



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001**

February 26, 2024

The Honorable Christopher T. Hanson
Chair
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

**SUBJECT: 10 CFR PART 61 – REVISIONS TO LOW-LEVEL RADIOACTIVE WASTE
DISPOSAL REQUIREMENTS**

Dear Chair Hanson:

During the 712th meeting of the Advisory Committee on Reactor Safeguards (ACRS), February 7-8, 2024, we completed our review of the staff's proposed rulemaking to revise the Commission's low-level radioactive waste (LLRW) disposal regulation in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." This rulemaking introduces site-specific performance assessment and inadvertent human intrusion analysis requirements to 10 CFR Part 61. Additionally, the proposed rule now allows for the disposition of greater-than-Class C (GTCC) waste. Our subcommittee on Regulatory Rulemaking, Policies, and Practices (and its predecessors) discussed this matter during meetings on November 19, 2013, December 3, 2013, January 16, 2014, October 18, 2016, and December 5, 2023. This letter report is our sixth report concerning this proposed rulemaking.

CONCLUSIONS AND RECOMMENDATIONS

1. The proposed rule represents a significant step forward in the management of a broad range of low-level radioactive wastes.
2. The inclusion of licensing flexibility and pathways for disposition of GTCC waste, depleted uranium, and other transuranic waste streams in the proposed rule represent a comprehensive approach to the disposal of low-level radioactive waste and will ensure that facilities meet Commission public health and safety objectives.
3. The proposed rule should be issued for public comment.

BACKGROUND/HISTORY

The staff of the Office of Nuclear Materials Safety and Safeguards (NMSS) is developing a revision to 10 CFR Part 61, which was promulgated by the NRC in 1982. The technical basis for the rule included analyses based on LLRW projections that were expected to be generated for the foreseeable future as determined at that time. Since 1982, several changes to policy and practice have resulted in some LLRW waste streams being included in the technical basis for the rule that were not included in 1982. These waste streams include large quantities of

depleted uranium (DU) waste, blended low-level wastes, waste streams from spent nuclear fuel reprocessing, Radium (Ra)-226 bearing wastes, and transuranic waste. Because these wastes contain or will produce through radioactive decay (progeny) significant quantities of long-lived radionuclides that were not specifically evaluated in the technical bases that supported the original (and still current) 10 CFR Part 61, these wastes may not be able to meet the requirements for protection of an inadvertent intruder that are included in the 10 CFR Part 61 requirements.

Additionally, the Commission directed that the proposed rule allows for the disposal of GTCC waste. Finally, an application for a uranium enrichment facility required a policy decision on the DU waste stream that will be generated by the proposed facility. These changes called into question whether these waste streams can be appropriately disposed in a shallow land disposal facility that meets the 10 CFR Part 61 requirements.

The ACRS met and heard presentations on the proposed rulemaking package from NMSS staff on December 5, 2023. However, rule development has been ongoing for the past 15 years. Several prior meetings were held with NMSS staff, staff from predecessor NMSS organizations, stakeholders, and consultants on the 10 CFR Part 61 revised rule language, requirements, and the associated implementation guidance. The Committee wrote its most recent Letter Report (its fifth letter on the topic) dated November 14, 2016.

DISCUSSION

Since the 2016 version of 10 CFR Part 61 was reviewed by the Committee, two significant developments required additional revisions by the staff:

1) Inclusion of Transuranic Waste in LLRW Definition

The staff proposes to revise the definition of LLRW to include transuranic waste, as directed in SRM-SECY-15-0094, and in accordance with revisions in the definition of LLRW resulting from the Low-Level Radioactive Waste Policy Amendments Act of 1985. Specifically, the rule removes transuranic waste from the list of materials excluded from the definition of LLRW.

2) Inclusion of Greater-than-Class C Waste

The staff is proposing to add criteria for disposal of GTCC waste streams. Further, they propose to allow for Agreement State licensing of GTCC waste streams that meet the regulatory requirements for near-surface disposal. In some cases, as noted below, the NRC would retain disposal authority under Section 274c of the Atomic Energy Act of 1954, as amended.

