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## RULEMAKING ISSUE

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(Notation Vote)

October 16, 2016

SECY-16-0121

FOR: The Commissioners

FROM: Victor M. McCree  
Executive Director for Operations

SUBJECT: STAFF RECOMMENDATIONS FOR RULEMAKING TO ADDRESS  
REMEDICATION OF RESIDUAL RADIOACTIVITY DURING OPERATION

PURPOSE:

To provide the Commission with an evaluation of options and the U.S. Nuclear Regulatory Commission (NRC) staff recommendations regarding the need for rulemaking to address the remediation of residual radioactivity at licensed facilities during the operational phase of facility life, also known as prompt remediation. The NRC staff's recommendation was shaped by an evaluation of operational experience gained during implementation of the Decommissioning Planning Rule (DPR) (76 FR 35512) and stakeholder feedback received during public meetings and through other forums.

SUMMARY:

This paper provides the results of the Commission-directed analysis of the implementation of the DPR, with particular emphasis on the operational experiences of licensees that have had releases resulting in residual radioactivity at their facilities since promulgation of the DPR. Specifically, the NRC staff collected 3 years of data on the effectiveness of the DPR, evaluated operational experience associated with implementation of the DPR at various types of facilities, and solicited stakeholder comments on the potential need for additional rulemaking. This paper provides the Commission with an evaluation of the options available to address prompt remediation of residual radioactivity at licensed facilities during the operational phase of facility life. The NRC staff recommends that no rulemaking or provision of additional guidance on prompt remediation be initiated.

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BACKGROUND:

The initial decommissioning regulations were promulgated as “General Requirements for Decommissioning Nuclear Facilities” (53 FR 24018; June 27, 1988). The rule established the definition of decommissioning as the removal of a facility safely from service and the reduction of residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license. The rule also set forth technical, financial, and environmental criteria for decommissioning licensed nuclear facilities.

The decommissioning regulations were subsequently amended in 1997 with issuance of Subpart E, “Radiological Criteria for License Termination,” to Part 20, “Standards For Protection Against Radiation,” of Title 10 of the *Code of Federal Regulations* (10 CFR), also known as the License Termination Rule (LTR) (62 FR 39088; July 21, 1997). The LTR provided specific radiological criteria for the decommissioning of lands and structures to determine the adequacy of remediation of residual radioactivity for unrestricted use and under restricted conditions. Specifically, the rule established criteria for a dose rate to the public of less than 25 mrem/year and in accordance with the as low as reasonably achievable (ALARA) requirements for unrestricted site use. It also established criteria for Commission approval of release of a site for restricted use, utilizing appropriate institutional controls, and continued monitoring measures.

Following promulgation of the LTR, in Staff Requirements Memorandum (SRM) SECY-01-0194 – AAR Manufacturing Group, Inc., and Proposed Use of Unimportant Quantities of Source Material as Decommissioning Criteria (Agencywide Documents Access and Management System (ADAMS) Accession No. ML021690563), the Commission directed the NRC staff to conduct an analysis of LTR issues, with particular emphasis on addressing restricted site release and the use of institutional controls. The NRC staff presented the results of its analyses and recommendations for action in SECY-03-0069 – Results of the License Termination Rule Analysis (ADAMS Accession No. ML030840302).

In SRM-SECY-03-0069 (ADAMS Accession No. ML033210595), the Commission approved the staff’s recommendation to proceed with rulemaking for a decommissioning planning rule that, among other things, would require that costs to remediate residual radioactivity be included in the decommissioning cost estimate and that appropriate financial assurance instruments be identified for licensees (excluding Part 50 licensees that are subject to the specific funding requirements in 10 CFR 50.75, “Reporting and recordkeeping for decommissioning planning,” and 10 CFR 50.82, “Termination of license”). The objective of the DPR was to improve overall decommissioning planning by enhancing knowledge of the location and amount of residual radioactivity, thereby reducing the likelihood that any currently operating facility would become a legacy site.

During development of the DPR from 2004 to 2007, the NRC staff discussed the proposed rule with the Advisory Committee on Nuclear Waste (ACNW) on several occasions, including the potential for establishing regulations requiring remediation to take place during operation. The ACNW observed that “premature action in the absence of adequate understanding of the site

and system behavior may be inappropriate or even counter-productive to remediation goals,” and recommended against incorporating a requirement for remediation during operation.<sup>1</sup> Therefore, the NRC staff did not include language for a requirement addressing remediation during facility operation in the technical basis or in the draft DPR. The NRC published the DPR in 2011 (76 FR 35512; June 17, 2011), with an effective date of December 17, 2012. The DPR applies to the operational phase of a licensed facility and requires licensees to establish programs that: (1) minimize introduction of radiological contamination into the site environment; (2) require surveys of areas, including the subsurface, that are reasonable under the circumstances to evaluate residual radioactivity; (3) document radiological survey data which identifies the location and amount of subsurface residual radioactivity detected; and (4) report updated financial assurance information as required by the DPR. The DPR does not have a mandatory requirement for licensees to conduct prompt remediation during operation.

In SRM-SECY-07-0177 – Proposed Rule: Decommissioning Planning (10 CFR Parts 20, 30, 40, 50, 70, and 72; ADAMS Accession No. ML073440549), which approved the proposed DPR, the Commission directed the NRC staff to “make further improvements to the decommissioning planning process by addressing remediation of residual radioactivity during the operational phase with the objective of avoiding complex decommissioning challenges that can lead to legacy sites.” To that end, the NRC staff developed a proposed draft technical basis for prompt remediation (ADAMS Accession No. ML111580353) and published a *Federal Register* notice (see 76 FR 42074; July 18, 2011), announcing the NRC’s “Consideration of Rulemaking to Address Prompt Remediation of Residual Radioactivity During Operations.”

The NRC staff conducted a public meeting and webinar to discuss prompt remediation on July 25, 2011 (see 76 FR 42074; July 18, 2011), obtained and evaluated additional stakeholder comments, and revised the draft regulatory basis associated with a potential rulemaking (ADAMS Accession No. ML120190685). Subsequently, in SRM-SECY-12-0046 – Options for Revising the Regulatory Approach to Groundwater Protection (ADAMS Accession No. ML121450704), the Commission directed the NRC staff to solicit additional stakeholder comments on the draft regulatory and technical bases for a proposed prompt remediation rule. The Commission also directed the NRC staff to evaluate the pros and cons of moving forward with a proposed prompt remediation rulemaking, including the initial analysis of whether the backfit requirements of 10 CFR 50.109, “Backfitting,” would be satisfied.

