Environmental Assessment for Final Rule - Decommissioning Planning

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ACRONYMS

ALARA	as low as reasonably achievable
EA	environmental assessment
EIS	environmental impact statement
GPI	Groundwater Protection Initiative
NEPA	National Environmental Policy Act of 1969
NRC	Nuclear Regulatory Commission
RA	Regulatory Analysis
TI	Temporary Instruction

1. INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) is revising its regulations to improve decommissioning planning and thereby reduce the likelihood that any current NRC licensed operating facility will become a "legacy site." A "legacy site" is a facility that is decommissioning and has an owner who cannot complete the decommissioning work for technical or financial reasons.

Legacy sites have two common characteristics: (1) subsurface residual radioactivity in amounts greater than anticipated and (2) insufficient funds to remediate the radiological contamination to levels that will meet the NRC's decommissioning criteria. This rulemaking is, therefore, aimed at improving licensee's decommissioning financial planning and improving licensee's awareness of the presence and amounts of significant residual radioactivity onsite. The changes to financial assurance requirements in this final rule have no direct impact on the environment and are not evaluated in this environmental assessment (EA). This EA evaluates whether the amended regulations that are intended to promote the early identification of residual radioactivity at existing and future operating sites will have any significant environmental impact.

1.1 Background

The NRC's regulations for implementing Section 102(2) of the National Environmental Policy Act of 1969 (NEPA), as amended, are contained in Subpart A of 10 CFR Part 51. These regulations require that an environmental impact statement (EIS) or an environmental assessment be prepared for all licensing and regulatory actions that are not classified as categorical exclusions or as otherwise not requiring environmental review. This EA is being prepared to determine whether this final rule has the potential to cause significant environmental impacts, requiring the preparation of an EIS.

The NRC terminates several hundred licenses each year with most requiring little, if any, remediation to meet NRC's related decommissioning criteria. In a few cases, operating conditions have led to large amounts of chemical and long-lived radioactive contamination being released to the subsurface environment over an extended period of time. Acute doses from these releases are typically below the limits imposed by 10 CFR Part 20, and thus the releases are rarely subject to NRC regulatory action. However, with many facilities operating for decades, numerous unremediated minor spills, accumulated over the lifetime of a facility, may lead to unanticipated levels of subsurface contamination that have not been adequately factored into decommissioning costs. If a licensee first learns of significant subsurface residual radioactivity at the start of decommissioning, after the facility has been shut down and the owner has no operating revenue, there is the possibility of a legacy site. Historically, in a few of these instances, the State or Federal government has provided funds to remediate the site consistent with unrestricted use of the site after license termination. For those sites that are highly contaminated, the delay in cleanup has introduced additional risk associated with occupational health and safety during decommissioning.

Another common factor that may eventually lead to costly environmental contamination is that the cost to dispose of radioactive material can be very high. Packaging and transportation requirements, the limited number of licensed disposal sites, and disposal

surcharges contribute to the high costs. The cost of disposal may affect the licensee's business practices. For example, a company may opt to store its waste onsite rather than shipping it offsite. Storing the waste on-site could increase the risk of later environmental contamination at the site. Such contamination could result in substantially higher site remediation costs, possibly exceeding available financial resources, at the time of facility decommissioning.

1.2 Need for the Final Rule

The final rule is intended to reduce the likelihood of future legacy sites among current operating facilities. Survey and related requirements are amended to ensure that significant residual radioactivity is detected in a timely manner, and financial assurance regulations are amended to ensure that adequate decommissioning funds will be available when needed.

The proposed rule on Decommissioning Planning was published on January 22, 2008 (73 FR 3812), for a 75-day public comment period. The Nuclear Energy Institute (NEI) and several other stakeholders requested an extension of 90 days to provide review of issues raised in the proposed rule. The NRC extended the comment period by 30 days, until May 8, 2008 (73 FR 14946). The NRC received 35 comment letters on the proposed rule. Two letters provided comments on the draft EA that was part of the proposed rulemaking package.

One commenter agreed with draft EA's conclusion that monitoring wells, if required at licensed sites, will result in small environmental impacts.

