typically does not cause immediate exposure to either workers or the public that approaches the limits specified in 10 CFR Part 20. It is only after operations have ceased, when the possible results of unlimited access to the site, and associated exposure pathways (i.e., ingestion and inhalation) are being evaluated, that the volume of contamination has become apparent.

Facilities that process large quantities of licensed material, especially in fluid form, have the potential for causing significant environmental contamination. Leaks from these facilities can lead to large amounts of radioactive contamination entering the subsurface environment over an extended time. Although estimated doses from this contamination are most likely to be below the limits in 10 CFR Part 20 that would require immediate remedial actions, the accumulation of low levels of contamination over years of operation could result in the licensee's discovering, too late, that its financial assurance is inadequate to fund the extent of decommissioning needed to permit release of the site for unrestricted use. In such cases, if the licensee is unable to provide the fences, gates, guards, alarms, and other resources needed to keep access to the site restricted over many years, the costs may well fall to state or federal taxpayers, or both.

A third factor the staff considered in preparing this final rule, particularly relevant to the need to minimize the introduction of residual activity at this site, is the high cost to dispose of radioactive materials offsite. These costs are a concern even when the material contains relatively low concentrations of radioactivity. A continued trend of increasingly higher disposal costs could delay decommissioning and increase the number of environmental contamination incidents from long-term storage or onsite burial of this material at operating facilities, resulting in higher decommissioning costs.

12. Have there been any unplanned releases from licensed operating facilities to date?

Yes. In addition to the releases from materials licensee facilities that have led to their becoming legacy sites, several operating fuel cycle and other materials licensees have experienced inadvertent releases of radioactive material that could result in additional residual radioactivity at the site. In addition, several nuclear power plants have reported inadvertent and unmonitored releases of liquid tritium,⁵ which resulted in ground-water contamination. In some instances, the

⁵ Tritium (H-3) is a weak radioactive isotope of the element hydrogen that occurs both naturally and during the operation of nuclear power plants. It has a half-life of 12.3 years and emits a weak beta

release of radioactive liquid was not recognized by the licensee until years after the release apparently began. The NRC Executive Director for Operations chartered a Task Force to conduct a lessons-learned review of these incidents. The Task Force Final Report ([ML062650312](#)) dated September 1, 2006, concluded that the levels of tritium and other radionuclides measured thus far do not present a health hazard to the public. But the Report did identify, among other things, the need to clarify existing licensee requirements to demonstrate that they have achieved public and occupational exposures that are ALARA during the life cycle of the facility, including the decommissioning phase.

13. What's being done about these unplanned releases?

To address the issue of inadvertent and unmonitored releases, the Nuclear Energy Institute (NEI) developed voluntary guidance for licensees in the industry Ground Water Protection Initiative ([ML072600295](#)). The GPI is a site-specific ground water protection program to manage situations involving inadvertent releases of licensed material to ground water and to provide timely communication to appropriate State/Local officials, with follow-up notification to the NRC as appropriate.

The NRC inspects power reactor licensees to assess whether they have completed and are maintaining their commitments to meet the GPI. This information is publicly available in ADAMS. Between August 2008 and August 2010, NRC inspected all 65 sites with operating nuclear power plants to determine whether the licensees had installed the necessary procedures and processes to respond to a leak or spill of radioactive material to groundwater. A report summarizing its findings was released in April 2011. ([ML11088A047](#)) The NRC will conduct additional inspections at all sites using a follow-up Temporary Inspection to verify full implementation of the GPI.

14. Why is NRC requiring changes in financial assurance reporting for decommissioning reactors?

§ 50.82(a) of the new rule revises the annual financial assurance reporting requirements for power reactor licensees undergoing decommissioning to provide information necessary to determine whether the licensee has financial assurance adequate to complete decommissioning. If not, the licensee will be required to provide additional financial assurance. The annual reports must identify yearly decommissioning expenditures, the remaining balance of decommissioning funds, and a cost estimate to complete decommissioning. Under 10 CFR 50.82(a)(8), the annual reports must identify the amount of funds accumulated to manage irradiated fuel, the projected cost of managing the irradiated fuel until title and possession is transferred to the Secretary of Energy, and, if necessary, a plan to obtain additional funds to cover the cost of irradiated fuel management.

Although several power reactor licensees have successfully decommissioned their reactor sites consistent with 10 CFR Part 20 requirements, in some cases, reactor decommissioning costs have exceeded the initial DCE. The Connecticut Yankee Nuclear Plant, for example, experienced higher decommissioning costs than planned, due in part to a larger volume of contaminated soil than was identified in the initial site characterization.

particle. The most common form of tritium is in water, since tritium and normal hydrogen react with oxygen in the same way to form water. Tritium replaces one of the stable hydrogens in the water molecule, H₂O, and creates tritiated water, which is colorless and odorless.