The NRC staff conducted another public meeting and webinar on June 4, 2013 (see 78 FR 33008; June 3, 2013), to obtain stakeholder comments on the ongoing prompt remediation issue, and included the results of the staff’s evaluation of those comments in SECY-13-0108 – Staff Recommendations for Addressing Remediation of Residual Radioactivity During Operations (ADAMS Accession No. ML13217A230). In SRM-SECY-13-0108 (ADAMS Accession No. ML13354B759), the Commission approved the NRC staff’s recommendation to collect 2 years of additional data from the implementation of the DPR. The Commission also directed that, “after collection and evaluation of the data and engaging stakeholders in a public meeting focused on operational experience from implementation of the DPR, the staff should provide to the Commission a paper with the staff’s recommendation for addressing remediation of residual radioactivity at licensed facilities during the operational phase of the facility.”

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<sup>1</sup> Letter from Michael T. Ryan, Chairman, ACNW, to Dale E. Klein, Chairman, NRC, “Prevention of Legacy Sites,” dated October 17, 2006 (ADAMS Accession No. ML062960469).

The NRC staff collected more than 2 years of data on the implementation of the DPR and hosted a public webinar on July 11, 2016 (see 81 FR 43959; July 6, 2016), during which members of the public, licensees, Agreement States, non-Agreement States, and other stakeholders provided input on the implementation of the DPR to date. This input has been used to inform the NRC staff's recommendations to the Commission regarding the need for additional regulations or guidance regarding prompt remediation during operation.

#### DISCUSSION:

While the DPR requires licensees to perform surveys (including surveys of the subsurface) that are reasonable to identify significant concentrations or quantities of residual radioactivity, it does not require licensees to conduct remediation during the operational phase of plant life. During operation, radiological contamination has the potential to spread to significantly larger volumes of groundwater in surrounding subsurface media if not appropriately monitored, controlled, or remediated. In addition, contamination that is not identified and appropriately accounted for in the decommissioning funding instruments has created legacy sites. However, based on its evaluation of how licensees are complying with the DPR, as well as the regulations that establish public dose criteria, the NRC staff determined that licensees are operating their facilities in a manner to minimize leaks and spills, monitor for residual radioactivity, adjust decommissioning funding to account for residual radioactivity, and maintain doses to the public within regulatory limits. Taken together, compliance with these regulations ensures public health and safety and reduces the potential for additional legacy sites.

In addition, based on previous ACNW input and ongoing evaluations related to licensee compliance with the DPR, the NRC staff has determined that there continues to be several challenges presented by a potential new rule requiring prompt remediation. These include the potential impacts of remediation activities on operational safety, the difficulty of establishing general applicable requirements for the broad range of licensees, and the cost/benefit considerations with respect to backfitting. To date, residual radioactivity has been mostly limited to onsite areas, and there has not been a significant impact on public health and safety. Licensees must comply with the applicable dose standards both during operation and decommissioning activities, as well as other applicable regulations and ALARA principles, thereby ensuring the protection of public health and safety. In addition, the staff considers it unlikely that a rulemaking requiring prompt remediation would meet 10 CFR 50.109 backfitting requirements with respect to a substantial increase in the overall protection of the public health and safety. Further, generic action levels for prompt remediation are not necessarily risk-informed and may not apply equally at all sites. The wide range of circumstances that may be present at an NRC-licensed facility undergoing decommissioning could result in a rule that is too broad and complex to be effectively implemented or enforced, which would not be consistent with the NRC's principles of good regulation.

In determining whether the manner in which licensees are complying with the DPR has been adequate to prevent future legacy sites, the NRC staff used the following information sources to evaluate the need for, and potential benefits arising from, additional rulemaking in the area of prompt remediation: (1) the NRC inspection results; (2) licensee event reports and radiological effluent monitoring reports; (3) the financial assurance mechanisms available to support decommissioning at different types of facilities; (4) the results of the Nuclear Energy

Institute (NEI) 07-07, "Industry Groundwater Protection Initiative" (ADAMS Accession No. ML072610036), and associated groundwater contamination evaluations; (5) guidance promulgated by the NRC and industry groups such as NEI and the Electric Power Research Institute (EPRI); and (6) stakeholder feedback collected during the July 11, 2016, public webinar and through other forums. A more detailed discussion of, and the NRC staff's evaluation with respect to each of these areas are contained in the enclosure to this paper. Overall, the NRC staff concluded that:

- Existing dose limits codified in NRC regulations currently provide adequate protection for public health and safety during operation. As such, an additional rule requiring prompt remediation would provide limited additional benefit and would not likely meet the backfitting provisions of 10 CFR 50.109.
- The current DPR requires early identification of existing "significant residual radioactivity" and timely adjustments to decommissioning funding, thereby mitigating the potential that residual contamination that is unaccounted for in the decommissioning funding instruments would lead to future legacy sites.
- The DPR characterizes "significant" residual radioactivity as "a quantity of radioactive material that would later require remediation during decommissioning to meet the 25 mrem/year unrestricted use criteria of 10 CFR 20.1402."
- No new legacy sites have been identified since the financial assurance regulations were promulgated in 1988, and no sites have had to make adjustments to their decommissioning funds due to the identification of residual radioactivity since implementation of the DPR.
- In some circumstances, mandated remediation during operation could adversely impact operational safety as certain locations may only be accessible after operations have ceased or when operational conditions permit.
- Protection of the environment, particularly the groundwater resource, from abnormal releases is based upon effective groundwater monitoring programs for determination of significant residual radioactivity, as well as use of industry initiatives where appropriate.
- Licensees are effectively complying with the DPR. The current regulations are sufficient to ensure that when operation at a facility ceases, site characterization will result in the appropriate identification of all significant residual subsurface radioactivity, and adequate financial resources will be available to complete decommissioning for release of the site for unrestricted use at the time of license termination.

#### RULEMAKING OPTIONS:

The options for addressing prompt remediation of residual radioactivity during operation, discussed more fully below, are (1) proceed with rulemaking, (2) defer a decision on rulemaking until additional implementation data from the DPR can be gathered, (3) no action, or (4) develop additional guidance to address prompt remediation.

Option 1: Propose Rulemaking on Prompt Remediation

Option 1a: Publish a proposed rule requiring prompt remediation when residual radioactivity exceeds a fixed calculated dose (e.g., 25 mrem/year at the time of proposed decommissioning or an exceedance of the 10 CFR Part 20 or ALARA criteria in the unrestricted area).