The other commenter disagreed with the draft EA's finding of no significant environmental impact and stated that such a finding violates the NEPA. The commenter believed the NRC must perform additional environmental analyses because the final rule does not go far enough in requiring prompt remediation of spills and leaks during facility operations, and that any deferral of cleanup activities could have a large impact on environmental resources, nearby properties, and public health. The NRC disagrees with this comment for the reasons stated in the final rule *Federal Register Notice* (section III, response to comment D.8).

1.3 Final Rule Action (Alternative 2: Monitoring with Financial Assurance Changes)[1]

The final rule action evaluated in this EA is a set of linked amendments that (a) revise 10 CFR 20.1406 to make its waste minimization requirements applicable to licensees as well as applicants; and (b) revise the 10 CFR 20.1501 survey requirements by replacing its undefined term "radioactive material" with "residual radioactivity," a term already defined in 10 CFR Part 20. This defined term includes subsurface contamination within its scope. Due to the need to better ascertain the extent of existing contamination within the subsurface during facility operations, both 10 CFR 20.1406(c) and 20.1501(a) are being worded to include subsurface contamination within their scope. Consistent with this approach, both provisions contain the "residual radioactivity" term, which serves to reinforce the intended linkage between these provisions. These changes are consistent with NRC policy that licensees conduct operations

[1] Alternatives in this EA are meant to be consistent with the alternatives in the Regulatory Analysis (RA). In the RA, Alternative 1 is the No Action Alternative. Alternative 2 is the preferred alternative. Alternative 3 adds collateral requirements to those proposed in the preferred approach.

so as to minimize the generation of waste, in order to facilitate later facility decommissioning and to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA). The purpose of these amendments is to focus licensee attention on subsurface residual radioactivity as a potential radiological hazard in later decommissioning activities.

NRC staff considered the technical basis information and came to the conclusion that the large majority of NRC and Agreement State licensees are not expected to have significant quantities of residual radioactivity because they possess small amounts of short-lived byproduct material or byproduct material that is encased in a capsule designed to prevent leakage or escape of the byproduct material (i.e., a sealed source). For NRC licensees who have subsurface residual radioactivity with no ground water implications, a minimal, routine monitoring plan may remain in effect through license termination. Many NRC licensees with a potential for subsurface residual radioactivity currently have onsite monitoring procedures that likely would provide sufficient information to satisfy the amendments to § 20.1406(c) and § 20.1501(a). Based on review of the technical basis information supporting this rule, licensees that are not expected to be affected by the amendments, by the effective date of the final rule, include nuclear power plants, research and test reactors, uranium fuel fabrication plants, critical mass licensees, uranium enrichment plants, UF6 production plants, sewage treatment plants, byproduct material plants that are not rare earth extraction facilities, and uranium recovery facilities.

For power reactors, onsite monitoring programs are in place to meeting existing effluent release regulations in 10 CFR § 50.36a and § 20.1301. In addition, the voluntary industry Ground Water Protection Initiative (GPI) includes a site risk assessment at each power plant based on plant design and work practices to evaluate credible pathways for licensed material to reach the ground water. Each power plant has sampling and analysis protocols for ground water and soil. In May 2008, NRC completed its Temporary Instruction 2515/173 (ADAMS ML072950622) that will be used by inspectors to assess if licensees have completed the voluntary industry Groundwater Protection Initiative. The Temporary Instruction includes inspection of licensees' Annual Reporting whereby the power reactor licensees will have documented onsite groundwater sample results for each calendar year in the Annual Radiological Environmental Operating Report (AREOR) or the Annual Radiological Effluent Release Report (ARERR), as part of their annual Environmental Reports. This information is publicly available in ADAMS.

Uranium fuel fabrication plants and the dry process natural uranium conversion facility also perform onsite surveys to detect radioactive release to the ground water. These facilities report survey results pursuant to existing reporting requirements in 10 CFR § 70.59 and § 40.65.

Uranium enrichment plants considered in this EA are of two types: the Department of Energy (DOE) gaseous diffusion plants and centrifuge enrichment plants. The two DOE gaseous diffusion plants, leased for operation by United States Enrichment Corporation (USEC), are regulated under the 10 CFR Part 76 certification process. Both plants have substantial subsurface and ground water contamination from operations during the time these facilities were under the control of the Atomic Energy Commission and the Department of Energy (DOE), and prior to certification by NRC. The DOE is currently conducting an extensive

ground water monitoring program at both plants. Centrifuge enrichment plants do not use large amounts of fluids in production processes and are not thought to pose risks of subsurface contamination.