Contents of the Proposed New Rule

Important provisions of the proposed rule include:

- An exception option for existing licensees that do not plan to accept GTCC waste or significant quantities of long-lived radionuclides (§61.1),
- Specification of a 1,000-year compliance period for sites that do not contain significant quantities of long-lived radionuclides or a 10,000-year compliance period for sites that are planning to accept significant quantities of long-lived radionuclides (§61.2),

- Description of defense-in-depth protections that enhance the resiliency of the facility are required to be included in the safety case (§61.7),
- Assessment for the protection of inadvertent intruders (§61.13),
- Requirement of a performance analysis for beyond the 10,000-year post-closure time period if significant quantities of long-lived radionuclides are to be disposed of (§61.13),
- Technical analyses for GTCC waste including an operational safety assessment, performance assessment, and inadvertent intruder dose analyses (§61.13),
- Requirement that the near-surface disposal of GTCC waste streams containing special nuclear material (SNM) in quantities subject to 10 CFR 70.24 include design features to limit the reconcentration of fissile material following disposal (§61.16),
- Requirements for avoiding accidental criticality during storage of SNM prior to disposal and waste emplacement for disposal that do not apply to radioactive waste that meets the exemption requirements under 10 CFR 71.15(c) as non-fissile material (§61.24),
- Revisions to technical analyses necessary to support site closure (§61.28),
- Specification of an annual dose limit of 0.25 milli-Sieverts (mSv) (25 millirem (mrem)) for any member of the public within the compliance period (§61.41),
- Specification of an annual dose not to exceed 5 mSv (500 mrem) to an inadvertent intruder within the compliance period and that exposures to an inadvertent intruder are reduced to the extent reasonably achievable during the performance period (§61.42),
- Specification that GTCC waste streams that are disposed of near the surface do not contain concentrations of alpha emitting transuranic nuclides with half-lives greater than 5 years that are greater than 10,000 nanocuries per gram (§61.52),
- Development of site-specific waste acceptance criteria that specify the allowable activities and concentrations for each specific radionuclide based on the results of the technical analyses or the use of generic waste acceptance criteria based on the existing LLRW classification requirements (§61.58),
- An option for an Agreement State licensee to meet only Agreement State regulator requirements in those Agreement States that have chosen to regulate GTCC waste streams acceptable for near-surface disposal. Such an Agreement State licensee would not have to comply with NRC licensing and regulatory requirements for the disposal of GTCC waste with concentrations of alpha emitting transuranic nuclides with half-lives greater than 5 years and less than or equal to 10,000 nanocuries per gram in an Agreement State-licensed land disposal facility. The NRC would retain its authority to approve the near-surface disposal of GTCC waste with transuranic nuclides greater than 10,000 nanocuries per gram (§73.67), and
- Clarification of the applicable physical protection requirements for LLRW containing SNM or Category 1 and 2 quantities of radioactive material (§73.67).

These provisions in the proposed rule provide licensing flexibility that is notable given the broad range of anticipated future waste streams.

Addressing Previous ACRS Comments

The Committee made several recommendations during our previous reviews. We note that subsequent revisions of the proposed rule have largely addressed the Committee's concerns, except for our preference for an inclusion of a quantitative uncertainty analysis to support the performance assessment. This subject was addressed in subsequent discussions with the staff.

The rule specifies that the site performance assessment consist of a qualitative analysis. In their 2016 response letter, the staff stated:

“...current approach provides a reasonable balance between the limitations of long-term evaluations, protection of future generations, and providing information for risk informing disposal of radioactive wastes. The Committee's recommendation for developing site-specific time periods could unnecessarily complicate compliance decisions and result in undue burden and regulatory uncertainty for the licensee and regulator. In addition, although the NRC staff agrees that the evaluation of uncertainty, as previously recommended by the Committee, is an important tool in understanding a site performance assessment, the NRC staff considers that uncertainty itself should not be the principal determinant of the compliance and performance periods.”