*Pros:*

- Provides the most robust assurance of licensee action to reduce the likelihood of future legacy sites and reduce the costs to remediate the site during decommissioning.
- Avoids the problem of lost institutional memory. The people most familiar with the facility would most likely be available to help with cleanup.
- Addresses some local authorities, States, and public concerns and interests, and avoids public liability for long-term care of new legacy sites.
- Under a new rule, licensees with tritium in the groundwater would be able to extract the contaminated groundwater, and then monitor and discharge using generically approved effluent discharge methods, rather than relying on site-specific justifications for tritium remediation activities.
- Limits potential doses to the public due to migration of contamination.
- Provides enforceable criteria for both the licensees and the NRC inspectors to determine compliance, which would provide the greatest degree of regulatory predictability and consistency of licensee implementation.

*Cons:*

- To date, most residual radioactivity in the form of particulate radioactivity has been found under or near facility systems, structures, and components where remediation activities would be difficult and, in some cases, could affect safe operation of the facility.
- A new rule would have limited benefit because the DPR already provides licensees ample business-related incentives to perform remediation when practical because of reporting requirements, requirements to maintain residual radioactivity at ALARA levels, and requirements to increase decommissioning funding if remediation is not performed. These incentives effectively provide additional assurance of compliance.
- A new rule would be a duplication of regulation given that licensees already must comply with ALARA requirements and the NRC dose limits in 10 CFR Part 20 during operation and decommissioning.

- A new rule would have limited benefit because adequate recordkeeping, subject to periodic inspections, already ensures that the nature and extent of contamination will be well understood regardless of whether the people performing the cleanup are familiar with the facility or the contamination when it occurred.
- As noted by the ACNW, it would be difficult to develop rule language that meets the NRC principles of clarity and efficiency for the wide range of facility types and site conditions that would need to be addressed.

Option 1b: Publish a proposed rule mandating that licensees develop a written plan, including cost estimates and schedules, to address residual radioactivity concentrations that would require remediation to meet unrestricted release criteria at the time of proposed license termination. Require the plan to include an evaluation of, and document, the pros and cons of prompt versus delayed remediation.

*Pros:*

- Provides a requirement for the licensee to establish performance and risk bases for its chosen course of action.
- Most information needed to complete the analysis is already available to the licensees (i.e., contaminant concentrations are routinely measured for compliance with existing regulations, and decommissioning costs are required to be evaluated on a periodic basis).
- Better ensures a response by the affected licensee that is proportionate to the risk presented by the known contamination.
- Enforceability would provide the greatest degree of regulatory predictability and consistency of licensee implementation.
- Imposes less burden on the NRC and licensees than requiring prompt remediation in all cases.

*Cons:*

- A new rule would have limited benefit because licensees implementing the NEI 07-07 voluntary Industry Groundwater Protection Initiative are already performing these types of evaluations.
- A new rule would have limited benefit because other licensees also perform cost/benefit evaluations based on their business models, and incentives already exist to minimize costs. These considerations ensure that prompt remediation will be undertaken if necessary.
- A new rule would have limited benefit because the DPR already requires most licensees to estimate the costs of remediation and adjust their

decommissioning funding accordingly. This provides adequate incentive for prompt remediation.

- A new rule would have limited benefit because it may provide little information beyond what is already required by the DPR on the extent of contamination and costs to remediate it.

Option 2: Defer Decision on Prompt Remediation Rulemaking for 5 Years to Gather More Information on Decommissioning Planning Rule Implementation Experience

*Pros:*

- Reduces resource expenditures in comparison to rulemaking in the short term.
- More data gathering could provide a more substantial basis for a decision on whether or not to initiate rulemaking.
- Provides an opportunity for more interaction with the regions on their experience in reviewing abnormal releases, and volunteered remediation by licensees.
- Compared with no action alternative, maintains an additional increment of regulatory incentive for licensee diligence in implementing the DPR, including conducting prompt remediation when warranted.

*Cons:*

- Postpones the decision on whether there remains a need to address the potential for future legacy sites. May needlessly create regulatory uncertainty.
- Current operating experience gives no indication that the number or severity of legacy sites is likely to grow or that DPR implementation may not be effective.
- Resources would need to be expended to collect and analyze additional data.

Option 3: No Action

*Pros:*

- Existing DPR requirements ensure that contamination is identified and monitored during facility operation.
- Voluntary industry initiatives already encourage an evaluation of prompt remediation and specify action thresholds for addressing contamination.
- Licensees already have incentives to perform remediation during operation, and operating experience has shown that facilities tend to remediate well before the decommissioning stage whenever practical or beneficial to the site.
- Current regulations require licensees that identify significant contamination to adjust their decommissioning financial assurance to permit removal of the



- residual radioactivity sufficient for unrestricted release of the site at license termination. This minimizes the potential for future legacy sites.
- Licensees already must comply with the NRC dose limits in 10 CFR Part 20 during operation and decommissioning, which provides adequate protection for public health and safety.
- This alternative requires no additional resource expenditures.

*Cons:*

- Contamination not promptly remediated may increase decommissioning costs due to the spread of contaminants and complexities in selecting and implementing remediation options to achieve remediation at a later time.
- Provides no enforceable requirement for prompt remediation if a licensee chooses to postpone cleanup of significant contamination as long as the contamination remains within the public dose limits.

Option 4: Develop Guidance to Address Prompt Remediation

Option 4a: Develop additional regulatory guidance on how to evaluate the impact of residual radioactivity.

*Pros:*

- Would provide licensees with regulatory guidance outlining methods acceptable to the NRC staff for evaluation of the potential impact of residual radioactivity.
- Would provide licensees with guidance on how to determine whether a release is significant, an acceptable method to evaluate the extent of residual radioactivity, and recommendations on when and how to prepare a remediation plan, including adequate modeling and monitoring.
- In the absence of known or suspected new legacy sites, appears to be a more risk-informed regulatory response than rulemaking.
- Regulatory Guide (RG) 4.22, "Decommissioning Planning During Operations," already provides guidance to licensees on conducting appropriate radiological surveys, maintaining records of residual radioactivity, and providing adequate funding to complete decommissioning. RG 4.25, "Assessment of Abnormal Radionuclide Discharges in Ground Water to the Unrestricted Area at Nuclear Power Plant Sites," will be issued in the near future and addresses many of the concerns associated with prompt remediation. Accordingly, the scope of additional guidance needed to address prompt remediation is likely to be reduced.
- Numerous NEI and EPRI guidance documents already exist or are in development to address minimization of contamination during operation

(especially in regard to groundwater considerations) and methods for evaluating the need for prompt remediation. After an independent evaluation of these documents, the NRC could build on them to provide regulatory guidance that is familiar to industry and more likely to be readily adopted. To the extent that the NRC could incorporate technically sound industry guidance that is already available or under development, the cost of developing NRC guidance could be reduced.

