

Updates to the U.S. Nuclear Regulatory Commission's Consolidated NMSS Decommissioning Guidance

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ABSTRACT

In September 2003, U.S. Nuclear Regulatory Commission (NRC) staff in the Office of Nuclear Material Safety and Safeguards (NMSS) consolidated and updated the policies and guidance of its decommissioning program in a three-volume NUREG report, NUREG-1757, "Consolidated NMSS Decommissioning Guidance" [1,2,3]. This NUREG report provides guidance on: planning and implementing license termination under the NRC's License Termination Rule (LTR), in 10 CFR Part 20, Subpart E; complying with the radiological criteria for license termination; and complying with the requirements for financial assurance and recordkeeping for decommissioning and timeliness in decommissioning of materials facilities. The staff plans to periodically update NUREG-1757, so that it reflects current NRC decommissioning policy.

In September 2005, the staff issued, for public comment, draft Supplement 1 to NUREG-1757 [4], which contains proposed updates to the three volumes of NUREG-1757. Draft Supplement 1 includes new and revised decommissioning guidance that addresses some of the LTR implementation issues, which were analyzed by the staff in two Commission papers (SECY-03-0069, Results of the LTR Analysis [5]; and SECY-04-0035, Results of the LTR Analysis of the Use of Intentional Mixing of Contaminated Soil [6]). These issues include restricted use and institutional controls, onsite disposal of radioactive materials under 10 CFR 20.2002, selection and justification of exposure scenarios based on reasonably foreseeable future land use (realistic scenarios), intentional mixing of contaminated soil, and removal of material after license termination (a follow-up to the LTR Analysis issue on the relationship between the LTR and the current case-by-case approach for release of solid materials). The staff also developed new and revised guidance on other issues, including the risk-informed graded approach for engineered barriers.

This paper is a follow-up to a poster session and paper at Waste Management 2004, which presented the new Consolidated NMSS Decommissioning Guidance in NUREG-1757. This paper discusses the issues addressed in the current update to NRC's decommissioning guidance and explores the relationships between the issues.

RESTRICTED USE, INSTITUTIONAL CONTROLS, AND ENGINEERED BARRIERS

NUREG-1757, Supplement 1 [4] includes revised decommissioning guidance for use of institutional controls at restricted use and alternate criteria sites under the LTR. The guidance describes two new institutional control options for restricted use. These options are the long-term control (LTC) license, which is a new type of possession-only license that functions as a legally enforceable institutional control, and the use of a legal agreement with a restrictive covenant (LA/RC). For restricted use sites that cannot arrange legally enforceable institutional controls, these two options provide for legally enforceable institutional controls, and if needed, durable institutional controls under the LTR.

The guidance also clarifies the LTR's risk-informed graded approach for institutional controls, which describes a framework for identifying lower risk and higher risk sites and the appropriate type of institutional controls for each.

The existing guidance on engineered barriers was expanded to supplement the restricted use guidance, further risk-inform NRC's decommissioning program, and provide more flexibility. The revisions include guidance to licensees for considering the use of engineered barriers, including a risk-informed graded approach for selecting engineered barriers; engineered barrier analysis process; technical basis for engineered barrier performance; and potential performance and degradation mechanisms. The guidance also provides an example of the application of the risk-informed graded approach to engineered barriers for erosion protection.

Revisions were also made to clarify the guidance on seeking advice from affected parties on institutional controls. The staff developed guidance on the types of information the licensee could share with the affected parties, to promote understanding of the restricted use decommissioning plans and allow the affected parties to provide advice on the various aspects of the institutional controls.

ONSITE DISPOSAL

NUREG 1757, Supplement 1 [4] contains guidance on the acceptable options for onsite disposal of radioactive materials under 10 CFR 20.2002, considering the prevention of future legacy sites (i.e., complex decommissioning sites that have insufficient funds to complete decommissioning). One acceptable option is onsite disposals that result in doses of no greater than 0.05 millisievert per year (mSv/y) (referred to as the "few millirem" per year policy), without requiring additional financial assurance. This is a continuation of NRC's current practice of approving onsite disposals. The guidance also provides two new options for approving onsite disposals: (1) a criterion of 1.0 mSv/y, if additional financial assurance is provided to cover the cost of decommissioning the burial at the time of license termination; (2) a criterion of 0.25 mSv/y, without requiring additional financial assurance, for short-lived materials that will decay significantly in a few years, and as long as the likelihood of creating a legacy site is low (i.e., license termination is not imminent).

The NRC staff is currently developing a proposed rulemaking, aimed at preventing future legacy sites. One of the important issues in preventing legacy sites is to ensure that sites have adequate financial assurance for decommissioning. The LTR Analysis included onsite disposal as one operational indicator of potentially increased decommissioning costs. Thus, the proposed rulemaking will likely address additional financial assurance needs as suggested in the option for approving onsite disposals at 1.0 mSv/y.