NRC staff estimates that one rare earth and extraction material licensee and four Agreement State rare earth and extraction material licensees will be affected by the final rule amendments to 10 CFR 20.1406(c) and 20.1501. Therefore, for the purpose of this EA, the final rule action would only affect these five hypothetical licensees.

2.0 ENVIRONMENTAL IMPACTS OF THE FINAL RULE

Under the final rule, § 20.1406(c) will require licensees to conduct their operations so as to minimize the introduction of residual radioactivity into the site, including the subsurface.

10 CFR 20.1501(a) uses the defined term "residual radioactivity" to include subsurface contamination within its scope, and is thus linked with 10 CFR 20.1406(c), which uses the same term. Together, the amended 10 CFR 20.1501(a) and 20.1406(c) specify that compliance with 10 CFR Part 20 survey and recordkeeping requirements may be a necessary part of effectively planning for decommissioning, and to demonstrate compliance with effluent dose limits. 10 CFR 20.1501(b) will require licensees to retain records from surveys of subsurface residual radioactivity with records important for decommissioning.

The Statements of Consideration and draft Regulatory Guide DG-4014, "Radiological Surveys and Monitoring During Operations," released with the final rule specify that the intent of the rule is to address amounts of residual radioactivity at a site that are significant to achieve effective decommissioning planning. For operating facilities, significant residual radioactivity is a quantity of radioactive material that would later require remediation during decommissioning to meet the unrestricted use criteria of 10 CFR 20.1402.

There are a variety of monitoring methods to evaluate subsurface characteristics, and these are highly site specific with respect to their effectiveness. As indicated above, for purposes of this EA it is assumed that five licensees will be affected by this final rule. It is assumed that the five licensees will install ground-water monitoring wells and surface monitoring devices at their sites. The installation of these monitoring devices and wells is generally expected to result in small environmental impacts due to their very localized nature.

2.1 Public and Occupational Health Impacts

Under the final rule, there is the potential for increased occupational exposure to radiological and chemical substances during sampling and testing. Such exposures are not expected to be significant, because they would likely remain within 10 CFR Part 20 limits and be ALARA. Monitoring will allow the licensees to be more cognizant of subsurface contamination. If such contamination is found to be at significant levels, licensees may opt to remediate it in the near-term, rather than waiting until decommissioning. Doing so would avoid incurring higher occupational exposure rates in the future, by which time additional amounts of contamination may have accumulated. Licensees may alternatively choose to provide increased decommissioning funding upon discovering significant amounts of subsurface contamination. Having sufficient funds for decommissioning will better ensure that the licensed

area is adequately remediated during decommissioning, thus ensuring adequate protection of public health and safety and the environment.

In most instances, the activities involved when installing leak detection systems and monitoring wells do not create transport mechanisms for radioactivity to leave the site and expose the public. Therefore, offsite doses are expected to be negligible from installing and implementing onsite monitoring.

2.2 Noise and Visual Impacts

The staff expects that the installation of detection equipment and the implementation of the monitoring program will create no more noise than any other operation at a licensed facility. Drilling monitoring wells may create loud noises, but it will be short term and only lasting a few days or weeks.

The leak detection equipment and the portions of the monitoring wells visible above grade do not create any adverse visual impacts. They are not very visible from close distances onsite and almost impossible to see from further distances offsite.

2.3 Transportation Impacts

Installing and maintaining an onsite monitoring program will require the delivery of equipment to the licensee. These excess deliveries are not expected to increase the average traffic volume to the licensee because the delivery of equipment will last only a few days and the number and size of vehicles required to deliver the equipment will be small.

If, due to the monitoring imposed by this rulemaking, a licensee finds that there has been subsurface contamination onsite, the licensee may choose to remediate the contamination prior to decommissioning by shipping the waste offsite. Licensees will likely make this decision in the cases where the waste consists of long-lived radionuclides that are not expected to decay substantially before site decommissioning. Though radiological shipments are highly regulated to ensure public health and safety, there is a potential for these waste shipments and disposal to result in public exposures. However, if the proposed action were not taken, this waste would eventually have to be shipped and disposed offsite during decommissioning. Therefore, the potential for exposure to the public would not increase due to the proposed action.