- Likely to require fewer resources than rulemaking.

*Cons:*

- Would not be enforceable.
- May be difficult to develop guidance language to address the wide range of facility types and site conditions that would be impacted.
- Would likely involve substantial uncertainties in monitoring and modeling results as anything related to subsurface investigation and modeling activities during operation are typically uncertain and expensive.

Option 4b: Develop a generic communication document to establish NRC expectations regarding the evaluation of unplanned releases and the threshold to conduct prompt remediation activities.

*Pros:*

- Would provide licensees with information on how to determine if a release is significant, as well as recommendations on the need for and possible plan to conduct remediation.
- Could be used as a vehicle to solicit additional information on the implementation of the DPR and remediation activities during operation.
- In the absence of known or anticipated new legacy sites, appears to be a more risk-informed regulatory response than rulemaking.
- Likely to require fewer resources than rulemaking.

*Cons:*

- Would not be enforceable.
- Would not provide NRC-approved method(s) for demonstrating compliance with the DPR requirements when there are questions about whether and how to conduct prompt remediation.

- Numerous other NEI and EPRI guidance documents already exist or are in development to address minimization of contamination during operation (especially in regard to groundwater considerations) and methods for evaluating the need for prompt remediation. A new NRC generic communication, unlike a guidance document providing accepted method(s) to demonstrate DPR compliance, may have limited benefit.
- May incur additional costs for licensees if additional information is requested as part of a generic letter.
- Without more specific guidance, a generic communication would be unlikely to resolve monitoring and modeling uncertainties.

### CONCLUSIONS:

Given the above considerations as well as the discussion and evaluation contained in the enclosure to this paper, the NRC staff concludes that the NRC's existing regulations are adequate because they require licensees to, among other things:

- Comply with the ALARA requirements for effluent releases and regulatory dose limits for individual members of the public and the environmental radiation standards contained in 10 CFR Part 20 (e.g., §20.1301(e)).
- Control licensed material to minimize the introduction of residual radioactivity into the site, including the subsurface (§20.1406(c)).
- Perform site surveys and monitoring activities to evaluate the potential radiological hazards of residual activity, including the subsurface (§20.1501(a)).
- Keep records important to decommissioning including those for areas that may have become contaminated during facility operation (§30.35, 40.36, 50.75, and 70.25).

In addition, (1) the 10 CFR Part 50 Technical Specifications help ensure control and monitoring of licensed material, and all licensees implement an ALARA radiation protection program and adhere to relevant NRC guidance; (2) all nuclear facilities have fully implemented the final DPR, and all power reactors continue to adhere to NEI's voluntary Industry Groundwater Protection Initiative; and (3) the NRC can and does routinely inspect licensee programs to ensure compliance with all applicable regulations, including those for the DPR. These facts are sufficient to support the recommendation not to proceed with any additional rulemaking related to prompt remediation at this time. There are no known DPR implementation issues that would lead the NRC staff to conclude that the promulgation of additional regulations for prompt remediation would have a positive impact on the public health and safety or the environment commensurate with the associated burden on licensees, other stakeholders, and the NRC.

RECOMMENDATION:

The NRC staff recommends Option 3, no action.

COORDINATION:

The Office of the General Counsel has no legal objections to this paper or the NRC staff's recommended approach.

*/RA/*

Victor M. McCree  
Executive Director  
for Operations

Enclosure:

U.S. Nuclear Regulatory Commission  
Staff Evaluation of the Implementation  
of the Decommissioning Planning Rule  
and the need for the Prompt Remediation  
Requirements during the Operational  
Phase of Facility Life

RECOMMENDATION:

The NRC staff recommends Option 3, no action.

COORDINATION:

The Office of the General Counsel has no legal objections to this paper or the NRC staff's recommended approach.

**/RA/**  
 Victor M. McCree  
 Executive Director  
 for Operations

Enclosure:  
 U.S. Nuclear Regulatory Commission  
 Staff Evaluation of the Implementation  
 of the Decommissioning Planning Rule  
 and the need for the Prompt Remediation  
 Requirements during the Operational  
 Phase of Facility Life

**ADAMS Accession No. ML16235A298**

**SRM-S13-0108-1**

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# **U.S. NUCLEAR REGULATORY COMMISSION STAFF EVALUATION OF THE IMPLEMENTATION OF THE DECOMMISSIONING PLANNING RULE AND THE NEED FOR PROMPT REMEDIATION REQUIREMENTS DURING THE OPERATIONAL PHASE OF FACILITY LIFE**

## Stakeholder Feedback

There is broad agreement among both industry and non-industry stakeholders that minimizing radiological contamination throughout the life of a facility is a good practice in keeping with the as low as reasonably achievable (ALARA) principles. There is less agreement on how that should be accomplished. In general, many non-industry stakeholders (e.g., local authorities, States, and the general public) expressed the opinion that additional regulatory requirements for prompt remediation are needed to ensure that facilities are able to meet the criteria for site release for unrestricted use at the time of decommissioning. However, industry stakeholders maintain that the existing NRC regulations and guidance documents, as well as industry voluntary initiatives and available guidance, already provide a framework to reduce contamination, protect public safety, and ensure sites meet the requirements for cleanup.

One of the significant comments from industry stakeholders was that the Nuclear Energy Institute (NEI) 07-07 Industry Groundwater Protection Initiative already establishes a site-specific remediation process to prevent migration of licensed material offsite and minimize potential decommissioning impacts. Another significant comment from industry stakeholders was that there are already sufficient NRC requirements and industry initiatives to report abnormal releases of licensed material, and that these events are typically monitored and the corrective actions evaluated under the U.S. Nuclear Regulatory Commission (NRC) inspection process. Another commenter stated that rigorous enforcement of existing regulations would achieve the goals of prompt remediation better than additional regulations. In general, the information gathered on the implementation of the DPR supports these assertions in that the NRC staff identified several examples of licensees choosing to remediate leaks and spills in the near term without an NRC requirement.

