Environmental Assessment for Proposed Rulemaking-Decommissioning Planning

Draft for Comment

U.S. Nuclear Regulatory Commission
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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 Nuclear Regulatory Commission (NRC) is proposing to revise 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 in decommissioning status with complex issues 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 proposed in this rulemaking 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 proposed rulemaking 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 rely more on storing waste, perhaps in settling ponds, than in shipping waste, to save money. Storing the waste on-site could increase the opportunity for environmental contamination from pond releases. Such releases could result in substantially higher site remediation costs, possibly exceeding available financial resources, at the time of facility decommissioning.

1.2 Need for the Proposed Action

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

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

The proposed 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 would contain the "residual radioactivity" term, which serves to reinforce the intended linkage between these provisions. These proposed changes are consistent with NRC policy that licensees conduct operations 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 proposed amendments to §§ 20.1406(c) and 20.1501(a). Based on review of the technical basis information supporting this proposed rule, licensees that would not be affected by the amendments include nuclear power plants, research and test reactors, uranium fuel fabrication plants, critical mass licensees, uranium

[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.

enrichment plants, UF6 production plants, uranium mills, solution mining facilities, sewage treatment plants, and byproduct material plants that are not rare earth extraction facilities.

For power reactors, onsite monitoring programs are being implemented to comply with 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. NRC staff has issued a revised baseline inspection module (Procedure 71122.01) used to inspect leaks and spills at power reactor sites.

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 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 certified under 10 CFR Part 76. 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 their production processes and are not, at this time, thought to pose risks of subsurface contamination.

NRC staff estimates that 1 rare earth and extraction material licensee and 4 Agreement State rare earth and extraction material licensees will be affected by the proposed amendments to 10 CFR 20.1406(c) and 20.1501. Therefore, for the purpose of this EA, the proposed action would only affect these 5 hypothetical licensees.

2.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

Under the proposed action, the new § 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) is being revised by replacing its undefined term "radioactive material" with "residual radioactivity" which includes subsurface contamination within its scope and provides a link with new 10 CFR 20.1406(c). Together, the amended 10 CFR 20.1501(a) and 20.1406(c) identify that compliance with 10 CFR Part 20 survey and recordkeeping requirements may be a necessary part of effective planning for decommissioning as well as to demonstrate compliance with effluent dose limits. 10 CFR 20.1501(b) is being added to require licensees to retain records from surveys of subsurface residual radioactivity with records important for decommissioning.

The Statements of Consideration and draft guidance released with the proposed 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 purposed of this EA it is assumed that five licensees will be affected by this proposed rulemaking. 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 proposed action 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 as low as reasonably achievable (ALARA). Monitoring will allow the licensees to be more cognizant of subsurface contamination. Licensees choosing to remediate contamination in the near-term, as the result of identifying contamination and preventing additional contamination from occurring by complying with NRC's amended regulations, will encounter contamination levels that are lower and more manageable. This would avoid incurring higher occupational exposure rates in the future, which would occur if the contamination conditions became worse over time and increasingly more hazardous as additional amounts of contamination accumulated. Licensees may alternatively choose to provide adequate funding in response to their knowledge of the extent of any 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. Drilling and installing monitoring wells into uncontaminated aquifers can create a pathway for soil radioactivity to migrate down into the aquifer if installed incorrectly. If the wells were to create a pathway to the aquifers below, the sampling and monitoring would detect the radioactivity and remedial actions would be implemented, if warranted, preventing continued migration of radioactivity.

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, once the licensee is aware of residual radioactivity in the subsurface due to the monitoring imposed by this rulemaking, 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 ensuring that waste 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 PROPOSED ACTION

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 proposed action. 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.

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 occupational exposure during 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; whereas with the proposed action, occupational exposure may slightly increase as the time spent near contaminated areas would increase during sampling periods. The creation of additional legacy sites would require extensive regulatory oversight and large financial resources to remedy.

The no-action alternative is not the preferred option because it would not address the need to prevent the creation of additional legacy sites. 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 Proposed 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 proposed additional monitoring, planning, and reporting requirements of the proposed action would also be implemented with this alternative. Therefore, for the purposes of this EA, the environmental impacts expected with this alternative are identical to those expected with the proposed action.

4.0 AGENCIES AND PERSONS CONSULTED

The NRC staff has determined that the proposed action 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 proposing to amend 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 so that environmental impacts would be considered 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 Proposed Rulemaking - Decommissioning Planning, September 2007.