REALISTIC EXPOSURE SCENARIOS

NUREG-1757, Supplement 1 [4] provides revised guidance on selection and justification of exposure scenarios based on reasonably foreseeable future land use (also referred to as "realistic exposure scenarios"). The guidance was modified to allow selection and justification of exposure scenarios based on reasonably foreseeable future land uses, which are considered to be land uses that are likely within the next 100 years. The NRC staff still allows licensees to use screening scenarios or bounding scenarios, but staff is emphasizing the flexibility afforded by use of realistic scenarios. The guidance notes that if realistic scenarios are used to demonstrate compliance, unlikely scenarios should also be evaluated not for comparison with the license termination criteria, but to risk-inform the decision.

It is noted that reasonably foreseeable future land use scenarios may be used to demonstrate compliance with either the unrestricted, restricted, or alternate criteria of the LTR. If a licensee is able to demonstrate

that all land uses that are reasonably foreseeable result in doses that meet the unrestricted use criteria, then restrictions are not needed to ensure this land use. NRC staff will review a licensee's dose assessment and its basis for the realistic scenario(s) to determine if the chosen scenario(s) are indeed realistic, as the policy of using realistic scenarios is not a method to avoid restricted use or alternate criteria requirements.

INTENTIONAL MIXING OF CONTAMINATED SOIL

NUREG-1757, Supplement 1 [4] provides new guidance on options for the use of intentional mixing of contaminated soil. The guidance endorses the current practice of allowing intentional mixing to meet waste acceptance criteria of off-site disposal facilities.

The guidance also discusses how intentional mixing may be acceptable to meet license termination criteria if it is part of an overall approach that includes removal of contaminated soils to the extent reasonably achievable. Also, the area containing the mixed contaminated soil after license termination should be equal to or smaller than the footprint of the zones of contamination before decommissioning begins. Uncontaminated or clean soil, from outside the footprint of the area containing contaminated soil, should not be mixed with the contaminated soil to lower concentrations. Staff will consider rare cases where the only viable alternative to achieving the LTR dose criteria appears to be use of uncontaminated soil from outside the footprint of the area containing contaminated soil.

Intentional mixing may be acceptable for limited cases of onsite disposal approved under 10 CFR 20.2002. Licensees should be aware that if intentional mixing is approved for a 10 CFR 20.2002 disposal during operations, the onsite disposal might need to be readdressed at the time of license termination to ensure that the dose criteria of the LTR are met.

REMOVAL OF MATERIAL AFTER LICENSE TERMINATION

NUREG-1757, Supplement 1 [4] provides additional guidance on removal of material after license termination, which is a follow-up to the LTR Analysis issue on the relationship between the LTR and the current case-by-case approach for release of solid materials from sites. The staff revised existing guidance on what building structure-related materials may remain onsite at license termination and what criteria should apply. The guidance provides three acceptable approaches for determining what materials may be left in buildings at license termination.

First, materials left onsite could meet previously approved release criteria, which may have been approved in license conditions, technical specifications, or generic NRC guidance. Second, materials could also be left onsite if residual radioactivity is volumetrically distributed and the potential dose from off-site use scenarios is no greater than 0.05 mSv/y (referred to as the "few millirem" per year policy). Finally, bare building structures may be left onsite if they result in a dose that meets the dose criteria of the LTR (for unrestricted use, no greater than 0.25 mSv/y and ALARA).

Supplement 1 [4] also provides guidance on when off-site use scenarios should be considered for dose assessments to show compliance with the LTR criteria. If less conservative and more realistic exposure scenarios (involving onsite exposure) are selected for dose assessment, these may no longer bound potential off-site use scenarios. Therefore, the licensee should consider the potential off-site uses in its analysis. There are some cases where off-site uses may be realistic and reasonably foreseeable scenarios. Such reasonably foreseeable off-site uses should also be analyzed to determine if the critical group might be an off-site user instead of an onsite user.

NRC PLANS TO FINALIZE GUIDANCE IN DRAFT SUPPLEMENT 1

Draft Supplement 1 [4] was published for public comment in September 2005, in order to receive feedback from a wide range of interested parties and to ensure that all information relevant to developing the document is available to NRC staff. After consideration of public comments on draft Supplement 1, the staff plans to revise Volumes 1, 2, and 3 of NUREG-1757 to incorporate this guidance by September 2006. When finalized, the guidance is intended for use by NRC staff, licensees, and the public. It will be available on NRC's decommissioning web site.

REFERENCES

1. NRC, 2003, Consolidated NMSS Decommissioning Guidance: Decommissioning Process for Materials Licensees, NUREG-1757, Vol. 1, Rev. 1
2. NRC, 2003, Consolidated NMSS Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria, NUREG-1757, Vol. 2
3. NRC, 2003, Consolidated NMSS Decommissioning Guidance: Financial Assurance, Recordkeeping, and Timeliness, NUREG-1757, Vol. 3
4. NRC, 2005, Consolidated NMSS Decommissioning Guidance: Updates to Implement the License Termination Rule Analysis, NUREG-1757, Supplement 1, Draft
5. NRC, 2003, Results of the License Termination Rule Analysis, SECY-03-0069
6. NRC, 2004, Results of the License Termination Rule Analysis of the Use of Intentional Mixing of Contaminated Soil, SECY-04-0035