One significant comment from non-industry stakeholders was that a new rule requiring prompt remediation would maintain residual radioactivity at low levels during operation and reduce the likelihood of a legacy site in the event of early shutdown when decommissioning trusts are not fully funded. Based on the information gathered at operating facilities, the NRC staff concluded that licensees, in general, are conducting operations in a way that minimizes the introduction of radiological contamination and provides for monitoring of any unplanned releases, which are major requirements of the Decommissioning Planning Rule (DPR). Licensees also maintain ALARA practices that assist in minimizing residual radioactivity during operation.

In addition, the NRC staff conducted a review of the decommissioning financial assurance mechanisms for the various types of licensees impacted by the DPR and determined that the associated financial regulations are sufficient to ensure that appropriate decommissioning funding is available even in the event of premature shutdown. The DPR ensures that decommissioning funding is evaluated during operation and is adjusted commensurate with the decommissioning impacts of any unplanned releases. The NRC staff also determined that there have been no new legacy sites identified since promulgation of the financial assurance rules in 1988, and no licensees have had to make adjustments to their decommissioning funds as a

Enclosure

result of the DPR, meaning that no residual radioactivity has been identified at a level that would require licensees to set aside additional funds to address cleanup during decommissioning. Taken together, this information leads the NRC staff to conclude that the DPR is being effectively implemented, and the existing regulatory framework is adequate to protect public health and safety and prevent future legacy sites.

#### U.S. Nuclear Regulatory Commission Regulatory and Inspection Activities

Concurrently with the effective date of the DPR, the NRC issued Temporary Instruction (TI) 2600/017, "Review of the Implementation of the Decommissioning Planning Rule," which was applicable to licensees other than Part 50 licensees, to assist inspectors in evaluating licensee compliance with the DPR. TI 2600/017 instructed inspectors to assess the licensees' responses to the requirements of the DPR contained in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20, which require licensees to minimize contamination released, by (1) reviewing potential sources of contamination at the site, and (2) verifying monitoring and sampling plans were updated to identify potential radiological contamination throughout the facility and site environment, including the subsurface. During the implementation of TI 2600/017 at 11 facilities, NRC inspectors were able to verify that the licensees maintained adequate radiological control programs to minimize the introduction of contamination into the site environments and had programs in place to ensure that releases of radiological effluents to the environment are promptly identified, recorded, and characterized. No findings of significance were identified at any of the facilities inspected under TI 2600/017.

For nuclear power plants, the NRC staff also inspected the implementation of NEI 07-07 under TI 2515/173, "Industry Groundwater Protection Initiative," and TI 2515/185, "Follow-Up on the Industry's Groundwater Protection Initiative." The NRC staff concluded that all licensees except one had adequately completed NEI 07-07 Objective 1.4, "Establish a remediation protocol to prevent migration of licensed material offsite and to minimize decommissioning impacts." The licensee that had not completed this action entered the issue into its corrective action program and the NRC concluded that the issues were satisfactorily addressed during a subsequent inspection.

During power reactor licensing, applicants for a combined license application or early site permit are required to provide the results of an investigation of onsite hydrogeology characterization and demonstrate that a postulated accidental release will conservatively bound any leaks, spills, or inadvertent releases except severe accidental releases (i.e., core melting). If the evaluated radionuclide concentrations from an accidental release exceed the effluent control limits specified in 10 CFR Part 20, Appendix B, the applicant is expected to propose technical specifications limiting the total amount of radioactivity allowed to be contained in liquid radwaste tanks or components. These actions ensure that new reactor licensees operate in a manner that minimizes the potential for contamination, and in accordance with the requirements of the DPR.

The Reactor Oversight Process (ROP) baseline inspection program is used to inspect power reactor licensees to verify compliance with, among other things, the requirements of 10 CFR Part 20. Specifically, the ROP inspection program verifies that licensees maintain compliance with Subpart B, "Radiation Protection Programs," and Subpart E of 10 CFR Part 20. As part of its evaluation of the implementation of the DPR, the NRC staff reviewed the ROP inspection

results since 2013 and determined that there have been five low significance findings/violations related to the portions of 10 CFR Part 20 addressed by the DPR.

These findings were primarily related to 10 CFR 20.1406, "Minimization of Contamination," which requires licensees to minimize the introduction of residual radioactivity into the site environment during operation. Inspectors identified violations of 10 CFR 20.1406 when licensees did not take timely action to identify and address the source of unplanned releases, thereby failing to minimize the introduction of contamination into the site. A primary consideration of the DPR is that unplanned releases are identified and evaluated quickly, allowing appropriate decisions to be made regarding monitoring and potential remediation activities, as well as to maintain an accurate characterization of the site's residual radioactivity.

The NRC staff evaluated these findings to determine whether the unplanned releases, if not addressed by the licensee in a timely fashion, could have potentially impacted future decommissioning activities or funding mechanisms. Given the very low safety significance of the findings and the overall scale of the unplanned releases, the NRC staff concluded that these five examples of failure to adequately implement the DPR would not have presented challenges to eventual site decommissioning or led to the creation of a legacy site. In addition, the facts that the deficiencies were identified as part of routine NRC inspection activities, evaluated by the licensees to determine whether prompt remediation or additional monitoring was required to address the unplanned release, and that decommissioning funding was assured throughout, demonstrate the effectiveness of the DPR requirements within the current regulatory framework. Taken together, this information leads the NRC staff to conclude that the DPR is being effectively implemented as it relates to minimizing contamination during operation and ensuring that releases of radioactivity to the environment are promptly identified and characterized.

#### Effluent and Environmental Monitoring Requirements

A major principle of the DPR is ensuring that releases of radioactivity to the environment are promptly identified and characterized, which is accomplished in part by effective environmental monitoring. Existing NRC regulations govern the identification, discharge, and monitoring of radiological effluents to ensure that public doses remain below the limits in 10 CFR Part 20. For power reactors, these requirements are implemented as part of the radiological environmental monitoring program (REMP), which is implemented by the licensee at each reactor facility. Specifically, air (gaseous) effluent releases and liquid effluent releases from all sources are monitored in accordance with the plant's Offsite Dose Calculation Manual (ODCM). The acceptable release limits stated in the ODCM are based on NRC regulations. The REMP supplements the effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation in the environment are consistent with the values predicted by the licensee's modeling of releases. The licensee is required to implement the REMP in accordance with its Technical Specifications and ODCM.