In the past, NRC has not required power reactor licensees to submit details of actual decommissioning costs, since each licensee's status as a regulated public utility provided access to cost-of-service rate recovery to help provide additional funds. A public utility also had protected access to sales revenues from its service territory to fund its obligations, even if rate recovery was limited.

Deregulation of the electric industry now permits a reactor licensee to operate as a merchant plant not subject to rate regulation and with no access to rate recovery of costs of service. When the merchant plant reactor ceases operation, the licensee may have no sales revenues. The licensee may be organized as a separate company or a subsidiary of a holding company to isolate the risks and rewards of selling electricity on the open market. Without access to rate relief, no sales revenues, and with the licensee's owner protected by limited liability, shortfalls in decommissioning funding may jeopardize timely completion of decommissioning. This final rule provides NRC regulatory authority to perform oversight to assure that the licensee anticipates potential shortfalls and takes steps to control costs to stay within its budget or obtain additional funds.

15. How does this rule affect financial assurance reporting requirements for power reactors?

Under [10 CFR 50.75\(f\)\(3\)](#) of existing rules, a power reactor licensee must provide a preliminary DCE five years before the projected end of the affected reactor's operation. This estimate must provide "an up-to-date assessment of the major factors that could affect the cost to decommission," including the cost of remediating any detected subsurface contamination that would result in radiation exposure in excess of the license termination criteria. Until that time, however, the power reactor licensee must submit a decommissioning fund status (DFS) report at least once every 2 years pursuant to 10 CFR 50.75(f). The DFS report must include the amount of decommissioning funds estimated to be required under 10 CFR 50.75(b) and (c).

Power reactor licensees may report either the amount calculated using the formulas of 10 CFR 50.75(c), or a site-specific cost estimate that may be more, but not less, than the amount calculated by the formulas. For power reactors reporting the formula amount, the cost of remediating subsurface contamination detected during operation is not required to be included. However, for site-specific cost estimates, a power reactor licensee must address any subsurface contamination that is detected and estimate the associated cost of remediation.

16. How does this rule affect financial assurance reporting requirements for non-power reactors?

Under unchanged existing rules, non-power research and test reactors (RTRs) must submit 2 years before their projected end of operations a preliminary decommissioning plan containing a DCE and "an up-to-date assessment of the major factors that could affect planning for decommissioning."

17. How does this rule affect financial assurance reporting requirements for materials licensees?

The new rule requires more detailed reporting by materials licensees of their decommissioning cost estimates (DCEs), and imposes tighter controls on the financial instruments used to provide decommissioning financial assurance. To enhance assurance that decommissioning funds will be available when needed even if the licensee is in financial distress, the rule eliminates the escrow account as an approved financial assurance mechanism for materials licensees, and the line of credit as an approved financial assurance mechanism for all

licensees. No NRC licensees are currently using lines of credit for decommissioning financial assurance.

18. How does this rule affect the way reactors provide financial assurance for decommissioning?

Except for elimination of the line of credit, the new rule does not affect financial assurance methods now in use by operating reactors, including research and test reactors. It does, however, now require each power reactor licensee undergoing decommissioning to provide a more detailed DCE, and a cost estimate for managing irradiated fuel in the licensee's post-shutdown decommissioning activities report. In addition, reactor licensees that have permanently ceased operations are now subject to annual financial assurance reporting requirements that include additional detail on actual costs to date and the cost to complete decommissioning. The rule clarifies that a permanently shut down reactor licensee must provide financial assurance to cover the cost to complete decommissioning. Permanently shutdown power reactors will be required to report annually on the status of funding for managing irradiated fuel.

19. Why does this final rule eliminate lines of credit and escrow accounts as acceptable financial assurance mechanisms for decommissioning?

This final rule eliminates the line of credit option from the list of surety, insurance, or other guarantee methods that may be used to provide financial assurance for decommissioning. Although the line of credit was initially authorized to provide an alternative to licensees that elected not to use a surety or letter of credit, the NRC recognized that it posed a greater risk than the other two surety methods, because it might be subject to underlying loan covenants that could make it more vulnerable to cancellation if the licensee experienced financial difficulties. Since 1988, moreover, no NRC licensees have elected to use a line of credit to provide financial assurance for decommissioning. Because of its greater risk of cancellation and its non-use by licensees, the NRC has decided to eliminate the line of credit as an alternative for providing financial assurance for decommissioning.

While the NRC agrees that a number of options should be available to licensees subject to financial assurance requirements, the NRC must balance cost and availability with other factors, including especially the ability of the mechanism to provide funds for decommissioning when needed. The NRC concluded that an escrow account provides a lower degree of assurance as compared to a trust account. This conclusion was based on an evaluation performed by the US EPA when it decided not to allow the escrow account as a financial assurance method for hazardous waste operators. Accordingly, the NRC has removed the escrow from the list of approved mechanisms for affected materials licensees.

20. Now that the rule has eliminated escrow accounts and lines of credit as acceptable financial assurances for materials licensees, what other kinds will NRC accept?