Because of the considerable uncertainties in societal and environmental conditions for the timeframes involved, we agree with the current staff position that quantification of uncertainties should not be the principal determinant of the compliance and performance periods. As invoked by the proposed rule, mitigating design features and qualitative considerations, including defense-in-depth, diversity, and enhanced controls, should provide adequate protection of the public health and safety.

SUMMARY

The proposed rule represents a significant step forward in the management of a broad range of low-level radioactive wastes. The inclusion of licensing flexibility and pathways for disposition of GTCC waste, depleted uranium, and other transuranic waste streams in the proposed rule represent a comprehensive approach to the disposal of low-level radioactive waste and will ensure that facilities meet Commission public health and safety objectives. The proposed rule should be issued for public comment.

We are not requesting a formal response from the staff to this letter report.

Member Halnon did not participate in the Committee's deliberations regarding this matter.

Sincerely,



Signed by Kirchner, Walter
on 02/26/24

Walter Kirchner
Chair

REFERENCES

1. U.S. Nuclear Regulatory Commission, Title *10 Code of Federal Regulations*, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," 1982.
2. Low-Level Radioactive Waste Policy Amendments Act (LLRWPA) of 1985, as amended, Pub. L. 99-240, 1985.
3. U.S. Nuclear Regulatory Commission, SECY-24-XXXX, Federal Register Notice: Proposed Rule, "Integrated Low-Level Radioactive Waste Disposal (10 CFR Parts 20, 61, 73, and 150)," (RIN 3150-AI92), Draft Document prepared for ACRS Subcommittee Meeting, December 2023 (ML23348A348).
4. U.S. Nuclear Regulatory Commission, "Disposal of Greater-Than-Class C (GTCC) and Transuranic Waste," Draft Regulatory Basis for Public Comment," (RIN 3150-AK00) (NRC Docket ID: NRC-2017-0081), July 2019 (ML19059A403).
5. U.S. Nuclear Regulatory Commission, "Guidance for Conducting Technical Analyses for 10 CFR Part 61," NUREG-2175, Revision 1, Draft Document prepared for ACRS Subcommittee Meeting, December 2023 (ML23348A367).
6. U.S. Nuclear Regulatory Commission, "Response to Advisory Committee on Reactor Safeguards Regarding Review of SECY-16-0106, Proposed Final Rule 10 CFR Part 61, 'Low-Level Radioactive Waste Disposal'," December 19, 2016 (ML16341A837)
7. Advisory Committee on Reactor Safeguards, "Review of SECY-16-0106, Proposed Final 10 CFR Part 61, 'Low-Level Radioactive Waste Disposal'," November 14, 2016 (ML16312A400).
8. U.S. Nuclear Regulatory Commission, Staff Requirements-SECY-15-0094, "Historical and Current Issues Related to Disposal of Greater-Than-Class C Low-Level Radioactive Waste," December 22, 2015 (ML15356A623).
9. Advisory Committee on Reactor Safeguards, "10 CFR Part 61 - Revisions to Low-Level Radioactive Waste Disposal Requirements," February 19, 2014 (ML14041A152).
10. Advisory Committee on Reactor Safeguards, "Revisions to Low-Level Radioactive Waste Disposal Requirements (10 CFR Part 61)," July 10, 2013 (ML13203A078).
11. Advisory Committee on Reactor Safeguards, "Proposed Rulemaking to Introduce a Site-Specific Performance Assessment and Human Intrusion Analysis Requirement to 10 CFR Part 61," September 22, 2011 (ML11256A191).
12. Advisory Committee on Reactor Safeguards, "Status of Staff Rulemaking Efforts for Depleted Uranium and Other Unique Waste Streams," March 18, 2010 (ML100760264).

February 26, 2024

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