During operation, the NRC monitors and inspects the licensee's REMP through the review of annually submitted radiological effluent discharge reports, as well as routine inspections of the licensee's facility to verify the effectiveness of the REMP. The public dose calculations resulting from implementation of the Radiological Effluent Controls Program are included in the annual radiological effluent discharge report, which is submitted to the NRC and available for public review. Dose limits to members of the public are set forth in 10 CFR Part 20 and specific licensee technical specifications conforming to the ALARA criteria in 10 CFR Part 50,



Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as is Reasonably Achievable' for Radioactive Material in Light Water-Cooled Nuclear Power Reactor Effluents," and are monitored and enforced by the NRC.

During its evaluation of the implementation of the DPR, the NRC staff examined the licensees' Radioactive Effluent Controls Program processes and procedures and determined that (1) spills and releases are being appropriately documented and characterized; (2) the adequacy of the associated procedures are being routinely reviewed under NRC oversight activities; and (3) licensees are submitting reports of leaks or spills at the appropriate reportable levels. In addition, the NRC staff notes that based on the current requirements of 10 CFR Part 20, licensees must meet the radioactive cleanup standards at the time of decommissioning, regardless of the overall contamination level at the facility or previous remediation activities. Taken together, the above information leads the NRC staff to conclude that the DPR is being effectively implemented as it relates to ensuring that releases of radioactivity to the environment are promptly identified and characterized, that doses to members of the public remain below the regulatory limits, and the current regulatory requirements ensure protection of public health as a result of any releases.

#### U.S. Nuclear Regulatory Commission Guidance Documents

Numerous regulatory guidance documents exist to assist licensees in implementation of the DPR by providing acceptable methods for monitoring radioactive effluents, operational approaches to minimize the introduction of contamination, and general decommissioning planning guidance. The following NRC regulatory guides (RG) are applicable to measurement of residual radioactivity, minimizing residual radioactivity, and performing decommissioning planning during operation:

- RG 1.21, "Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste," which contains information on the monitoring of abnormal or unplanned releases.
- RG 4.1, "Radiological Environmental Monitoring for Nuclear Power Plants," which provides a method considered acceptable for use in establishing and conducting an environmental monitoring program at nuclear power plants. In particular, it describes guidance on the establishment of a REMP, which involves measuring the levels of radiation and radioactive materials in the local environment.
- RG 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning," which provides guidance on meeting the requirements of 10 CFR 20.1406. Regulatory Position C.2 of RG 4.21 focuses on gathering sufficient information to support the development of a conceptual site model and in planning design features for the early detection of leakage and migration of radioactivity in soils and ground and surface water.
- RG 4.22, "Decommissioning Planning During Operations," which provides guidance to licensees who are required to minimize contamination and radioactive waste generation, conduct appropriate radiological surveys including the subsurface, maintain records of residual radioactivity, and provide adequate funding to complete decommissioning in accordance with portions of the DPR, namely, 10 CFR 20.1406 and 10 CFR 20.1501.

- NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition” (SRP), Section 2.4.13, “Accidental Releases of Radioactive Liquid Effluents in Ground and Surface Waters,” provides guidance for reactor license applicants to characterize the site and evaluate the ability of the groundwater environment to delay, disperse, dilute, or concentrate liquid effluents. SRP Section 11.2, “Liquid Radwaste Management System,” provides guidelines to evaluate radiological consequences from an accidental release and implement additional protective measures to limit the potential for radionuclide contamination during the plant design stage.
- These SRP sections are supplemented by Branch Technical Position 11-6, “Postulated Radioactive Releases Due to Liquid-Containing Tank Failures,” and two Interim Staff Guidance (ISG) documents, DC/COL-ISG-013, “Assessing the Radiological Consequences of Accidental Releases of Radioactive Materials from Liquid Waste Tanks for Combined License Applications,” and DC/COL-ISG-014, “Assessing the Radiological Consequences of Accidental Releases of Radioactive Materials from Liquid Waste Tanks in Ground and Surface Waters for Combined License Applications.”

In addition, the NRC staff is currently in the final stages of completing draft RG 4.25, “Assessment of Abnormal Radionuclide Discharges in Ground Water to the Unrestricted Area at Nuclear Power Plant Sites.” This draft guide describes an approach the NRC staff considers acceptable for use in assessing abnormal discharges of radionuclides in groundwater from the subsurface to the unrestricted area at nuclear power plant sites.

Taken together, the information contained in these guidance documents presents the NRC’s overall expectations regarding the minimization of contamination during operation, as well as the need for subsequent monitoring, evaluation of remediation options for contamination, and assessment of funding to address residual radioactivity that is present, whether planned or unplanned. After reviewing the information contained in the issued regulatory guides, SRP, and draft RG 4.25, the NRC staff concludes that sufficient regulatory guidance exists to implement the current regulatory framework and assist licensees in implementing the DPR effectively.

#### Industry Guidance Documents

Several industry guidance documents also exist that, while more specific to groundwater considerations, are available to assist licensees in determining the need for remediation. The two most relevant documents are NEI 07-07 and Electric Power Research Institute’s (EPRI) report titled “Groundwater and Soil Remediation Guidelines for Nuclear Power Plants, Public Edition” (Agencywide Document and Access Management System (ADAMS) Accession No. ML113120014). Because the DPR requires licensees to periodically check for residual radioactivity throughout the site, including subsurface soil and groundwater, the appropriate identification and monitoring of groundwater pathways is of high importance. In addition, these industry guidelines provide detailed information on the creation of a remediation protocol to enable licensees to make informed decisions regarding the type of remediation most appropriate for their site-specific conditions during operation (i.e., prompt remediation).

NEI 07-07 describes the Industry Groundwater Protection Initiative (GPI), which identifies actions to improve the management and response to instances where the inadvertent release of radioactive substances may result in low but detectable levels of plant-related radiological materials in subsurface soils and water. The GPI also identifies those actions necessary for

implementation of a timely and effective groundwater protection program. Some of the primary objectives of the GPI are to establish site-specific action plans to help assure timely detection and effective response to situations involving radiological releases in groundwater, to prevent migration of inadvertently released material offsite, and to quantify any potential impacts on future decommissioning activities.

The EPRI guidelines provide methods to assess the need for and timing of remediation of soil and/or groundwater contamination from onsite leaks, spills, or inadvertent releases. The suggested remediation evaluation protocol established by the EPRI guidelines includes remediation objectives, site investigation criteria, and draft site release limits to evaluate the need for remediation in the event of a leak or spill. Specifically, the EPRI guideline objectives were designed to (1) prevent migration of licensed material offsite; (2) minimize decommissioning impacts; and (3) determine when soil and/or groundwater remediation would be most beneficial and effective in terms of technical considerations, feasibility, and cost.