As of December 31, 2006, there were about 300 NRC materials licensees that have a regulatory obligation to provide approved financial assurance mechanisms. An acceptable financial assurance mechanism for unrestricted use decommissioning is any of the following four types of financial instruments:

- *A prepayment of the applicable decommissioning costs.* The prepayment method for materials licensees is full payment in advance of decommissioning using an account

segregated from licensee assets and outside the licensee's administrative control.⁶ About 11 percent of current financial assurance mechanisms for materials licensees are prepayment methods, with most of these being escrow accounts. Currently accepted prepayment mechanisms include escrow accounts (8 percent), trust funds (2 percent), certificates of deposit (1 percent), government funds (0 percent), and deposits of government securities (0 percent). This final rule eliminates all prepayment mechanisms except the trust fund.

- *A guarantee to pay the decommissioning costs issued by a qualified third party or the licensee.* The guarantee method can be used by licensees that demonstrate adequate financial strength through their annual completion of financial tests contained in appendices A, C, D, and E of 10 CFR Part 30. About 51 percent of current financial assurance mechanisms for materials licensees are guarantee methods. Currently accepted guarantee mechanisms include letters of credit (28 percent), parent company guarantees (8 percent), licensee self-guarantees (7 percent), surety bonds (8 percent), lines of credit (0 percent), and insurance policies (0 percent).
- *A statement of intent from a Federal, state or local government licensee.* The statement of intent is a commitment from a Federal, state or local government licensee that it will request and obtain decommissioning funds from its funding body, when necessary for decommissioning an NRC licensed site. It is available for use only by governmental entities. About 38 percent of the NRC materials licensees who are required to provide financial assurance use the statement of intent as a means to provide financial assurance.
- *An external sinking fund.* The external sinking fund is an approved financial assurance method that allows an NRC materials licensee to make annual deposits into the fund to accumulate the necessary funds during the time leading up to termination of operations. For materials licensees, the external sinking fund must be coupled with a surety method or insurance, such that the total amount of financial assurance covers the cost of decommissioning. No NRC materials licensees that have an obligation to provide decommissioning financial assurance use this option. Reactor licensees are not required to couple the external sinking fund with another method, but in order to rely on the external sinking fund alone, the reactor must have access to cost-of-service rate recovery or non-bypassable charges from a rate-making authority. In addition, the reactor licensee must demonstrate that the current sinking fund balance plus the amount of future earnings and authorized collections will cover the total cost of decommissioning. The reactor licensee is not required to make deposits into the fund on any particular schedule. Reactor licensees who are not public utilities, in general, are not allowed to use the external sinking fund. However, non-public utility licensees may use the prepayment method, which is similar in that it allows the licensee to take credit for future earnings. Reactor licensees may combine the external sinking fund (or the prepayment fund) with a parent company or self-guarantee method as well as a surety or insurance. This rulemaking provides materials licensees opting to use the external sinking fund with a degree of flexibility similar to that allowed for reactor licensees since 1998 (in a final rulemaking for power reactor financial assurance, the

⁶ Reactor licensees using the prepayment method are not required to have the full amount of decommissioning in the account, and they are not required to make deposits into the fund on any particular schedule. Reactor licensees may take credit for future earnings on the trust fund balance, which permits them to maintain a trust fund balance less than the full cost of decommissioning.

NRC allowed use of a parent company guarantee or self-guarantee with an external sinking fund ([63 FR 50465](#); September 22, 1998)).

This final rule makes conforming changes in the financial assurance requirements for materials licensees (10 CFR 30.35, 40.36, 70.25, and 72.30) to provide greater consistency with the 10 CFR Part 50 regulations.

It should be noted that this discussion of financial assurance to decommission a site pertains to the cost of decommissioning to meet the unrestricted use criteria specified in [10 CFR 20.1402](#). If a licensee can demonstrate its ability to meet the provisions of [10 CFR 20.1403](#) for restricted use, financial assurance for long-term surveillance and control must be provided before the license is terminated, using the methods specified in 10 CFR 20.1403(c).

21. What regulatory guidance will be available to help licensees comply with the rule?

NRC maintains a [public web site on decommissioning guidance](#) with links to pertinent guidance documents. [Volume 3 of NUREG-1757](#), NRC's consolidated decommissioning guidance on financial assurance for materials licensees, has been updated to address the requirements of the new rule and should be available in the same timeframe as the final rule. NRC is also issuing draft Regulatory Guide DG-4014 ([ML111230072](#)) for materials licensees on radiological surveys and monitoring during operations. It will be published for public comment in early fall , and the staff plans a workshop during the public comment period for stakeholders and interested members of the public. A final Regulatory Guide, to be designated RG 4.22, is planned for publication in the spring of 2012. Another available source of guidance is [NUREG-1748](#), *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs*. Although the main focus of this guidance is the NRC staff's environmental review process, it also contains related information that licensees may find useful in preparing for license termination.

[NUREG-1713](#), *Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors*, will need conforming changes to implement the requirements of this new rule.