Moreover, if a licensee becomes aware of significant levels of residual radioactivity in the subsurface, the licensee and the NRC will be better able to ensure the protection of public health and safety and the environment by identifying and resolving the source of the contamination, and by taking steps to ensure that it is not allowed to migrate offsite. Early identification also gives the licensee more time to plan waste remediation strategies that are both safe and cost effective.

3.0 ALTERNATIVES TO THE FINAL RULE

As required by Section 102(2)(E) of the NEPA (42 U.S.C.A. 4332(2)(E)), the NRC has considered possible alternatives to the final rule. The staff considered the following alternatives to the proposed action:

3.1 Alternative 1: No-Action Alternative

This alternative provides a baseline to assess the other two alternatives. Under the No-Action alternative, the Commission would not adopt changes to the current regulations. It assumes no changes are made to the regulations and there will be additional legacy sites from currently operating facilities licensed by the NRC and Agreement States. The basis for this assumption of additional legacy sites is documented in section 3.1 of the final rule Regulatory Analysis. Consistent with the requirements in NUREG/BR-0058, Revision 4, "the alternatives examined in the regulatory analysis should correspond as much as possible to the alternatives examined in the EIS or EA [page 38]." Thus, the No-Action alternative assumes additional legacy sites.

If the NRC chooses this alternative, rulemaking would not be pursued and the current regulations would be maintained. The current regulatory focus is on preventing acute radiological hazards based on licensee compliance with existing radiation exposure limits. Although there are only a handful of legacy sites, these sites require a disproportionate amount of time to regulate, pose a radiological hazard, and present long-term concerns as to how to effectively remediate existing contamination. Choosing this alternative would defer any occupational exposure from well installation and surveying. However, the lack of surveys may ultimately lead to additional legacy sites that would present long-term remediation problems due to subsurface contamination.

Under the no-action alternative, occupational exposure would remain at the current level. If the proposed action is taken, occupational exposure may slightly increase as the time spent near contaminated areas would increase during sampling periods. But this benefit of the no-action alternative would be outweighed by the creation of additional legacy sites, which would require extensive regulatory oversight and large financial resources to remedy.

The no-action alternative is thus not the preferred option. Current practices could also allow a small number of licensees to become financially insolvent because of the increased cost of remediating previously unknown subsurface contamination. This subsurface contamination may not be detected under the present set of NRC regulations until the end of operations when the licensee begins preparing for decommissioning. These considerations were an important factor in the NRC's determination that the no-action alternative is not acceptable.

3.2 Alternative 3: Monitoring with Changes to Financial Assurance, and Collateral

This alternative would implement the changes set forth in Alternative 2 (the preferred alternative), with one additional requirement for a security interest in collateral to support the decommissioning assurance pledged in the parent company guarantee and self guarantee financial assurance mechanisms. As discussed in the introduction, changes to financial planning requirements have no direct impact on the environment and are not considered in this

environmental assessment. The additional monitoring, planning, and reporting requirements of Alternative 2 would also be implemented under Alternative 3. Therefore, for the purposes of this EA, the environmental impacts of Alternative 3 are identical to those of Alternative 2.

4.0 AGENCIES AND PERSONS CONSULTED

The NRC staff has determined that the final rule is not a type of activity that has potential to cause effects on historic properties because it is a procedural action. Therefore, no further consultation is required under Section 106 of the National Historic Preservation Act. Additionally, the NRC staff has determined that Section 7 consultation with the U.S. Fish and Wildlife Service is not required because the preferred Federal action is procedural in nature and will not affect listed species or critical habitat.

5.0 CONCLUSION

The NRC is amending its regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site. This document was prepared to consider and document the environmental impacts as part of the decision-making process. This assessment discusses the impacts of the rulemaking under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in Subpart A of 10 CFR Part 51. This rulemaking is not expected to have any significant environmental impacts, and therefore this rulemaking does not warrant the preparation of an environmental impact statement.

6.0 REFERENCES

1. Code of Federal Regulations, Title 10, Chapter I, Parts 2, 20, 30, 40, 50, 51, 70, and 72.
2. NUREG-1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, August 2003. (ML032450279)
3. NUREG-1496, Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities, Volume 1, July 1997. (ML0423104920)
4. Regulatory Analysis for Final Rulemaking - Decommissioning Planning, September 2008.