The NEI 07-07 GPI has been adopted by all operating power reactors, and the EPRI guidelines are used throughout the industry at both operating and decommissioning power reactors. Licensees that are implementing the NEI 07-07 GPI are considered to meet the requirements of the DPR. Specifically, NEI 07-07 Objective 1.4.a addresses developing a remediation protocol to prevent migration of licensed material to offsite areas and minimize decommissioning impacts. This objective includes establishing written procedures outlining the decision making process for remediation of leaks and spills or other inadvertent releases. Licensees for all operating power reactors have established these procedures, and in general they ensure that licensees evaluate the costs and benefits of performing prompt remediation. Licensees make a determination based on this evaluation as to whether prompt remediation is advisable (i.e., has an overall benefit during operation). The remediation determination takes into account many aspects such as dose pathways, spill volume, proximity of the spill to the site boundary or other structures, weather conditions, environmental impacts, additional decommissioning costs, site release criteria, and whether or not prompt remediation will be effective.

In addition, NEI 08-08A, "Generic FSAR [Final Safety Analysis Report] Template Guidance for Life-Cycle Minimization of Contamination" (ADAMS Accession No. ML093220530), provides a complete generic program description for use in developing construction and operating license applications. The document reflects contemporary NRC guidance, including RG 1.206, "Combined License Applications for Nuclear Power Plants," and industry-NRC discussions regarding the applicable standards to meet the requirements of 10 CFR 20.1406 for life-cycle minimization of contamination. Specifically, NEI 08-08A provides industry guidance applicable to reactor license applicants for (1) minimizing nuclear power plant facility contamination, (2) minimizing contamination of the environment, (3) facilitation of decommissioning, and (4) minimizing the generation of waste. NEI 08-08A also provides specific items that should be considered during power plant facility design, operation, and procedural implementation.

During its evaluation of the implementation of the DPR, the NRC staff identified multiple examples (approximately 14 of the 65 sites) where licensees have performed remediation of onsite residual radioactivity as a result of their participation in the industry initiatives, even though there was no NRC regulation in place that required prompt remediation during operation. This information leads the NRC staff to conclude that the DPR is being adequately implemented as it relates to minimizing contamination during operation, ensuring that releases of radioactivity to the environment are promptly identified and characterized, and documenting radiological

survey data that identifies the location and concentrations of contamination that may require remediation at the time of license termination. In addition, industry guidance exists on determining the need for prompt remediation using an established decision making process.

The NRC staff also identified that there are numerous additional resources available to the industry to address the minimization of contamination at operating facilities. These include:

- NEI 09-14, Revision 3, "Guideline for the Management of Underground Piping and Tank Integrity," dated April 2013 (ADAMS Accession No. ML13130A322).
- American National Standards Institute / American Nuclear Society-2.17-2010 (R2016), "Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Plants," dated 2016.
- International Atomic Energy Agency TECDOC Series No. 482, "Prevention and Mitigation of Ground-Water Contamination from Radioactive Releases," dated 1988.

These guidance documents assist licensees in evaluating components and systems that have a higher potential for creating an unplanned radiological release (i.e., buried piping), as well as provide discussions of the fundamental concepts of groundwater transport and conceptual site modeling, which are important components in evaluating the significance of the releases and residual radioactive plumes. Along with the industry initiatives discussed above, the NRC staff concludes that adequate industry guidance exists to assist licensees in effectively implementing the DPR.

#### Operating Experience at Nuclear Power Reactors

For power reactor licensees, the NRC staff reviewed and evaluated operating experience (OpE) data related to leaks and spills of licensed radioactive material. The NRC staff focused on OpE data from 2013 through 2015 pertaining to licensees' implementation of the existing DPR requirements, including Annual Radioactive Effluent Release Reports and Annual Radiological Environmental Operating Reports; 10 CFR 50.72, "Immediate notification requirements for operating nuclear power reactors," reports; 10 CFR 50.75(g), "Reporting and recordkeeping for decommissioning planning," records related to leaks and spills; NRC inspection reports; and evaluations related to the licensees' implementation of industry initiatives. The NRC staff's review also included an evaluation of the licensees' written procedures outlining the decision making process related to remediation of inadvertent releases to onsite areas. In addition, the NRC staff obtained information directly from licensees on their remediation protocols and the processes used to implement the DPR at specific sites.

After a thorough review of both OpE data and procedures related to the requirements of the DPR and industry initiatives, the NRC staff concludes that power reactor licensees have adequately implemented the DPR and are adequately addressing abnormal releases (i.e., leaks and spills). However, in discussions with both industry and non-industry stakeholders about the minimization of contamination at operating facilities, the issues surrounding groundwater remediation for tritium were repeatedly raised. Many members of the public held the perception that prompt remediation of tritium is an appropriate measure to protect public health and safety. Because the DPR requires surveys for residual radioactivity, including the subsurface, and

because of the public's perception, the NRC staff also evaluated how prompt remediation considerations impact groundwater releases, especially in regard to tritium.

Under the current regulatory framework, if a licensee determines that timely remediation of a release of radioactive material to groundwater during operation has an overall benefit, then the most effective remediation technique is chosen. The most common remediation technique is to extract the contaminated groundwater or soil, monitor the contamination, and discharge the licensed material as a regulatory or monitored release. As remediation progresses, the licensee monitors the remediation technique for effectiveness. If remediation is not performed, the licensee is required to monitor the groundwater concentrations and then estimate, report, and account for the associated discharge to the unrestricted area in accordance with 10 CFR 50.36a, "Technical specifications on effluents from nuclear power reactors."

The general principle of groundwater flow is that groundwater will migrate down gradient to an adjacent large water body (e.g., aquifer, river, lake, or ocean) with environmental dilution and eventual dispersion as a liquid effluent. Groundwater transport of tritium occurs at the same rate as groundwater flow since tritium cannot be filtered or otherwise removed from liquid effluents (unless evaporated into the atmosphere). Other radionuclides such as cesium-137 (Cs-137) and strontium-90 (Sr-90) are absorbed within the geologic media and thus travel much slower than tritium. As a result, in most cases involving tritium contamination, remediation does not equate to elimination of the tritium. Therefore, the decision to remediate tritium is largely based upon the contaminant activity levels and travel time to the accessible environment. For other radionuclide contaminants, the retardation factors and conceptual site model must be determined to estimate groundwater discharge fluxes and travel times.

Operating experience with remediating tritium releases has demonstrated that there are some small potential negative impacts of prompt remediation of the affected groundwater. For example, if the chosen remediation method is to promptly remove the groundwater containing tritium from the subsurface and subsequently monitor and discharge the groundwater at an approved discharge location, the discharge would be much faster and at a higher concentration than would occur if the remediation method of monitored natural attenuation were implemented. The latter method would cause the same amount of tritium to be discharged to the same adjacent waterway at an attenuated slower rate within the groundwater to the same discharge location. In addition, extraction of groundwater via pumping may inadvertently enhance transport of residual groundwater plumes containing radionuclides such as Cs-137 or Sr-90, thereby introducing a new challenge for evaluating the possibility of increased discharges of other contaminants to the environment. Given these considerations, the NRC staff notes that while the remediation of groundwater during operation may appear intuitively beneficial, in practice, remediation is often complex and may create unintended consequences which need to be addressed.

While there is generally little health and safety benefit associated with prompt remediation of tritium, as noted above, there is a benefit associated with public perception in avoiding the negative impacts of delaying groundwater remediation activities, thereby causing degradation to the groundwater resource. As such, in cooperation with State and local authorities, several licensees have chosen to conduct remediation activities to maintain a positive environmental stewardship relationship with the State and local entities. In addition, per the requirements of the associated industry initiatives, 10 CFR 50.36a, and the Radioactive Effluent Controls Program, significant effluent releases at nuclear power plants are now monitored, giving the NRC staff confidence that remediation decisions are being made appropriately. Given the

above, the NRC staff concludes that additional regulatory requirements for prompt remediation are not warranted because current requirements adequately protect public health and safety and the environment.

#### Operating Experience at Other Nuclear Facilities

All nuclear facilities licensed under 10 CFR Part 30, Part 40, Part 70, and Part 72 are subject to the DPR. In addition, these facilities are subject to the Decommissioning Timeliness Rule (DTR), which went into effect in 1994 (59 FR 36026; July 15, 1994), and was established to ensure the timely decommissioning of licensed facilities. In general, the DTR requires that decommissioning be completed within 24 months unless the NRC approves an alternative schedule. According to NRC Regulatory Issue Summary 2015-19, "Decommissioning Timeliness Rule Implementation and Associated Regulatory Relief" (ADAMS Accession No. ML15226A397), the DTR was established to avoid delays in decommissioning sites at which licensed activities have permanently ceased. Additionally, the DTR reduces the risk of delays in decommissioning because of bankruptcy, corporate takeover, or other unforeseen changes in a company's financial status. The DTR establishes requirements for (1) notifying the NRC of pending decommissioning actions and cessations in licensee operations, (2) when decommissioning plans need to be submitted, and (3) completing decommissioning activities.

During its evaluation of the implementation of the DPR at facilities other than nuclear power reactors, the NRC staff examined the licensees' decision-making processes in regard to remediation and determined:

- In general, the DTR encourages licensees to remediate unplanned contamination in the near term to prevent challenging the decommissioning timeliness requirements.
- No licensees have had to make adjustments to their decommissioning funds as a result of the DPR, meaning that no contamination has occurred or been identified at a level that would require licensees to set aside additional funds to address cleanup during decommissioning.
- Decisions regarding the timeliness of remediation are largely influenced by the requirements of 10 CFR Part 20 and the evaluations conducted under 10 CFR 70.25(g), "Financial assurance and recordkeeping for decommissioning," for certain types of licensees, as well as the requirements of the Environmental Protection Agency's 40 CFR 190, "Environmental Radiation Protection Standards for Nuclear Power Operations."

In addition, as part of an audit of the uranium recovery inspection program, the NRC staff reviewed the applicable inspection procedures and confirmed that they include direction to verify that the requirements for decommissioning planning under the DPR are included in licensee procedures/processes. Specifically, these procedures require inspectors to examine the components of decommissioning planning at non-reactor facilities to ensure that: (1) spills and releases are appropriately documented and characterized, and the adequacy of the associated procedures are reviewed; (2) licensees are submitting reports of leaks or spills at the appropriate reportable levels; (3) licensees are taking action to mitigate and/or remediate contamination based on the potential for public exposure and the need to meet the regulatory cleanup limits at the time of decommissioning; and (4) financial surety is reviewed and verified at regular intervals using the most current values based on the licensee's spill/release reports.

The regional inspectors confirmed that use of the non-reactor inspection procedures has enabled them to verify that licensees have appropriate procedures in place for dealing with leaks and spills, as well as the associated potential releases, and are appropriately documenting inadvertent contamination events (to include excursions for uranium recovery sites) for inclusion in their decommissioning files. The inspectors further noted that because the NRC has cited non-reactor licensees for failure to promptly evaluate spills and releases in the past, most licensees now adequately maintain a program and procedures for evaluating and documenting such releases. In addition, to ensure that inadvertent contamination does not challenge public dose limits or create an area where the licensee must implement additional radiological controls, contaminated areas are most often promptly mitigated and remediated at the discretion of the licensee as a good operational practice. Finally, in all cases where remediation took place at non-reactor facilities since implementation of the DPR, the regional inspectors verified that control of the area was within procedural requirements, and the area was properly characterized, thereby meeting all associated regulatory requirements.

In examining the implementation of the DPR and use of the DTR at non-reactor facilities, the NRC staff determined that the associated licensees have adequately implemented the DPR and are addressing inadvertent leaks and spills effectively. Given the information described above, the NRC staff concludes that the DPR is being effectively implemented at non-reactor facilities as it relates to minimizing contamination during operation, ensuring that releases of radioactivity to the environment are promptly identified and characterized, documenting radiological survey data, and ensuring the financial surety of the decommissioning entity.

#### U.S. Nuclear Regulatory Commission Staff Conclusion on the Need for Additional Actions to Address Remediation During Operation

Now that the DPR has been in place for more than 3 years, the NRC staff has evaluated the regulatory requirements to determine if existing regulations are sufficient to prevent creation of more legacy sites. The NRC staff notes that given the length of time it takes to decommission a nuclear facility, there were few data points to consider since implementation of the DPR. However, as described above, the operating experience at all nuclear facilities, as well as the lack of identification of any new legacy sites, gives the NRC staff confidence that the continued use of the DPR, associated industry initiatives, and licensee compliance with other NRC requirements will adequately prevent new legacy sites. Therefore, the NRC staff recommends that the Commission not direct additional rulemaking or other regulatory actions pertaining to prompt remediation for any licensees.